

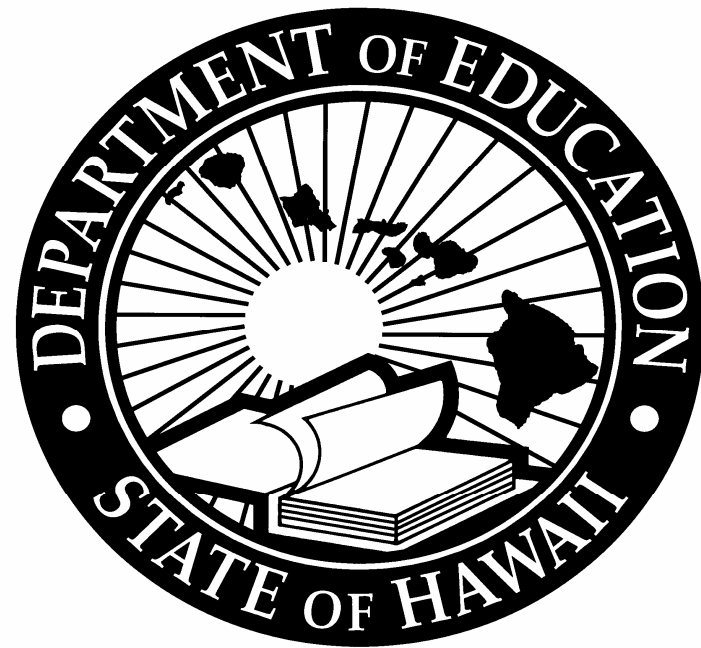
# Hawaii Content and Performance Standards *for Science*

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Office of Curriculum, Instruction and Student Support /  
Instructional Services Branch

Department of Education  
State of Hawaii

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## THE HAWAII STANDARDS SYSTEM

### FOREWORD

The Hawaii Standards System supports standards-based education through curriculum, instruction and assessment components. The Hawaii Standards System supports school level implementation of standards-based education by:

- Identifying the targets for student learning such as the Vision of the Public School Graduate, General Learner Outcomes, the Hawaii Content and Performance Standards III, and other course standards;
- Providing curricular and behavioral support for students through direct services to students and their families; and
- Developing, acquiring, and assuring access to support for implementation of standards-based education for teachers, school leaders, and other academic staff.

An essential component of the Hawaii Standards System is the Hawaii Content and Performance Standards III (HCPS III) document which contains:

- Essential content and skills in *nine* content areas: Career and Technical Education, Fine Arts, Health, Language Arts, Math, Physical Education, Science, Social Studies, and World Languages;
- Standards that describe the educational expectations for ALL students in grades K-5;
- Essential standards for all required courses in the *four core* areas: Language Arts, Math, Science, and Social Studies; and
- Essential standards that can be met through elective courses chosen by secondary students to fulfill graduation requirements in the *five extended core* areas: Career and Technical Education, Fine Arts, Health, Physical Education, and World Languages.

Included in the Hawaii Standards System are standards for courses not found in this HCPS III document. These standards may be found in HCPS II and will be identified in a future version of the Approved Courses and Code Numbers (ACCN) course descriptions. Because ALL courses are standards-based, these specialized courses utilize:

- Industry or national standards that describe essential content and skills for elective courses in areas such as Career and Technical Education and Fine Arts; and
- Content area-specific standards found in HCPS II.

The system also provides student instructional support components such as Special Education and English for Second Language Learners. It also includes student and family support components such as Pihana Na Mamo and Parent Community Network Coordinators.

## **THE GENERAL LEARNER OUTCOMES**

Equally important to learning academic content is developing the knowledge, skills and attitudes that all students need in order to lead full and productive lives. The six General Learner Outcomes serve as the essential, overarching goals for all of the content and performance standards. These Outcomes are

- The ability to be responsible for one's own learning
- The understanding that it is essential for human beings to work together
- The ability to be involved in complex thinking and problem solving
- The ability to recognize and produce quality performance and quality products
- The ability to communicate effectively
- The ability to use a variety of technology effectively and ethically

These Outcomes must be an integral part of teaching and learning and the heart of every Hawaii classroom. Teachers of all subjects in all grades must contribute to the development of the General Learner Outcomes while promoting the learning of subject matter as well.

The real test of the standards is their ability to improve student learning. Raising expectations is but the first step; it's what we do with the standards—how we realize them in all classrooms for all students—that will determine whether we can fulfill the Department's vision of graduating students who

- realize their individual goals and aspirations;
- possess the attitudes, knowledge and skills necessary to contribute positively and compete in a global society;
- exercise the rights and responsibilities of citizenship; and
- pursue post-secondary education and/or careers without need for remediation.

### HAWAII CONTENT AND PERFORMANCE STANDARDS III

The publication of the report *A Nation at Risk* (National Commission on Excellence in Education, 1983) served as the impetus for the standards movement in American education. Subsequently national content area organizations developed standards in their respective areas. Nationally, standards serve three general purposes: 1) To clarify expectations for students, 2) To raise those expectations, and 3) To provide common targets that help assure equitable educational expectations, opportunities, and experiences for all students. These three purposes form the foundation of Hawaii's educational standards and standard-based education.

In Hawaii the effort to clarify and implement standards-based education is now in its third generation. The chronology below describes the evolution of the Hawaii Content and Performance Standards.

- 1991 The Hawaii State Legislature created the Hawaii Commission on Performance Standards. The commission is composed of community members as well as a few DOE staff members. Their mission is to: (1) set the performance standards of achievement expected of all public school students, (2) recommend the means to assess student attainment of these standards, and (3) develop a school-by-school implementation model.
- 1994 The Commission published the Hawaii Content and Performance Standards (commonly known as the "Blue Book").
- 1994 The Hawaii State Legislature created the Performance Standards Review Commission (PSRC) to be convened beginning in the 1997-98 school year and every four years thereafter to assess the effectiveness of Hawaii's standards-based education implementation. The Review Commission findings suggested that the number of standards might be unwieldy for teachers to implement and recommended that HCPS be reformatted to be more user friendly.
- 1998 The booklet "Making Sense of Standards" and the ten content area documents that constituted the HCPS II were the result of the Review Commission's recommendations of 1994
- 1999 The Council for Basic Education conducted a conference to identify the key issues related to the implementation of the Hawaii Content and Performance Standards in a standards-based system.
- 2002 The Review Commission was again convened to consider implementation of the standards and to review the quality of the standards themselves.
- 2003 In response to the Review Commission report and input from the teacher field, the Instructional Services Branch and McREL (Mid-continent Research for Education and Learning) worked to identify *essential* and *desirable* standards, benchmarks, and performance indicators.
- 2004 The DOE begins refinement of HCPS II. This new standards document will be known as HCPS III.
- 2005 Between April and August Hawaii Content and Performance Standards III for nine content areas were approved by the Board of Education.
- 2006-07 Full implementation of HCPS III. HCPS III will be used as the basis of standards-based large-scale assessments, standards-based report cards, and standards-based course descriptions.

## **GENERAL GUIDELINES AND PRINCIPLES FOR THE DEVELOPMENT OF THE HAWAII CONTENT AND PERFORMANCE STANDARDS III**

### **PURPOSES OF THE HAWAII CONTENT AND PERFORMANCE STANDARDS III**

1. To assure equity by holding all students to the same expectations
2. To help schools improve student performance and meet Annual Yearly Progress
3. To define the content and skills that enable quality student performance
4. To reduce the number of standards to be more manageable and to clearly describe what ALL students should know and be able to do
5. To provide clearer focus on instructional targets by providing basic guidance in determining the quality of student work through benchmark rubrics
6. To provide a clear focus on assessment targets by providing sample performance assessments that can guide more specific assessment tasks at the classroom level

### **RATIONALE FOR REVISING**

Recommendations for the revision of HCPS II came from many sources. As mentioned above, in 2002 the Hawaii State Performance Standards Review Commission cited the following major criticisms of the original HCPS:

- Too many standards
  - HCPS had 1544
  - HCPS II had only 139 standards but 3,960 benchmarks and grade level performance indicators
- Lack of a strong connection between the standards and their purpose—the General Learner Outcomes
- Lack of clarity and coherence in the wording of the standards
- Lack of classroom assessment models or a general plan for assessing the HCPS

Despite the fact that HCPS II reduced the number of standards from 1544 to 139 teachers still felt there were still too many benchmarks and grade level performance indicators to implement at the classroom level. This led to the involvement of the Mid-continent Research for Education and Learning (McREL). McREL is one of ten regional educational laboratories that make up the Regional Educational Laboratory System, which serves education agencies and schools across the nation. McREL staff have done extensive work with standards and are at the forefront of standards-based education. McREL worked with DOE curriculum specialists to:

- Calculate the time required to achieve standards and the identification of essential and desirable standards, benchmarks, and performance indicators. This activity was conducted with teachers in each content area and grade level.
- Consider the time available in the school day was also calculated based on the focus of the grade level cluster (such as developing literacy in the early grades) and the time allowed within required courses at the secondary levels when developing standards and particularly grade level benchmarks.

### **SPECIFICATIONS FOR HCPS III STANDARDS DEVELOPMENT**

The following specifications were followed in the development of HCPS III standards. These principles guided each phase of the process and served to keep the focus on students. McREL staff analyzed the essential HCPS II standards against national and other state standards, and the DOE content specialists worked with teachers to assure the comprehensiveness of the standards. This was particularly important in areas where there were no other documents to use as comparison (such as Hawaiian history or native languages). The following were the guidelines used in developing the HCPS III standards, grade-level benchmarks, sample performance assessments, and rubric statements.

- Essential standards, benchmarks and performance indicators were used as the foundation for the HCPS III standards.
- As the new standards statements were developed, they were also compared against national standards and other highly regarded state’s standards.
- Analysis of the standards led to the elimination of overlaps and/or redundancies within and between content areas.
- Consistent grain size (benchmarks that were of approximately the same instructional size)
- Standards, benchmarks, sample performance assessments, and rubrics were written in plain language, understandable to primary audience (teachers) and secondary audiences (students and parents).
- Benchmarks were written as describing “proficient.” Attention was paid to the taxonomic level of the benchmarks so that they would appropriately scaffold and challenge students.
- Implementable—The benchmarks were written with consideration of the delivery of instruction (integrated elementary curriculum, required and elective courses at the secondary level)
- Benchmarks and sample performance assessments were written to be measurable through the examination of student work from which valid inferences about student learning could be made

## **HCPS III: STANDARDS FOR ALL STUDENTS**

The Hawaii Content and Performance Standards III describe educational targets in all nine content areas for ALL students in grades K-5. All students, therefore, are expected to be given the opportunity to meet all of the K-5 HCPS III standards. At the secondary level, however, the standards describe different things in different content areas. For the four CORE content areas (Language Arts, Mathematics, Science and Social Studies) the standards describe expectations for all students, since all students are expected to take certain required courses in these areas. For the *extended core* (Health, Physical Education, Fine Arts, World Languages, and Career and Technical Education) they describe a continuum that should be expected by students who choose courses in these areas as electives. It should be emphasized that ALL courses, required or elective, are standards-based and are part of the *Hawaii Standards System*.

### **CHARACTERISTICS OF GRADES K-2: ACQUIRING THE FOUNDATIONAL SKILLS**

In the primary grades (K-2) the standards identify foundational content and skills. Instruction supports the acquisition of these very important skills, knowledge, and content. Children at these grade levels should be exposed to meaningful activities that support language and vocabulary development. Scaffolding learning is essential. Creating many varied opportunities to learn, practice and demonstrate skills is the focus of early elementary education. Teaching is structured and learning takes place in a more controlled, systematic context. As they learn and mature, children become increasing independent of the teacher.

### **CHARACTERISTICS OF GRADES 3-5 STANDARDS: BUILDING UPON FOUNDATIONAL SKILLS AND KNOWLEDGE**

At the upper elementary levels (grades 3-5) curriculum focuses on refining, broadening, enhancing, and applying skills and knowledge in more challenging and varied contexts. Students use the foundational skills, processes, and knowledge they gained in their early elementary experience to extend and apply in all the nine content areas.

### **CHARACTERISTICS OF GRADES 6-8 STANDARDS: EXPLORING AND DEVELOPING INTERESTS**

At the middle school level standards are designed to allow students to explore a variety of content and skills. This exploration can serve to focus curricular choices students make at the high school and post-secondary levels. There is an emphasis on refining and applying skills to more challenging and varied content. Higher order thinking and the development of civic mindedness is supported through the curriculum as guided by the standards. Students are encouraged to explore specialized content through world languages, art, or music and to use increasingly sophisticated means of communicating their learning through various computer applications.

### **CHARACTERISTICS OF GRADES 9-12 STANDARDS: PREPARING FOR POST-SECONDARY CHOICES**

Standards at the high school level prepare students to apply their learning in their post-secondary choices. They allow students to develop skills that will ensure their success in their adult lives including their participation in the larger global society. HCPS III standards of the CORE content areas (Language Arts, Math, Science, and Social Studies) describe the minimal content of courses that fulfill graduation requirements. HCPS III standards

of the Extended Core (Career and Technical Education, Fine Arts, Health, Physical Education, and World Languages) describe essential standards that can be fulfilled through elective courses of study. As students make elective course choices, they experience a well-rounded educational experience. HCPS Course Standards (to be described in another document) describe courses that some students may elect to take. These courses contain standards that allow students to develop knowledge and skills related to their interests, their talents, their post-secondary and/or career plans.

#### **ORGANIZATION OF THE STANDARDS (GENERAL DESCRIPTION)**

HCPS III standards are organized in a similar way for all nine content areas. Some of the content areas continue to organize their standards in grade level clusters. This is because, for content areas such as Physical Education, it is more developmentally appropriate to allow several years to achieve the benchmark, rather than to artificially break up physical skills into too discrete pieces that do not make sense instructionally. HCPS III are organized by and contain:

**Strand**=themes or “Big Ideas” that organize standards

**Standard** = a broad statement of what a student needs to know or be able to do

**Topic** = organizes the benchmarks into related ideas

**Benchmark** = a specific statement of what a student should know or be able to do (related to the topic) at a specific grade level or grade level cluster

**Sample Performance Assessment** = a generalized description of how a student might demonstrate significant aspects of the benchmark

The statement “No benchmark at this level” indicates that a grade level benchmark could not be created because it was either developmentally or instructionally inappropriate. The grade level/discipline at which a benchmark appears is where it may be assessed, but it is NOT the only grade level/discipline at which it should be taught. It is assumed, for example, that once content or a skill is taught it is reinforced and further developed in subsequent years. Benchmarks are not repeated.



## THE STANDARDS NUMBERING SYSTEM

Each benchmark is assigned a code as an aid to identify quickly its place in relation to the entire document, and as a placeholder for database purposes. By convention, the code consists of three positions, each separated by a decimal point: E.g., **K.3.1**

Example: K.3.1

K.3.1 = Grade Level (Kindergarten) Clusters as appropriate (e.g., K-2.3.1)

K.3.1 = Content Standard Number (Standard #3)

K.3.1 = Benchmark Number (1st listed benchmark)

Example: PS.7.3

PS.7.3 = Course Abbreviation (Physical Science)

PS.7.3 = Content Standard Number (Standard #7)

PS.7.3 = Benchmark Number (3rd listed benchmark)

With the release of HCPS III, we continue the important journey begun a decade ago: to assure a quality education for every student in our public schools. This challenging task requires that we re-examine teaching and learning, that we reconsider curriculum, assessment, and instruction. To succeed in this task, we must implement HCPS III with both rigor and relevance, always keeping our ultimate goal firmly in mind: to improve student understanding.

# SCIENCE

## INTRODUCTION

### THE SPIRIT OF SCIENCE

The Spirit of Science progresses  
By asking questions and looking for precise answers.  
This spirit has enriched our human experience  
And opens new possibilities for thought and action.  
We want to pass on the Spirit of Science to the next generation,  
Making the bond between science and ourselves  
A bond between ourselves and the Future.

– The Epic of Man and Science  
IBM Japan Pavilion, Tsukuba Expo ‘85

### THE THRILL AND EXCITEMENT OF WONDER AND DISCOVERY

Science is important for all students to learn and do because of the need to maintain and improve the quality of life. In order to accomplish this, students need to understand the connection between oneself, other living things, the world around them and the Universe beyond. Science offers students (and humans in general) a powerful tool (scientific inquiry) and knowledge (biological, physical, and earth-space sciences) to answer their questions and satisfy their curiosities.

### WHY IS SCIENCE A CORE AREA?

Scientific thinking, applying inquiry and its rules (Habits of the Mind), makes it possible for everyone to share in the richness and excitement of understanding the natural and built world. Everyone can use scientific principles and processes in making personal decisions and participate in discussion and decisions that affect society. A sound grounding in science provides the foundation for many of the skills that people use every day, such as: problem solving creatively, thinking critically, working cooperatively in teams, and using technology effectively. Additionally, economic productivity of our society is intimately linked to the scientific and technological skills of our work force.

## **GOALS OF SCIENCE EDUCATION: SCIENCE EDUCATOR GOALS AND PHILOSOPHY**

### **GOALS**

Science Education aims to develop basic scientific literacy for all students so that they have the skills and knowledge to maintain and improve the quality of their lives. The goal is not necessarily for every student to become a scientist. Those who intend to pursue a science-based career need to go beyond these standards. The Goals of Science Education are:

- Understand and apply the processes, ways of thinking and dispositions that humans have while investigating Nature and the physical world.
- Understand and apply current knowledge about the world around us to satisfy our curiosities and enhance our daily lives.

### **PHILOSOPHY**

We believe that:

- Science is for all students.
- The “Spirit of Science” is innate in every student which moves them to pursue personal curiosities and actively seek answers to their wonderings.
- Students foster the scientific endeavor by asking relevant and significant questions and seeking precise answers to those questions.
- Science is basic to the students’ perception and understanding of their world.

The goal is for all students to use their scientific knowledge and skills to make decisions that maintain and improve the quality of their lives and the lives of all organisms on Earth.

## HCPS III AND II SCIENCE COMPARISON

HCPS III	HCPS II D = Domain; S = Standard
<p><b>Standard 1: SCIENTIFIC INVESTIGATION</b> Discover, invent, and investigate using the skills necessary to engage in the scientific process</p>	<p>D1.S1: Doing Scientific Inquiry D1.S4. Doing Safety D2.S1. Understanding Scientific Inquiry and the Character of Scientific Knowledge</p>
<p><b>Standard 2: NATURE OF SCIENCE</b> Understand that science, technology, and society are interrelated</p>	<p>D1.S3: Using Unifying Concepts and Themes D1.S5. Relating the Nature of Technology to Science D2.S2. Interdependence of Science, Technology, and Society D2.S3. Malama I Ka Aina: Sustainability</p>
<p><b>Standard 3: ORGANISMS AND THE ENVIRONMENT</b> Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment</p>	<p>D2.S4. Unity and Diversity D2.S5. Interdependence D2.S6. Cycle of Matter and Energy Flow</p>
<p><b>Standard 4: STRUCTURE AND FUNCTION IN ORGANISMS</b> Understand the structures and functions of living organisms and how organisms can be compared scientifically</p>	<p>D2.S4. Unity and Diversity D2.S9. Cells, Tissues, &amp; Organs</p>
<p><b>Standard 5: DIVERSITY, GENETICS, AND EVOLUTION</b> Understand genetics and biological evolution and their impact on the unity and diversity of organisms</p>	<p>D2.S4. Unity and Diversity D2.S7. Biological Evolution D2.S8. Heredity</p>
<p><b>Standard 6: NATURE OF MATTER AND ENERGY</b> Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</p>	<p>D2.S13. The Nature of Matter D2.S14. Energy, Its Transformation and Matter D2.S15. Forces, Motion, Sound and Light</p>
<p><b>Standard 7: FORCE AND MOTION</b> Understand the relationship between force, mass, and motion of objects; and know the major natural forces: gravitational, electric, and magnetic</p>	<p>D2.S15. Forces, Motion, Sound and Light D2.S17. Forces of the Universe</p>
<p><b>Standard 8: EARTH AND SPACE SCIENCE</b> Understand the Earth and its processes, the solar system, and the universe and its content</p>	<p>D2.S16. The Universe D2.S18. Earth in Solar System D2.S19. Forces that Shape Earth</p>

**NOT INCLUDED IN HCPS III:**

- D1.S2 – Living the Values, Attitudes, and Commitment of the Inquiring Mind (Covered by General Learner Outcomes)
- D2.S10 – Human Development (Covered by Health Education)
- D2.S11 – Wellness (Covered by Health Education)
- D2.S12 – Learning and Human Behavior (Covered by Health Education)

**ADDED FEATURES TO HCPS III**

The scope of the HCPS III has therefore been narrowed so that teachers can focus and set priorities in their instruction and ultimately student learning. Other features include:

1. Rubrics: In order to address the question, “What does quality work look like,” a four-level rubric is provided for each benchmark.
2. Focus on content and skills: Items which were instructional in nature were deleted.
3. Discipline benchmarks: Benchmarks are organized by discipline areas at the high school level.

**HCPS III SCIENCE STANDARDS: ORGANIZATION OF THE SCIENCE STANDARDS**

The grade progression in the science standards goes from kindergarten through grade 8. At the high school level, the standards are categorized into 3 areas: Physical Sciences, Biological Sciences, and Earth-Space Sciences:

Kindergarten	Grade six
Grade one	Grade seven
Grade two	Grade eight
Grade three	Physical Sciences
Grade four	Biological Sciences
Grade five	Earth-Space Sciences

There are eight (8) standards for science. The standards and benchmarks are organized by grade level (Kindergarten through grade 8) and by disciplines in the high schools (physical, biological, and Earth-space sciences). This facilitates the classroom teacher’s efforts by identifying grade level/discipline content and skills that are the basis for appropriate curricula, instructional strategies, and assessment. These standards are not a curriculum. They provide goals and expectations for schools to design a school-wide science curriculum and for teachers to design their own classroom curriculum. It focuses the selection and implementation of appropriate instructional materials and strategies.

The statement “No benchmark at this level” indicates that a grade level benchmark could not be created because it was either developmentally or instructionally inappropriate. The grade level/discipline at which a benchmark appears is where it may be assessed, but it is NOT the only grade level/discipline at which it should be taught. It is assumed, for example, that once content or a skill is taught it is reinforced and further developed in subsequent years. There is a need to look at the student’s total education (K-12) to determine what his/her needs are and plan accordingly to ensure that all students will achieve the standards. For example, the benchmarks for Standard 1 generally focus on one part of the entire inquiry process at each grade level. Teachers should remember that they need to teach the entire inquiry process and focus on the grade level benchmark for assessment.

Benchmarks are not repeated. Grade level appropriate skills scaffold and combine with previously learned content and skills to allow students to achieve at higher and higher taxonomic levels.

#### **STANDARDS AT A GLANCE**

The following is an overview of the Science Content Standards. Listed in the chart are the 3 major strands, 8 science standards and the major topics for each standard.

## SCIENCE CONTENT STANDARDS – AT A GLANCE

STRAND	SCIENCE STANDARDS/TOPICS
<b>THE SCIENTIFIC PROCESS</b>	<p><b>Standard 1: SCIENTIFIC INVESTIGATION</b> Discover, invent, and investigate using the skills necessary to engage in the scientific process</p> <ul style="list-style-type: none"> <li>• Scientific Inquiry</li> <li>• Scientific Knowledge</li> </ul>
	<p><b>Standard 2: NATURE OF SCIENCE</b> Understand that science, technology, and society are interrelated</p> <ul style="list-style-type: none"> <li>• Science, Technology, and Society</li> <li>• Unifying Concepts and Themes</li> </ul>
<b>LIFE AND ENVIRONMENTAL SCIENCES</b>	<p><b>Standard 3: ORGANISMS AND THE ENVIRONMENT</b> Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment</p> <ul style="list-style-type: none"> <li>• Cycles of Matter and Energy</li> <li>• Interdependence</li> </ul>
	<p><b>Standard 4: STRUCTURE AND FUNCTION IN ORGANISMS</b> Understand the structures and functions of living organisms and how organisms can be compared scientifically</p> <ul style="list-style-type: none"> <li>• Classification</li> <li>• Cells, Tissues, Organs, and Organ System</li> </ul>
	<p><b>Standard 5: DIVERSITY, GENETICS, AND EVOLUTION</b> Understand genetics and biological evolution and their impact on the unity and diversity of organisms</p> <ul style="list-style-type: none"> <li>• Unity and Diversity</li> <li>• Heredity</li> <li>• Biological Evolution</li> </ul>

<b>STRAND</b>	<b>SCIENCE STANDARDS/TOPICS</b>
<b>PHYSICAL, EARTH, AND SPACE SCIENCES</b>	<p><b>Standard 6: NATURE OF MATTER AND ENERGY</b>            Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</p> <ul style="list-style-type: none"> <li>• Nature of Matter</li> <li>• Waves</li> <li>• Energy and Its Transformation</li> </ul>
	<p><b>Standard 7: FORCE AND MOTION</b>            Understand the relationship between force, mass, and motion of objects; and know the major natural forces: gravitational, electric, and magnetic</p> <ul style="list-style-type: none"> <li>• Forces and Motion</li> <li>• Forces of the Universe</li> </ul>
	<p><b>Standard 8: EARTH AND SPACE SCIENCE</b>            Understand the Earth and its processes, the solar system, and the universe and its content</p> <ul style="list-style-type: none"> <li>• Forces That Shape the Earth</li> <li>• Earth Materials</li> <li>• Earth in the Solar System</li> <li>• The Universe</li> </ul>



### HCPS III SCIENCE: GRADE LEVEL BENCHMARK COUNTS BY STANDARDS

<b>Strand</b>	<b>Content Standard</b>	<b>K</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>P.S.</b>	<b>B.S.</b>	<b>E.S.</b>
<b>The Scientific Process</b>	<b>Standard 1: SCIENTIFIC INVESTIGATION</b>	3	2	2	2	2	2	2	3	2	9	9	9
	<b>Standard 2: NATURE OF SCIENCE</b>	1	2	1	1	1	1	2	1	2	2	2	4
<b>Life and Environmental Sciences</b>	<b>Standard 3: ORGANISMS AND THE ENVIRONMENT</b>	1	1	1	1	2	2	1	3			4	
	<b>Standard 4: STRUCTURE AND FUNCTION IN ORGANISMS</b>	1	1	1	1	1	1		4			6	
	<b>Standard 5: DIVERSITY, GENETICS, AND EVOLUTION</b>	1	2	1	1	3	1		6	1		5	
<b>Physical, Earth, and Space Sciences</b>	<b>Standard 6: NATURE OF MATTER AND ENERGY</b>	1	1	1	3	2	3	10		3	12		
	<b>Standard 7: FORCE AND MOTION</b>	1	1	1	1	1	1	2		1	4		
	<b>Standard 8: EARTH AND SPACE SCIENCE</b>	2	1	2	4	3	4			12			10
<b>TOTAL</b>		<b>11</b>	<b>11</b>	<b>10</b>	<b>14</b>	<b>15</b>	<b>15</b>	<b>17</b>	<b>17</b>	<b>21</b>	<b>27</b>	<b>26</b>	<b>23</b>

## AN OVERVIEW OF THE EIGHT SCIENCE STANDARDS

**STANDARD #1: SCIENTIFIC INVESTIGATION** – *students discover, invent, and investigate using the skills necessary to engage in the scientific process*

Scientific investigation is about the wonder of discovery, the pride of invention, and the satisfaction of increasing knowledge about the world. Students use science inquiry skills that are part of a process to answer a question or satisfy a curiosity. These steps or skills help students understand and support their discoveries.

The Scientific inquiry process includes the following skills:

- use senses to make accurate observations
- ask questions based on their knowledge
- develop hypotheses based on knowledge that can be tested
- design an experimental procedure to verify a hypothesis
- collect, organize, and analyze data or evidence
- formulate and defend conclusions based on data or evidence
- participate in peer review
- understand the importance of ethics and integrity in scientific investigations

**STANDARD #2: THE NATURE OF SCIENCE**– *Understand that science, technology, and society are inter-related*

The scientific process generally results in new knowledge or skills that lead to discoveries and technologies which can affect or influence society. Through the application of GLO #6 (Effective and Ethical User of Technology) these discoveries and technological advances can make our lives and our world better. Without ethics and efficacy, however, scientific discovery can also have devastating negative societal effects.

The scientific process is the method by which we observe, study, and increase knowledge of the natural world. Using the inquiry process in the sciences has helped humankind understand why objects fall to the earth (Physical science), why certain plants are found in deserts (Botany), why steel exposed to oxygen will rust (Chemistry), why cross-pollinating plants can produce predictable results (Biology), and why oil is most likely found near certain rock types (Geology).

Technology is the result of knowledge and experience. Technology allows humankind to create healthier living conditions, develop labor-saving devices, and communicate more effectively. It has improved transportation, manufacturing, construction, and communication. Science and technology have changed people’s attitudes and expectations, affecting society and human interaction. Conversely, society determines the direction for and use of both scientific knowledge and the resultant technology.

The fundamental understandings regarding the Nature of Science are:

- Science, technology and society are inter-related, each affecting the other
- Scientific knowledge and skills are gathered through the inquiry process
- Technology is the result of science knowledge and skills
- Society dictates the uses of scientific knowledge and skills as well as technology

**STANDARD #3: ORGANISMS AND THE ENVIRONMENT** – *Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment.*

This standard focuses on the interdependence between organisms and the relationship(s) between living things and their environment. All organisms interact with other organisms in a variety of ways and they all depend on their environment and other living things to survive.

Some essential ideas contained in this standard and taught throughout the K-12 continuum are:

- organisms and the environment
- unity, diversity, and interrelationships (interdependence)
- cycles of matter and energy

**STANDARD #4: STRUCTURE AND FUNCTION IN ORGANISMS**– *Understand the structures and functions of living organisms and how organisms can be compared scientifically.*

This standard focuses on the building blocks (or parts) of organisms and how these parts maintain life. One of the most important concepts in this standard is “all living things are made of one or more cells.” Ultimately, all functions, including reproduction, occur at the cellular level, though other levels of organization are important in multi-cellular organisms. In addition, this standard includes the concept of classification (how organisms are related and therefore grouped together).

The key concepts in this standard are:

- structure as it relates to function (at all levels of organization)
- cell structure, function(s), and specialization
- modern classification system

**STANDARD #5: DIVERSITY, GENETICS AND EVOLUTION** – *Understand genetics and biological evolution and their impact on the unity and diversity of organisms.*

Standard 5 deals with the role DNA plays in determining the structure and function of cells and organisms, how genetics (DNA) relates to the passing of traits to offspring and how the process of evolution leads to organisms changing over time. Ultimately, this change in organisms affects the interrelationship between organisms and between organisms and their environment. In one sense, this standard, Diversity, Genetics, And Evolution, explains the mechanisms that underlie both standards 3 and 4.

The essential ideas in this standard are:

- DNA structure and function at a cellular level
- Role of DNA in reproduction and heredity
- Theory of Evolution

**STANDARD #6: NATURE OF MATTER AND ENERGY** – *Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe.*

The universe is made of matter and energy. The interaction of matter and energy determines the structure of the universe. Matter is usually found in the physical states of solid, liquid, or gas. The state matter takes is determined by its chemical and physical properties, and by how much energy it has. Physical and chemical properties are observable characteristics of substances. Matter can undergo physical changes and chemical reactions that can be predicted by the organization of atomic structure and reaction patterns.

Energy is the ability to change matter (form, properties or position) or transform itself. There are many forms of energy such as electrical, chemical, light, sound, nuclear, and heat. Waves are a disturbance and can transmit or carry energy through matter or space, but do not transport matter. Energy can be transformed from one form to another such as radiant energy (light) to electrical energy. As energy is used and changed, it eventually transforms into heat that is scattered. The total amount of matter and energy in the universe is constant. This means that matter and energy in the universe are conserved.

The key concepts in this standard are:

- physical and chemical properties of matter
- physical and chemical changes of matter
- different forms of energy
- transformation, transfer, and transmittal of energy
- conservation of matter and energy

**STANDARD #7: FORCE AND MOTION** – *Understand the relationship between force, mass and motion of objects; major natural forces: gravitational, electrical, and magnetic*

This standard is all about forces and how they change the motion of objects. To change the motion of an object with mass, a force must be applied. Forces affect the motion of everything in the universe and they can act over long distances, but they also weaken dramatically with increasing distance. The three major natural forces are gravitational, electrical, and magnetic. Gravitational force is exerted by all objects with mass and is the weakest force because a lot of mass is required before its effect is noticed. It is the primary force that governs the motion of bodies such as stars, planets and galaxies in the universe and is an attracting or pulling force. Electrical force is strong and generated by charged objects. Magnetic force is also strong and related to electrical forces. Both electrical and magnetic forces attract or repel; they can push or pull.

The key concepts in this standard are:

- forces change the motion of objects
- the applied force and mass determine the amount of change in motion
- forces can affect motion over distance
- three major natural forces: gravitational, electrical, and magnetic

**STANDARD #8: EARTH AND SPACE SCIENCE** – *Understand the Earth and its processes, the solar system, and the universe and its content*

The earth is a self-contained world where all matter is recycled. Chemical and physical processes are the bases for the earth's cycles, such as the water cycle, carbon cycle, and rock cycle. These cycles interact between the earth's land, air, water, and interior to produce rocks, mountains, winds, waves, currents, volcanoes, and earthquakes that help shape the Earth. The relative positions of the Earth, moon, and sun also help to shape the Earth as they cause changes in the seasons and changes in the climate and weather locally and globally. By understanding these processes and cycles and their interactions, humankind can learn how to live effectively and safely as a part of our dynamic planet.

Planet earth is one of many planets, moons, asteroids, and comets that revolve around a solitary star – the sun. This group of objects and the sun make up the solar system. Billions of solar systems and stars form a galaxy. Our solar system is part of the Milky Way galaxy. Billions of galaxies and other objects, such as quasars, have been found far beyond our galaxy using telescopes and other instruments. Current knowledge and theories of the earth, sun, solar system, and universe are the products of improved technology.

The key concepts in this standard are:

- The Earth functions as a self-contained world (a closed system).
- Matter and energy cycles within the earth's systems to produce forces that shape the surface of the earth.

- The origin and evolution of the solar system
- Theories about the origin of the universe
- The physical and nuclear dynamics of a star

## Summary of Standards for Science, Kindergarten – 12<sup>th</sup> Grade

### THE SCIENTIFIC PROCESS

**Standard 1: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process**

**Standard 2: NATURE OF SCIENCE—Understand that science, technology, and society are interrelated**

### LIFE AND ENVIRONMENTAL SCIENCES

**Standard 3: ORGANISMS AND THE ENVIRONMENT—Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment**

**Standard 4: STRUCTURE AND FUNCTION IN ORGANISMS—Understand the structures and functions of living organisms and how organisms can be compared scientifically**

**Standard 5: DIVERSITY, GENETICS, AND EVOLUTION—Understand genetics and biological evolution and their impact on the unity and diversity of organisms**

### PHYSICAL, EARTH, AND SPACE SCIENCES

**Standard 6: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe**

**Standard 7: FORCE AND MOTION—Understand the relationship between force, mass, and motion of objects; and know the major natural forces: gravitational, electric, and magnetic**

**Standard 8: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its content**





**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Kindergarten*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC INQUIRY	SC.K.1.1 Use the senses to make observations		The student: Uses the five senses (i.e., sight, smell, hearing, touch, and taste) to make observations about objects and events.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Use appropriate senses to make detailed observations on what is actually observed	Use appropriate senses to make observations on what is actually observed	Use the senses to make limited observations on what is observed	Use the senses to make observations that are inaccurate or inferred
SCIENTIFIC INQUIRY	SC.K.1.2 Ask questions about the world around them		The student: Asks questions about objects, organisms, events, places, or relationships in the environment.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Consistently ask relevant questions about the world around them	Usually ask relevant questions about the world around them	Sometimes ask questions, with assistance, about the world around them	Rarely ask questions, even with assistance, about the world around them

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Kindergarten*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC INQUIRY	SC.K.1.3 Collect data about living and non-living things		The student: Participates in (group) data collection.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Collect detailed and relevant data about living and non-living things	Collect relevant data about living and non-living things	Collect data about living and non-living things, some of which may not be relevant	Collect information, most of which is not relevant or understandable

<b>Standard 2: The Scientific Process: NATURE OF SCIENCE—Understand that science, technology, and society are interrelated</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENCE, TECHNOLOGY, AND SOCIETY	SC.K.2.1 Identify different types of technologies at home, in the classroom, and/or in the world		The student: Identifies examples of technologies that exist at home, in the classroom, and/or in the world (e.g., knife, pencil, computer, pencil sharpener, refrigerator).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Identify and explain examples of technology at home, in the classroom, and/or in the world	Identify different types of technologies at home, in the classroom, and/or in the world	Provide limited examples of technologies at home, in the classroom, and/or in the world	Recognize, with assistance, examples of technologies at home or in the classroom

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Kindergarten*

<b>Standard 3: Life and Environmental Sciences: ORGANISMS AND THE ENVIRONMENT—Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
INTERDEPENDENCE	SC.K.3.1 Identify similarities and differences between plants and animals		The student: Identifies ways that plants and animals are similar and different and records observations as a group.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Describe detailed similarities and differences between plants and animals	Identify similarities and differences between plants and animals	Recognize a few similarities and differences between plants and animals	Recognize, with assistance, some obvious similarities and differences between plants and animals

<b>Standard 4: Life and Environmental Sciences: STRUCTURE AND FUNCTION IN ORGANISMS—Understand the structures and functions of living organisms and how organisms can be compared scientifically</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
CLASSIFICATION	SC.K.4.1 Identify differences between living and non-living things		The student: Lists ways that living and non-living things are different (e.g., plants, animals, rocks, water).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Describe detailed differences between living and non-living things	Identify significant differences between living and non-living things	Identify a few differences between living and non-living things	Name examples of living and non-living things

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Kindergarten*

**Standard 5: Life and Environmental Sciences: DIVERSITY, GENETICS, AND EVOLUTION—Understand genetics and biological evolution and their impact on the unity and diversity of organisms**

TOPIC	BENCHMARK	SAMPLE PERFORMANCE ASSESSMENT		
HEREDITY	SC.K.5.1 Identify ways in which some offspring are very much like their parents, although not exactly	The student: Names ways in which parents and their offspring are similar, although not exactly (e.g., body features, color).		
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Describe, in detail, how some offspring are very much like and different from their parents	Identify ways some offspring are very much like their parents, although not exactly	Identify obvious ways some offspring are very much like their parents	Recall that some offspring are very much like their parents

**Standard 6: Physical, Earth, and Space Sciences: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe**

TOPIC	BENCHMARK	SAMPLE PERFORMANCE ASSESSMENT		
NATURE OF MATTER	SC.K.6.1 Classify objects by their attributes (e.g., physical properties, materials of which they are made)	The student: Sorts objects by the materials of which they are made (e.g., wood, cloth, metal, plastic, paper) and their physical properties (e.g., size, color, shape, weight).		
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Identify the attributes by which a collection of objects can be classified, then classify the objects accordingly	Classify objects by their attributes	With minimal assistance, classify objects by their attributes	With much assistance, classify objects by a few attributes

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Kindergarten*

<b>Standard 7: Physical, Earth, and Space Sciences: FORCE AND MOTION—Understand the relationship between force, mass, and motion of objects; and know the major natural forces: gravitational, electric, and magnetic</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
FORCES AND MOTION	SC.K.7.1 Identify that objects that will fall to the ground unless something is holding them up		The student: Uses a variety of objects to show that things will fall to the ground unless something is holding them up.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Predict situations when different objects will or will not fall to the ground	Identify, with consistency, whether different objects will or will not fall to the ground	Identify, with some consistency, whether different objects will or will not fall to the ground	Identify, inconsistently, whether different objects will or will not fall to the ground

<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
FORCES THAT SHAPE THE EARTH	SC.K.8.1 Report and describe weather changes from day to day and over the seasons		The student: Records daily and seasonal weather changes with simple symbols and describes how the weather changes over time.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Report and describe, in detail, weather changes from day to day and over the seasons and identify weather patterns	Report and describe weather changes from day to day and over the seasons	Provide examples of weather changes from day to day and over the seasons	Give an example of a weather change

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Kindergarten*

<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
THE UNIVERSE	SC.K.8.2 Identify different types of celestial objects seen in the day and night sky		The student: Identifies different types of celestial objects seen in the day and night sky (e.g., sun, moon, stars).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare different types of celestial objects seen in the day and night sky	Identify different types of celestial objects seen in the day and night sky	Name a celestial object seen in the day or night sky	Recall that there are different types of celestial objects in the day or night sky

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 1*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC INQUIRY	SC.1.1.1 Collect, record, and organize data using simple tools, equipment, and techniques safely		The student: Uses simple tools safely (e.g., magnifying glass, balance scales) to make observations about common objects in the classroom and uses simple techniques to record and organize data for analysis.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Collect, record, and organize data accurately, using a variety of simple tools, equipment, and techniques safely	Collect, record, and organize data using simple tools, equipment, and techniques safely	Collect, record, and organize data using simple tools, equipment, or techniques safely, with assistance	Collect, record, and organize data safely, with much assistance
SCIENTIFIC INQUIRY	SC.1.1.2 Explain the results of an investigation to an audience using simple data organizers (e.g., charts, graphs, pictures)		The student: Describes what was investigated, discovered, and learned to classmates, using simple data organizers.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Clearly explain, in detail, the results of an investigation to an audience using data organizers	Explain significant results of an investigation to an audience using simple data organizers	Explain, with assistance, the results of an investigation to an audience	Explain, with much assistance, a part of an investigation to an audience

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 1*

<b>Standard 2: The Scientific Process: NATURE OF SCIENCE—Understand that science, technology, and society are interrelated</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENCE, TECHNOLOGY, AND SOCIETY	SC.1.2.1 Explain why people create technological devices		The student: Gives reasons common devices were invented.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare various reasons people create technological devices	Identify a few technological devices and explain why they were created	Identify, with assistance, a technological device and a reason it was created	Give an example of a technological device
UNIFYING CONCEPTS AND THEMES	SC.1.2.2 Describe a variety of changes that occur in nature		The student: Describes changes that occur in animals, plants, on land, or in the sky.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Describe a variety of changes that occur in nature and the causes for these changes	Describe a variety of changes that occur in nature	Provide a few examples of changes that occur in nature	Recognize that changes occur in nature



**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 1*

<b>Standard 3: Life and Environmental Sciences: ORGANISMS AND THE ENVIRONMENT—Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
CYCLES OF MATTER AND ENERGY	SC.1.3.1 Identify the requirements of plants and animals to survive (e.g., food, air, light, water)		The student: Lists what a selected plant or animal (e.g., cat, fish, orchid) must have to live.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Describe the requirements of plants and animals for survival and well being	Identify the requirements of plants and animals to survive	Identify a few of the requirements of plants and animals to survive	Recognize that plants and animals have requirements for survival

<b>Standard 4: Life and Environmental Sciences: STRUCTURE AND FUNCTION IN ORGANISMS—Understand the structures and functions of living organisms and how organisms can be compared scientifically</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
CLASSIFICATION	SC.1.4.1 Describe how living things have structures that help them to survive		The student: Identifies how the structures of a plant or animal help it to make or obtain food (e.g., in plants-leaves, roots; in animals-sharp teeth, good vision).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare the structures of different living things that help them to survive	Describe how living things have structures that help them to survive	Name, with assistance, a few of the structures of living things that help them to survive	Recall, with assistance, that living things require structures to help them survive

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 1*

**Standard 5: Life and Environmental Sciences: DIVERSITY, GENETICS, AND EVOLUTION—Understand genetics and biological evolution and their impact on the unity and diversity of organisms**

TOPIC	BENCHMARK	SAMPLE PERFORMANCE ASSESSMENT		
HEREDITY	SC.1.5.1 Identify ways in which the same kinds of plants and the same kinds of animals differ	The student: Names differences among the same kinds of plant or same kinds of animal (e.g., differences among roses, dogs, birds).		
	<b>RUBRIC</b>			
	<b>Advanced</b> Describe, in detail, the ways in which the same kinds of plants and the same kinds of animals differ	<b>Proficient</b> Identify ways in which the same kinds of plants and the same kinds of animals differ	<b>Partially Proficient</b> Identify very few ways in which the same kinds of plants and the same kinds of animals differ	<b>Novice</b> Recognize, with assistance, that there are differences between the same kinds of plants and the same kinds of animals
UNITY AND DIVERSITY	SC.1.5.2 Describe the physical characteristics of living things that enable them to live in their environment	The student: Identifies the physical characteristics of living things that enable them to live in their environment (e.g., fish have fins to swim in the water; polar bears have lots of fur to live in the cold; cacti have specialized stems to store water).		
	<b>RUBRIC</b>			
	<b>Advanced</b> Compare the physical characteristics of different living things that enable them to live in their environment	<b>Proficient</b> Describe the physical characteristics of living things that enable them to live in their environment	<b>Partially Proficient</b> Name a few physical characteristics of living things that enable them to live in their environment	<b>Novice</b> Recall, with assistance, that the physical characteristics of living things enable them to live in their environment

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 1*

<b>Standard 6: Physical, Earth and Space Science: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
NATURE OF MATTER	SC.1.6.1 Identify solids, liquids, and gases and their basic properties		The student: Lists the basic properties of solids, liquids, and gases.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Provide examples of solids, liquids, and gases and describe their properties	Identify solids, liquids, and gases and their properties	Provide a few examples of solids, liquids and gases and a property of each	Recognize, with assistance, solids, liquids, and gases

<b>Standard 7: Physical, Earth, and Space Sciences: FORCE AND MOTION—Understand the relationship between force, mass, and motion of objects; and know the major natural forces: gravitational, electric, and magnetic</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
FORCES AND MOTION	SC.1.7.1 Describe how the motion of an object can be changed by force (push or pull)		The student: Explains the motion (change in speed and/or direction) of an object when he or she pushes or pulls that object.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Describe and provide examples of how the motion of an object can be changed by force	Describe how the motion of an object can be changed by force (push or pull)	Identify, with assistance, the motion of an object that is changed by force	Show, with assistance, how the motion of an object can be changed by force

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 1*

<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
THE UNIVERSE	SC.1.8.1 Describe that the sun warms the land, air, and water		The student: Describes the differences in the warmth of land, air, and water in the morning and afternoon or on cloudy and sunny days.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain that the sun warms the land, air, and water and give examples	Describe that the sun warms the land, air, and water	Recall that the sun warms the land, air, and water	Recall, with assistance, that the sun warms the Earth

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 2*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC INQUIRY	SC.2.1.1 Develop predictions based on observations		The student: Makes predictions based on observations about the world around him or her.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Make logical predictions based on justified inferences from observations	Make predictions based on observations	With assistance, make predictions partially based on observations	Make inaccurate predictions or make predictions not based on observations
SCIENTIFIC INQUIRY	SC.2.1.2 Conduct a simple investigation using a systematic process safely to test a prediction		The student: Implements a simple procedure safely to answer a question or test a prediction that relies on careful observations (e.g., collects, records, and organizes data).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Consistently conduct a simple investigation using a systematic process safely to provide a valid test of a prediction	Usually conduct a simple investigation using a systematic process safely to provide a test of a prediction	Sometimes conduct a simple investigation using a systematic process safely to provide a test of a prediction	Rarely conduct a simple investigation using a systematic process safely to provide a test of a prediction

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 2*

<b>Standard 2: The Scientific Process: NATURE OF SCIENCE—Understand that science, technology, and society are interrelated</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
UNIFYING CONCEPTS AND THEMES	SC.2.2.1 Describe changes that have occurred in society as a result of new technologies		The student: Describes the ways society has changed as a result of technology (e.g., the use of the wheel, motor, and electricity).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain the changes that have occurred in society as a result of new technologies, and describe what is common among these changes	Describe a variety of changes that have occurred in society as a result of new technologies	Provide a few examples of changes that have occurred in society as a result of new technologies	Recognize changes that have occurred in society as a result of new technologies

<b>Standard 3: Life and Environmental Sciences: ORGANISMS AND THE ENVIRONMENT—Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
INTERDEPENDENCE	SC.2.3.1 Describe how animals depend on plants and animals		The student: Describes how different animals use plants and animals (e.g., for food, for building nests).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Classify animals based on their dependence on plants and animals	Describe how animals depend on plants and animals	Describe a few of the ways animals depend on plants and animals	Recall that animals depend on plants and animals

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 2*

<b>Standard 4: Life and Environmental Sciences: STRUCTURE AND FUNCTION IN ORGANISMS—Understand the structures and functions of living organisms and how organisms can be compared scientifically</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
CLASSIFICATION	SC.2.4.1 Explain how plants and animals go through life cycles		The student: Illustrates the stages of the life cycles (e.g., germination/birth, growth, reproduction, and death) of various plants and animals, pointing out some details that distinguish each stage.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Classify plants and animals by the details of their life cycles	Explain how plants and animals go through life cycles	Give an example of a plant life cycle and an animal life cycle	Recall that plants and animals go through life cycles

<b>Standard 5: Life and Environmental Sciences: DIVERSITY, GENETICS, AND EVOLUTION—Understand genetics and biological evolution and their impact on the unity and diversity of organisms</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
UNITY AND DIVERSITY	SC.2.5.1 Identify distinct environments and the different kinds of organisms each environment supports		The student: Names different environments (e.g., mountain, rainforest, ocean) and lists different kinds of plants and animals that live there.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare and contrast the distinct environments and the different kinds of organisms they support	Identify several distinct environments and the different kinds of organisms each environment supports	Identify a distinct environment and a few of the organisms that the environment supports	Recall that different environments support different kinds of organisms

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 2*

<b>Standard 6: Physical, Earth and Space Science: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
NATURE OF MATTER	SC.2.6.1 Identify ways to change the physical properties of objects		The student: Provides examples of a variety of techniques to change the properties of objects (e.g., heating, cooling, mixing, tearing, bending).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain how the physical properties of objects can be changed through a variety of techniques	Identify a variety of ways to change the physical properties of object	Identify a few ways to change the physical properties of objects	Recall that there are ways that the physical properties of objects can be changed

<b>Standard 7: Physical, Earth, and Space Sciences: FORCE AND MOTION—Understand the relationship between force, mass, and motion of objects; and know the major natural forces: gravitational, electric, and magnetic</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
FORCES AND MOTION	SC.2.7.1 Identify the properties of magnets		The student: Identifies the properties of magnets (e.g., the attraction to iron, distinct positive and negative poles, attract and repel), using examples to illustrate each property.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Describe, in detail, the properties of magnets and how these properties can be used	Identify several properties of magnets	Give, with assistance, a few examples of how magnets work	Recognize, with assistance, examples of how magnets work



**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 2*

<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
EARTH MATERIALS	SC.2.8.1 Identify different Earth materials and classify them by their physical properties		The student: Gives examples of different Earth materials (e.g., rocks, minerals, soil, sand, water) and groups them by their physical properties (e.g., size, shape, texture, color).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Classify different Earth materials by their physical properties and justify the classification	Identify different Earth materials and classify them by their physical properties	Identify, with assistance, some Earth materials and their physical properties	Recognize, with assistance, different Earth materials and their physical properties
EARTH MATERIALS	SC.2.8.2 Identify the limited supply of natural resources and how they can be extended through conservation, reuse, and recycling		The student: Identifies natural resources that are limited and ways to conserve those resources (e.g., fresh water, fuel, trees).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain why a resource is limited and why it needs to be extended through conservation, reuse, and recycling	Identify some of the natural resources that are limited and how they can be extended through conservation, reuse, and recycling	Recognize that the supply of natural resources is limited and suggest a way to extend it	Recall that the supply of natural resources is limited

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 3*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC INQUIRY	SC.3.1.1 Pose a question and develop a hypothesis based on observations		The student: Brainstorms different types of questions and develops a question and hypothesis based on observations.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Pose a question and develop a hypothesis based on logical inferences and observations	Pose a question and develop a hypothesis based on observations	Pose a question or develop a hypothesis partially based on observations	With assistance, pose a question or develop a hypothesis
SCIENTIFIC INQUIRY	SC.3.1.2 Safely collect and analyze data to answer a question		The student: Safely collects and organizes data using tables, charts, and/or graphs to explain what happens in an experiment.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Summarize and share analysis of data collected safely to answer a question	Safely collect and analyze data to answer a question	With assistance, safely collect and analyze data	With assistance, safely collect data and attempt to analyze data

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 3*

<b>Standard 2: The Scientific Process: NATURE OF SCIENCE—Understand that science, technology, and society are interrelated</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENCE, TECHNOLOGY, AND SOCIETY	SC.3.2.1 Describe ways technologies in fields such as agriculture, information, manufacturing, or communication have influenced society		The student: Describes different types of farming technologies, information technologies, manufacturing technologies, or communication technologies and describes how they affected people in the community.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare how technologies in various fields have influenced society	Describe ways technologies in fields such as agriculture, information, manufacturing, or communication have influenced society	Identify, with assistance, ways that technologies have influenced society	Recall that technologies have influenced society

<b>Standard 3: Life and Environmental Sciences: ORGANISMS AND THE ENVIRONMENT—Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
INTERDEPENDENCE	SC.3.3.1 Describe how plants depend on animals		The student: Describes how plants depend on animals for their survival (e.g., seed dispersal, pollination, oxygen/carbon dioxide cycle).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Classify plants by their dependence on animals	Describe how plants depend on animals	Name very few ways in which plants depend on animals	Recognize that plants depend on animals

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 3*

<b>Standard 4: Life and Environmental Sciences: STRUCTURE AND FUNCTION IN ORGANISMS—Understand the structures and functions of living organisms and how organisms can be compared scientifically</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
CELLS, TISSUES, ORGANS, AND ORGAN SYSTEMS	SC.3.4.1 Compare distinct structures of living things that help them to survive		The student: Compares the structures of different organisms that help them to survive (e.g., sharp eyes, good ears, fast feet, tall stems).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Group living things by the distinct structures that help them to survive and provide justification for the grouping	Compare distinct structures of living things that help them to survive	Describe a few ways in which distinct structures of living things help them to survive	Name distinct structures of living things that help them to survive

<b>Standard 5: Life and Environmental Sciences: DIVERSITY, GENETICS, AND EVOLUTION—Understand genetics and biological evolution and their impact on the unity and diversity of organisms</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
UNITY AND DIVERSITY	SC.3.5.1 Describe the relationship between structure and function in organisms		The student: Explains how structures are related to the functions they perform in living things (e.g., meat-eating animals have teeth that are sharp to tear meat).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Classify the structures of organisms according to their function	Describe the relationship between structure and function in organisms	Identify the relationship between structure and function in an organism	Recall that structures in organisms are related to the functions they perform

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 3*

<b>Standard 6: Physical, Earth, and Space Sciences: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
ENERGY AND ITS TRANSFORMATION	SC.3.6.1 Define energy and explain that the sun produces energy in the form of light and heat		The student: Defines energy and gives examples of the effects of sun energy (e.g., appearance and temperature of an object placed in the sun and shade).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain how energy from the sun provides heat and light for the Earth and compare that energy to other forms of energy	Define energy and explain that the sun produces energy in the form of light and heat	With assistance, give examples of the sun producing energy in the form of light and heat	Recognize that the sun provides energy for the Earth in the form of light and heat
WAVES	SC.3.6.2 Explain how things make sound through vibrations		The student: Describes how musical instruments (e.g., guitar, violin, and trumpet) create vibrations in objects to produce sound.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare, explain, and give examples that demonstrate how different things make sound through vibrations	Explain how things make sound through vibrations	List things that make sound through vibrations	Recall that things make sound through vibrations

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 3*

<b>Standard 6: Physical, Earth, and Space Sciences: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
WAVES	SC.3.6.3 Explain how light traveling in a straight line changes when it reaches an object		The student: Uses examples of light traveling in a straight line (using shadows or flashlights) to explain how it changes when it reaches an object.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Predict how light traveling in a straight line will change when it reaches an object	Explain how light traveling in a straight line changes when it reaches an object	Provide examples of what happens when light traveling in a straight line reaches an object	Recall ways that light traveling in a straight line will change when it reaches an object

<b>Standard 7: Physical, Earth, and Space Sciences: FORCE AND MOTION—Understand the relationship between force, mass, and motion of objects; and know the major natural forces: gravitational, electric, and magnetic</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
FORCES AND MOTION	SC.3.7.1 Compare how simple machines do work to make life easier		The student: Compares how simple machines (e.g., wedge, pulley, screw) use forces (pushes and pulls) to do work.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Classify how different machines do work to make life easier and justify the classification	Compare how simple machines do work to make life easier	Describe, with assistance, how simple machines do work to make life easier	Name a few simple machines that do work to make life easier

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 3*

<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
EARTH MATERIALS	SC.3.8.1 Describe different Earth materials (e.g., rocks, minerals, sand, soil) and explain their formation and composition		The student: Describes how rocks, minerals, sand, and soil are formed and the materials of which they are composed.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Classify different Earth materials and compare their formation and composition	Describe different Earth materials and explain their formation and composition	Identify, with assistance, different Earth materials and different types of formation	Recognize, with assistance, that different Earth materials have different formation and composition
FORCES THAT SHAPE THE EARTH	SC.3.8.2 Describe how the water cycle is related to weather and climate		The student: Illustrates the water cycle and explains its relationship to weather and climate.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Describe how the phases of the water cycle relate to weather and climate	Describe how the water cycle is related to weather and climate	Give an example of how the water cycle is related to weather or climate	Recognize that the water cycle is related to weather and climate



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SCIENCE GRADES K-12**

*Grade 3*

<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
THE UNIVERSE	SC.3.8.3 Safely observe and describe the basic movements of the sun and moon		The student: Describes the movement of the sun and moon across the sky from east to west every day; the change in the appearance of the moon over the course of a month; and the position of the sun in the sky from season to season.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain why the sun and moon appear to move across the sky	Describe the basic movements of the sun and moon	Identify a few basic movements of the sun and moon	Recognize that the sun and moon move across the sky
THE UNIVERSE	SC.3.8.4 Describe that constellations stay the same, though they “appear” to move across the night sky		The student: Describes that constellations stay the same, though they “appear” to move across the sky every night.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain why constellations remain the same, yet “appear” to move across the night sky	Describe that although constellations “appear” to move across the night sky, they stay the same	Identify constellations in the night sky	Recall that constellations are clusters of stars

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**HAWAII CONTENT AND PERFORMANCE STANDARDS  
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*Grade 4*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC INQUIRY	SC.4.1.1 Describe a testable hypothesis and an experimental procedure		The student: Describes a testable hypothesis (e.g., if, then, because statement) and an experimental procedure to test it.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Create a testable hypothesis and an experimental procedure to test it	Describe a testable hypothesis and an experimental procedure	Identify, with assistance, a testable hypothesis and an experimental procedure	Recognize, with assistance, a testable hypothesis or an experimental procedure
SCIENTIFIC KNOWLEDGE	SC.4.1.2 Differentiate between an observation and an inference		The student: Observes an object or situation and makes an inference from the observation, describing how they differ.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain the difference between an observation and an inference and give examples	Differentiate between an observation and an inference	Provide examples of observations and inferences	Define an observation and an inference

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
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*Grade 4*

<b>Standard 2: The Scientific Process: NATURE OF SCIENCE—Understand that science, technology, and society are interrelated</b>			
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENCE, TECHNOLOGY, AND SOCIETY	SC.4.2.1 Describe how the use of technology has influenced the economy, demography, and environment of Hawaii	The student: Describes how a specific technology (e.g., farming, manufacturing, or communication) has influenced the economy, demography, and environment of Hawaii and describes a plan to improve the conditions in the natural environment.	
	<b>RUBRIC</b>		
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>
Explain how the use of technology has influenced the economy, demography, and environment of Hawaii and suggest ways to conserve the environment	Describe how the use of technology has influenced the economy, demography, and environment of Hawaii	Give examples of how the use of technology has influenced the economy, demography, and environment of Hawaii	Recognize that the use of technology has influenced the economy, demography, and environment of Hawaii

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
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*Grade 4*

<b>Standard 3: Life and Environmental Sciences: ORGANISMS AND THE ENVIRONMENT—Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
CYCLES OF MATTER AND ENERGY	SC.4.3.1 Explain how simple food chains and food webs can be traced back to plants		The student: Diagrams and explains a simple food chain or food web that begins with plants.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare the characteristics of simple food chains with those of food webs	Explain how both simple food chains and food webs can be traced back to plants	Describe how simple food chains or food webs can be traced back to plants	Recognize that simple food chains or food webs can be traced back to plants
INTERDEPENDENCE	SC.4.3.2 Describe how an organism’s behavior is determined by its environment		The student: Describes how an organism’s behavior is affected by its environment (e.g., courting, nesting, feeding patterns).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain and give examples of how different organisms’ behaviors are determined by their environments	Describe how an organism’s behavior is determined by its environment	Identify a way that an organism’s behavior is influenced by its environment	Recognize that an organism’s behavior is influenced by its environment

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*Grade 4*

<b>Standard 4: Life and Environmental Sciences: STRUCTURE AND FUNCTION IN ORGANISMS—Understand the structures and functions of living organisms and how organisms can be compared scientifically</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
CELLS, TISSUES, ORGANS, AND ORGAN SYSTEMS	SC.4.4.1 Identify the basic differences between plant cells and animal cells		The student: Names the basic differences between plant and animal cells (e.g., plant cells have a cell membrane and a cell wall, chloroplasts; animal cells have a cell membrane).	
	<b>RUBRIC</b>			
	<b>Advance</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain and give examples of the differences between plant and animal cells	Identify the basic differences between plant cells and animal cells	Recognize very few differences between plant and animal cells	Recall, with assistance, very few differences between plant and animal cells

<b>Standard 5: Life and Environmental Sciences: DIVERSITY, GENETICS, AND EVOLUTION—Understand genetics and biological evolution and their impact on the unity and diversity of organisms</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
BIOLOGICAL EVOLUTION	SC.4.5.1 Compare fossils and living things		The student: Compares fossil evidence and living things to identify similarities and differences.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare, and use evidence to explain, the relationship between fossils and living things	Compare fossils and living things, describing their similarities and differences	Identify the connection between fossils and living things	Recall that there is a connection between fossils and living things

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*Grade 4*

<b>Standard 5: Life and Environmental Sciences: DIVERSITY, GENETICS, AND EVOLUTION—Understand genetics and biological evolution and their impact on the unity and diversity of organisms</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
UNITY AND DIVERSITY	SC.4.5.2 Describe the roles of various organisms in the same environment		The student: Describes the roles (e.g., decomposers, producers, consumers) of various organisms that inhabit the same environment.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Analyze how the roles of different organisms affect their interaction in the same environment	Describe the roles of various organisms in the same environment	Identify a few organisms and their role in the same environment	Recall, with assistance, very few organisms and their role in the same environment
UNITY AND DIVERSITY	SC.4.5.3 Describe how different organisms need specific environmental conditions to survive		The student: Illustrates and explains how specific environmental conditions support the survival of specific organisms.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain why different organisms need specific environmental conditions to survive	Describe how different organisms need specific environmental conditions to survive	List specific environmental conditions that organisms need to survive	Recall that organisms need specific environmental conditions to survive

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 4*

<b>Standard 6: Physical, Earth, and Space Sciences: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
NATURE OF MATTER	SC.4.6.1 Describe how some materials may be combined to form new substances		The student: Describes and gives examples of new substances formed by mixing different materials (e.g., vinegar and baking soda produce a gas when mixed together).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Predict the new substances that will be formed when some materials are combined	Describe how some materials may be combined to form new substances	Provide examples of how some materials may be combined to form new substances	Recognize that some materials may be combined to form new substances
ENERGY AND ITS TRANSFORMATION	SC.4.6.2 Explain what is needed for electricity to flow in a circuit to create light and sound		The student: Explains and constructs an open and closed circuit (e.g., using batteries, bulbs, buzzers, and wires).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain why a conductor, a closed circuit, and a power source are needed for electricity to flow in a circuit	Explain what is needed for electricity to flow in a circuit to create light and sound	List the materials needed for electricity to flow in a circuit	Recognize that electricity flows through a circuit



**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 4*

<b>Standard 7: Physical, Earth, and Space Sciences: FORCE AND MOTION—Understand the relationship between force, mass, and motion of objects; and know the major natural forces: gravitational, electric, and magnetic</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
FORCES OF THE UNIVERSE	SC.4.7.1 Describe that the mass of the Earth exerts a gravitational force on all objects		The student: Describes that the Earth’s gravity attracts objects toward its center without touching them.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain how the mass of the Earth exerts a gravitational force towards its center on all objects	Describe that the mass of the Earth exerts a gravitational force towards its center on all objects	Recognize that the Earth exerts a gravitational force on all objects	Recall, with assistance, that the Earth exerts a gravitational force on all objects

<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
FORCES THAT SHAPE THE EARTH	SC.4.8.1 Describe how slow processes sometimes shape and reshape the surface of the Earth		The student: Describes how the surface of the Earth is shaped and reshaped through slow processes (e.g., waves, wind, water, ice).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Use evidence to explain how slow processes have shaped and reshaped the surface of the Earth	Describe how the shaping and reshaping of the Earth’s land surface is sometimes due to slow processes	Provide examples of the shaping and reshaping of the Earth’s land surface due to slow processes	Recognize that the shaping and reshaping of the Earth’s land surface is sometimes due to slow processes

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 4*

<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
FORCES THAT SHAPE THE EARTH	SC.4.8.2 Describe how fast processes (e.g., volcanoes, earthquakes) sometimes shape and reshape the surface of the Earth		The student: Describes how fast processes have shaped and reshaped the Hawaiian Islands.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Use evidence to explain how fast processes have shaped and reshaped the surface of the Earth	Describe how the shaping and reshaping of the Earth’s land surface is sometimes due to fast processes	Provide examples of the shaping and reshaping of the Earth’s land surface due to fast processes	Recognize that the shaping and reshaping of the Earth’s land surface is sometimes due to fast processes
EARTH IN THE SOLAR SYSTEM	SC.4.8.3 Describe the relationship between the sun and the Earth’s daily rotation and annual revolution		The student: Describes the position of the Earth in relation to the sun during the Earth’s rotation and its annual revolution.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Use evidence to explain the relationship between the sun and the Earth’s daily rotation and annual revolution	Describe the relationship between the sun and the Earth’s daily rotation and annual revolution	Identify the Earth’s daily rotation and annual revolution	Recognize that the Earth rotates daily and revolves annually around the sun

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 5*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC INQUIRY	SC.5.1.1 Identify the variables in scientific investigations and recognize the importance of controlling variables in scientific experiments		The student: Identifies variables in a scientific investigation and describes why the variables need to be controlled.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Identify the variables in scientific investigations, explain why variables need to be controlled, and give examples of how to control variables in scientific experiments	Identify the variables in scientific investigations and recognize the importance of controlling variables in scientific experiments	Identify, with assistance, the variables in a scientific investigation or the importance of controlling the variables	Recognize, with much assistance, the variables in scientific investigations
SCIENTIFIC INQUIRY	SC.5.1.2 Formulate and defend conclusions based on evidence		The student: Presents findings and conclusions to classmates and answers questions using evidence from the investigation.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Formulate and defend conclusions that are supported by detailed evidence and make connections to the real world	Formulate and defend conclusions that are supported by evidence	Make conclusions that are partially supported by evidence	Make conclusions without evidence

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 5*

<b>Standard 2: The Scientific Process: NATURE OF SCIENCE—Understand that science, technology, and society are interrelated</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
UNIFYING CONCEPTS AND THEMES	SC.5.2.1 Use models and/or simulations to represent and investigate features of objects, events, and processes in the real world		The student: Uses geometric figures, number sequences, graphs, diagrams, sketches, number lines, maps, or stories as models to represent features of objects, events, or processes in the real world.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Consistently select and use models and simulations to effectively represent and investigate features of objects, events, and processes in the real world	Use models and/or simulations to represent and investigate features of objects, events, and processes in the real world	With assistance, use models or simulations to represent features of objects, events, or processes in the real world	Recognize examples of models or simulations that can be used to represent features of objects, events, or processes

<b>Standard 3: Life and Environmental Sciences: ORGANISMS AND THE ENVIRONMENT—Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
CYCLES OF MATTER AND ENERGY	SC.5.3.1 Describe the cycle of energy among producers, consumers, and decomposers		The student: Diagrams and describes the flow of energy among producers, consumers, and decomposers (e.g., food chains, food webs).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain and give detailed examples of the cycle of energy among producers, consumers, and decomposers	Describe the cycle of energy among producers, consumers, and decomposers	Describe a part of the energy cycle with an example (e.g., describe one or two parts of a food chain)	Recognize an example of part of an energy cycle

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 5*

<b>Standard 3: Life and Environmental Sciences: ORGANISMS AND THE ENVIRONMENT—Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>		
INTERDEPENDENCE	SC.5.3.2 Describe the interdependent relationships among producers, consumers, and decomposers in an ecosystem in terms of the cycles of matter	The student: Illustrates the relationships (e.g. carbon dioxide and oxygen exchange) among producers, consumers, and decomposers in an ecosystem.		
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain and give examples of how specific relationships among producers, consumers, and decomposers in an ecosystem affect the cycling of matter	Describe the interdependent relationships among producers, consumers, and decomposers in an ecosystem in terms of the cycling of matter	Identify a few relationships between producers, consumers, or decomposers in an ecosystem in terms of the cycling of matter	Recall, with assistance, that matter cycles in an ecosystem among producers, consumers, and decomposers

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 5*

<b>Standard 4: Life and Environmental Sciences: STRUCTURE AND FUNCTION IN ORGANISMS—Understand the structures and functions of living organisms and how organisms can be compared scientifically</b>			
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
CELLS, TISSUES, ORGANS, AND ORGAN SYSTEMS	SC.5.4.1 Describe the structures of the human body and how they work together to sustain life	The student: Describes how organs or organ systems work together in the human body to sustain life (e.g., heart and lungs, digestive system, and excretory system).	
	<b>RUBRIC</b>		
	<b>Advance</b>	<b>Proficient</b>	<b>Partially Proficient</b>
Compare human body systems in terms of the structures and relationships that exist within them	Describe the structures of the human body and how they work together to sustain life	Identify the structures of the human body and how these structures work together to sustain life	Name the structures of the human body and state that they work together to sustain life

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 5*

<b>Standard 5: Life and Environmental Sciences: DIVERSITY, GENETICS, AND EVOLUTION—Understand genetics and biological evolution and their impact on the unity and diversity of organisms</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
HEREDITY	SC.5.5.1 Recognize that some traits of living things are inherited and others are learned		The student: Recalls inherited traits (e.g., eye color, flower color) and learned characteristics (e.g., riding a bicycle).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Make generalizations about inherited and learned traits (e.g., inherited traits can be changed and learned traits cannot be changed)	Recognize that some traits of living things are inherited and others are learned	Identify, from a list of traits, those that are inherited and those that are learned	Recall that living things inherit some of their traits

<b>Standard 6: Physical, Earth and Space Science: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
ENERGY AND ITS TRANSFORMATION	SC.5.6.1 Identify different forms of energy (e.g., thermal, electrical, nuclear, light, sound) and how they can change and transfer energy from one form to another		The student: Describes different examples showing energy transformation.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare the different ways that energy can change forms and transfer energy	Identify the different forms of energy and how they can change and transfer energy from one form to another	Identify a few forms of energy or ways that energy can change forms	Recognize that energy can change forms

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 5*

<b>Standard 6: Physical, Earth and Space Science: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
ENERGY AND ITS TRANSFORMATION	SC.5.6.2 Describe ways that heat can be transferred from one object to another		The student: Provides examples of the transfer of heat from one object to another (e.g., from warm water to an ice cube or cold water) and explains how heat was transferred.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare and explain ways that heat can be transferred from one object to another	Describe ways that heat can be transferred from one object to another	List a few ways that heat can be transferred from one object to another	Recognize that heat can be transferred from one object to another
WAVES	SC.5.6.3 Compare what happens to light when it is reflected, refracted, and absorbed		The student: Demonstrates and compares how light can be reflected (e.g., by a mirror), refracted (e.g., by a lens), and absorbed (e.g., by an object).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare and give examples of the ways light can be reflected, refracted, and absorbed	Compare what happens to light when it is reflected, refracted, and absorbed	Describe that light is reflected, refracted, and absorbed	Provide examples of the reflection, refraction, or absorption of light



**HAWAII CONTENT AND PERFORMANCE STANDARDS  
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*Grade 5*

**Standard 7: Physical, Earth, and Space Sciences: FORCE AND MOTION—Understand the relationship between force, mass, and motion of objects; and know the major natural forces: gravitational, electric, and magnetic**

TOPIC	BENCHMARK	SAMPLE PERFORMANCE ASSESSMENT		
FORCES OF THE UNIVERSE	SC.5.7.1 Explain how electrically charged materials can push or pull other charged materials	The student: Explains how electrically charged materials can be pushed or pulled by other charged materials (e.g., by rubbing balloons on a piece of wool).		
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare how electrically charged materials can push or pull other charged materials	Explain how electrically charged materials can push or pull other charged materials	Provide examples of electrically charged materials that can push or pull other charged materials	Recognize that electrically charged materials can push or pull other charged materials

**Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents**

TOPIC	BENCHMARK	SAMPLE PERFORMANCE ASSESSMENT		
EARTH IN THE SOLAR SYSTEM	SC.5.8.1 Describe the relationship (size and distance) of Earth to other components in the solar system	The student: Creates a model or diagram showing the sizes of and distance between components of Earth and the other components of the solar system.		
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare and contrast the relationship of Earth to the other components in the solar system	Describe the relationship (size and distance) of Earth to other components in the solar system	Identify a few differences between Earth and other components in the solar system	Provide a few examples of the relationship (size and distance) of Earth to other components in the solar system

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 5*

<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
EARTH IN THE SOLAR SYSTEM	SC.5.8.2 Describe examples of what astronomers have discovered using telescopes		The student: Describes the information gathered by astronomers on Mauna Kea.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain the significance of what astronomers have discovered using telescopes	Describe examples of what astronomers have discovered using telescopes	Recognize examples of what astronomers have discovered using telescopes	Name a discovery that astronomers have made using telescopes
EARTH IN THE SOLAR SYSTEM	SC.5.8.3 Explain that the planets orbit the sun and that the moon orbits the Earth		The student: Explains that the Earth and other planets orbit the sun and the moon orbits around the Earth.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Demonstrate and explain how the planets orbit the sun and how the moon orbits the Earth	Explain that the planets orbit the sun and that the moon orbits the Earth	Recognize that the planets orbit the sun and that the moon orbits the Earth	Recall that planets orbit the sun or that the moon orbits the Earth

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 5*

<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
EARTH IN THE SOLAR SYSTEM	SC.5.8.4 Demonstrate that day and night are caused by the rotation of the Earth on its axis		The student: Demonstrates how day and night are caused by Earth’s rotation on its axis.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Use a model to demonstrate and explain how the rotation of the Earth on its axis causes day and night	Demonstrate the rotation of the Earth on its axis and how it causes day and night	Provide an example that the Earth rotates on its axis and causes day and night	Recognize that the Earth rotates on its axis and causes day and night

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
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**HAWAII CONTENT AND PERFORMANCE STANDARDS  
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*Grade 6*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC INQUIRY	SC.6.1.1 Formulate a testable hypothesis that can be answered through a controlled experiment		The student: Constructs a hypothesis (e.g., if, then, and because statement) that is tested through a controlled experiment.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Formulate a testable hypothesis with a detailed justification as to how it can be answered through a controlled experiment	Formulate a testable hypothesis with a simple justification that can be answered through a controlled experiment	Formulate a hypothesis without any justification	Formulate an incomplete hypothesis
SCIENTIFIC INQUIRY	6.1.2 Use appropriate tools, equipment, and techniques safely to collect, display, and analyze data		The student: Selects and safely uses appropriate tools, equipment, and techniques to collect, analyze, and display data.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Consistently select and safely use appropriate tools, equipment, and techniques to collect, display, and analyze data	Usually select and safely use appropriate tools, equipment, and techniques to collect, display, and analyze data	Sometimes select and safely use appropriate tools, equipment, and techniques to collect, display, and analyze data	Rarely select and safely use appropriate tools, equipment, and techniques to collect, display, and analyze data

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 6*

<b>Standard 2: The Scientific Process: NATURE OF SCIENCE—Understand that science, technology, and society are interrelated</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENCE, TECHNOLOGY, AND SOCIETY	SC.6.2.1 Explain how technology has an impact on society and science		The student: Explains ways in which technology has changed our society and science.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain and provide examples of how technology has an impact on society and science	Explain how technology has an impact on society and science	Give a partial explanation of how technology has an impact on society and science	Recognize that technology has an impact on society and science
SCIENCE, TECHNOLOGY, AND SOCIETY	SC.6.2.2 Explain how the needs of society have influenced the development and use of technologies		The student: Describes ways in which the development and use of a specific technology (e.g., wheel, pencil, email, cell phone, satellite) has been influenced by society.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain and provide examples of how the needs of society have influenced the development and use of technologies and predict possible developments	Explain how the needs of society have influenced the development and use of technologies	Provide examples of how the needs of society have influenced the development and use of technologies	Recognize that the needs of society have influenced the development and use of technologies

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
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*Grade 6*

<b>Standard 3: Life and Environmental Sciences: ORGANISMS AND THE ENVIRONMENT—Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
CYCLES OF MATTER AND ENERGY	SC.6.3.1 Describe how matter and energy are transferred within and among living systems and their physical environment		The student: Explains the flow of matter and energy in ecosystems (e.g., the total amount of matter and energy remain constant as they are continuously transferred within and among organisms and their environment).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare and describe ways that matter and energy are transferred within and among living systems and their physical environment	Describe how matter and energy are transferred within and among living systems and their physical environment	List ways matter or ways energy is transferred within and among living systems and their physical environment	Recognize that matter or that energy is transferred within and among living systems and their physical environment

<b>Standard 4: Life and Environmental Sciences: STRUCTURE AND FUNCTION IN ORGANISMS—Understand the structures and functions of living organisms and how organisms can be compared scientifically</b>		
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>
	<i>No benchmark at this level</i>	

<b>Standard 5: Life and Environmental Sciences: DIVERSITY, GENETICS, AND EVOLUTION—Understand genetics and biological evolution and their impact on the unity and diversity of organisms</b>		
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>
	<i>No benchmark at this level</i>	

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
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*Grade 6*

<b>Standard 6: Physical, Earth, and Space Sciences: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
ENERGY AND ITS TRANSFORMATION	SC.6.6.1 Compare how heat energy can be transferred through conduction, convection, and radiation		The student: Compares how heat energy is transferred and makes comparisons between conduction, convection, and radiation.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Describe and compare how heat energy can be transferred through conduction, convection, and radiation and make a connection to real world situations	Compare how heat energy can be transferred through conduction, convection, and radiation	Describe how heat energy can be transferred through conduction, convection, and radiation	Recognize that heat energy can be transferred
ENERGY AND ITS TRANSFORMATION	SC.6.6.2 Describe the different types of energy transformations		The student: Describes a variety of energy transformations (e.g., heat energy into mechanical energy; chemical energy into light energy; electrical energy into magnetic energy).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain the different types of energy transformations and give examples of their application	Describe the different types of energy transformations	Identify, with assistance, different types of energy transformations	Recognize that energy can be transformed



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*Grade 6*

<b>Standard 6: Physical, Earth, and Space Sciences: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
ENERGY AND ITS TRANSFORMATION	SC.6.6.3 Explain how energy can change forms and is conserved		The student: Explains the conservation of energy by comparing the input and output of energy of a specific device or process (e.g., throwing a ball against a wall).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Provide a detailed explanation of the conservation of energy with supporting evidence	Explain how energy can change forms and is conserved	Describe, with assistance, how energy can change forms and is conserved	Recognize that energy is conserved
ENERGY AND ITS TRANSFORMATION	SC.6.6.4 Describe and give examples of different types of energy waves		The student: Describes the different types of energy waves (e.g., radio waves, sound waves, light waves) and provides examples of each.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare and explain the different types of energy waves and provide examples of real world applications	Describe and give examples of the different types of energy waves	Give examples of a few types of energy waves	Select from a given list the different types of energy waves

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SCIENCE GRADES K-12**

*Grade 6*

<b>Standard 6: Physical, Earth, and Space Sciences: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
NATURE OF MATTER	SC.6.6.5 Explain how matter can change physical or chemical forms, but the total amount of matter remains constant		The student: Describes how matter remains constant before and after physical and chemical changes (e.g., breaking and weathering of rocks, lighting a match).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain, in detail and with supporting evidence, the conservation of matter	Explain how matter can change physical or chemical forms, but the total amount of matter remains constant	Define the conservation of matter	Recognize that the amount of matter in a given system is constant
NATURE OF MATTER	SC.6.6.6 Describe and compare the physical and chemical properties of different substances		The student: Compares and contrasts physical and chemical properties (e.g., mass, melting point, boiling point, magnetism, conductivity, rusting, reactivity) of different substances (e.g., salts, sugars, elements, acids, bases).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Classify substances based on the descriptions of their physical and chemical properties and justify the classification system used	Describe and compare the physical and chemical properties of different substances	Identify some physical and chemical properties of substances	Recognize that substances have physical and chemical properties

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 6*

<b>Standard 6: Physical, Earth, and Space Sciences: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
NATURE OF MATTER	SC.6.6.7 Describe the organization of the periodic table		The student: Uses the periodic table to identify patterns of elements (e.g., metals, nonmetals, and inert gases).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Describe ways matter is organized on the periodic table and use it to provide an example of an element’s properties	Describe the organization of the periodic table	Identify basic ways matter is organized on the periodic table	Recognize that matter is organized on the periodic table
NATURE OF MATTER	SC.6.6.8 Recognize changes that indicate that a chemical reaction has taken place		The student: Observes chemical reactions and identifies the changes (e.g., release of heat, light, gas).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Identify and describe changes that indicate a chemical reaction has taken place	Recognize changes that indicate a chemical reaction has taken place	Identify, with assistance, that a chemical reaction has taken place	Observe chemical reactions

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SCIENCE GRADES K-12**

*Grade 6*

<b>Standard 6: Physical, Earth, and Space Sciences: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
NATURE OF MATTER	SC.6.6.9 Describe matter using the atomic model		The student: Illustrates how matter is made up of atoms which contain protons and neutrons in the nucleus and orbiting electrons.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Describe the characteristics of each of the components of an atom and the relationship between them	Describe the basic components of atoms: neutrons, protons, and electrons	Name the basic components of atoms: neutrons, protons, and electrons	Recognize that matter is made of different components
WAVES	SC.6.6.10 Explain how vibrations in materials set up wavelike disturbances that spread away from the source		The student: Manipulates models of waves to demonstrate how waves spread away from their sources (e.g., using a water table).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Analyze how vibrations in materials set up wavelike disturbances that spread away from the source	Explain how vibrations in materials set up wavelike disturbances that spread away from the source	Describe that vibrations in materials set up wavelike disturbances	Recognize that vibrations in materials set up wavelike disturbances

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 6*

<b>Standard 7: Physical, Earth, and Space Sciences: FORCE AND MOTION—Understand the relationship between force, mass, and motion of objects; and know the major natural forces: gravitational, electric, and magnetic</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
FORCE AND MOTION	SC.6.7.1 Describe examples of how forces affect an object’s motion		The student: Uses Newton’s Laws of Motion to describe how forces affect an object’s motion (e.g., constant speed in a straight line unless a force is acting upon it).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain, with supporting evidence and Newton’s Laws, how forces affect an object’s motion	Describe examples of how forces affect an object’s motion	Identify the forces that affect an object’s motion	Identify examples of forces
FORCES OF THE UNIVERSE	SC.6.7.2 Explain that electric currents can produce magnetic effects and that magnets can cause electric currents		The student: Demonstrates and explains that magnets can produce electric currents and that electric currents produce a magnetic field.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain, and provide real world applications, that electric currents can produce magnetic effects and that magnets can cause electric currents	Explain that electric currents can produce magnetic effects, and that magnets can cause electric currents	Describe that electric currents can produce magnetic effects, or that magnets can cause electric currents	Recognize electric currents and magnetic effects

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 6*

<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>		
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>
	<i>No benchmark at this level</i>	

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 7*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC INQUIRY	SC.7.1.1 Design and safely conduct a scientific investigation to answer a question or test a hypothesis		The student: Identifies the dependent and independent variables, writes an experimental design, and safely conducts the experiment.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Consistently design and safely conduct a logical, systematic scientific investigation to answer a question and test a hypothesis	Usually design and safely conduct a scientific investigation to answer a question or test a hypothesis	Sometimes design and safely conduct a scientific investigation to answer a question or test a hypothesis	Rarely design and safely conduct a scientific investigation to answer a question or test a hypothesis
SCIENTIFIC INQUIRY	SC.7.1.2 Explain the importance of replicable trials		The student: Explains the importance of multiple trials in a scientific investigation to ensure that results are replicable and precise.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain, with supporting evidence, the importance of replicable trials	Explain the importance of replicable trials	Recognize the importance of replicable trials	Recall, with assistance, that multiple trials are important to ensure results that are replicable and precise

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 7*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC KNOWLEDGE	SC.7.1.3 Explain the need to revise conclusions and explanations based on new scientific evidence		The student: Explains why conclusions and explanations need to be revised, based on new evidence in a journal article and/or published scientific evidence.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Evaluate and revise conclusions and explanations using justifications based on new scientific evidence	Explain the need to revise conclusions and explanations based on new scientific evidence	Identify the need to revise conclusions and explanations based on new scientific evidence	Recognize the need to revise conclusions and explanations



**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 7*

<b>Standard 2: The Scientific Process: NATURE OF SCIENCE—Understand that science, technology, and society are interrelated</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>		
SCIENCE, TECHNOLOGY, AND SOCIETY	SC.7.2.1 Explain the use of reliable print and electronic sources to provide scientific information and evidence	The student: Explains how the evidence found in a wide variety of print and electronic sources (e.g., database programs, internet) can be used to develop conclusions.		
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain how print and electronic sources can be used to provide scientific information and evaluate the sources used for validity and reliability	Explain the use of reliable print and electronic sources to provide scientific information and evidence	Explain that print and electronic sources can be used to provide scientific information and evidence	Recognize that print and electronic sources can be used to provide scientific information and evidence

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 7*

<b>Standard 3: Life and Environmental Sciences: ORGANISMS AND THE ENVIRONMENT—Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
CYCLES OF MATTER AND ENERGY	SC.7.3.1 Explain how energy moves through food webs, including the roles of photosynthesis and cellular respiration		The student: Illustrates and describes the role of photosynthesis and cellular respiration in transferring energy through a chosen food web.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare the roles of photosynthesis and cellular respiration in the cycling of energy through food webs	Explain how energy moves through food webs, including the roles of photosynthesis and cellular respiration	Describe how energy moves through food webs	Recognize that energy moves through food webs
INTERDEPENDENCE	SC.7.3.2 Explain the interaction and dependence of organisms on one another		The student: Explains how organisms in a biological community interact (e.g., predator/prey, producer/consumer, parasitism, mutualism, competition, cooperation, niche).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Evaluate and explain how organisms interact with and depend on one another	Explain how organisms interact with and depend on one another	Identify how organisms interact with and depend on one another	Recognize that organisms interact with and depend on one another

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 7*

<b>Standard 3: Life and Environmental Sciences: ORGANISMS AND THE ENVIRONMENT—Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
INTERDEPENDENCE	SC.7.3.3 Explain how biotic and abiotic factors affect the carrying capacity and sustainability of an ecosystem		The student: Identifies and describes how biotic and abiotic factors (e.g., available resources, disease, competition, predation, climate, habitat) affect the health and carrying capacity of an ecosystem.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Analyze and explain the biotic and abiotic factors that affect the carrying capacity and sustainability of an ecosystem based on evidence	Explain how biotic and abiotic factors affect the carrying capacity and sustainability of an ecosystem	Describe that biotic or abiotic factors affect the carrying capacity and sustainability of an ecosystem	Recognize that biotic and abiotic factors affect the carrying capacity and sustainability of an ecosystem

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 7*

<b>Standard 4: Life and Environmental Sciences: STRUCTURE AND FUNCTION IN ORGANISMS—Understand the structures and functions of living organisms and how organisms can be compared scientifically</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
CELLS, TISSUES, ORGANS, AND ORGAN SYSTEMS	SC.7.4.1 Describe the cell theory		The student: Describes the theory that all organisms are made up of cells that are the basic building blocks of life; some organisms are unicellular but others are multi-cellular.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain the cell theory and give examples of unicellular and multi-cellular organisms	Describe the cell theory	Define the cell theory	Recognize a cell
CELLS, TISSUES, ORGANS, AND ORGAN SYSTEMS	SC.7.4.2 Describe the basic structure and function of various types of cells		The student: Describes the structure and function of a cell (e.g., plant, animal, and prokaryotic; muscle, nerve, bone).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare and contrast various types of cells according to their structures and functions	Describe the basic structure and function of various types of cells	Identify the basic structure and function of a few types of cells	List the basic structure or the basic function of various types of cells

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 7*

<b>Standard 4: Life and Environmental Sciences: STRUCTURE AND FUNCTION IN ORGANISMS—Understand the structures and functions of living organisms and how organisms can be compared scientifically</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
CELLS, TISSUES, ORGANS, AND ORGAN SYSTEMS	SC.7.4.3 Describe the levels of organization in organisms		The student: Describes the levels of organization within an organism beginning with the smallest unit of life up to the whole organism (e.g., cellular, tissue, organ, organ system, and whole organism).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare details of the levels of organization in organisms	Describe the levels of organization in organisms	Provide examples of the levels of organization in organisms	Recall that there are levels of organization in organisms
CLASSIFICATION	SC.7.4.4 Classify organisms according to their degree of relatedness		The student: Analyzes the degree of relatedness among selected organisms by comparing the similarities and differences found in internal and external anatomical features.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Classify organisms according to their degree of relatedness and justify the classification	Classify organisms according to their degree of relatedness	Identify ways to classify organisms according to their degree of relatedness	Recognize that organisms can be classified

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Grade 7*

<b>Standard 5: Life and Environmental Sciences: DIVERSITY, GENETICS, AND EVOLUTION—Understand genetics and biological evolution and their impact on the unity and diversity of organisms</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
HEREDITY	SC.7.5.1 Differentiate between sexual and asexual reproduction		The student: Compares the advantages and disadvantages of sexual and asexual reproduction in terms of variation in offspring (e.g., sexual reproduction allows for greater genetic variation; asexual reproduction limits the spread of disadvantageous characteristics in a species).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare the processes, the advantages, and the disadvantages of sexual and asexual reproduction, with examples	Compare and contrast sexual and asexual reproduction	Describe sexual and asexual reproduction	Recognize the different outcomes of sexual and asexual reproduction
HEREDITY	SC.7.5.2 Describe how an inherited trait can be determined by one or more genes which are found on chromosomes		The student: Explains how traits can be determined by one or more genes (e.g., eye color, attached or non-attached earlobes, color of flowers).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain and give examples of how an inherited trait can be determined by one or more genes which are found on chromosomes	Describe how an inherited trait can be determined by one or more genes which are found on chromosomes	Name inherited traits that are determined by one or more genes which are found on chromosomes	Recognize that an inherited trait can be determined by one or more genes which are found on chromosomes

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*Grade 7*

<b>Standard 5: Life and Environmental Sciences: DIVERSITY, GENETICS, AND EVOLUTION—Understand genetics and biological evolution and their impact on the unity and diversity of organisms</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
HEREDITY	SC.7.5.3 Explain that small differences between parents and offspring could produce descendants that look very different from their ancestors		The student: Explains that small differences due to the exchange and interaction of genetic information from parents are passed down to offspring and over successive generations could result in great differences.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Generalize and explain the possible effect(s) of a small difference between parents and offspring on successive generations	Explain that small differences between parents and offspring could produce descendants that look very different from their ancestors	Name small differences between parents and offspring that could produce descendants that look very different from their ancestors	Recognize that small differences between parents and offspring could produce descendants that look very different from their ancestors
UNITY AND DIVERSITY	SC.7.5.4 Analyze how organisms' body structures contribute to their ability to survive and reproduce		The student: Analyzes how body structures of different organisms contribute to their survival and reproduction (e.g., Hawaiian Honeycreeper's bills).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Analyze and compare how organisms' body structures contribute to their ability to survive and reproduce and support conclusions with evidence	Analyze how organisms' body structures contribute to their ability to survive and reproduce	Describe how an organisms' body structures contribute to their ability to survive and reproduce	Recognize that an organism's body structure contributes to their ability to survive and reproduce

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
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*Grade 7*

**Standard 5: Life and Environmental Sciences: DIVERSITY, GENETICS, AND EVOLUTION—Understand genetics and biological evolution and their impact on the unity and diversity of organisms**

TOPIC	BENCHMARK	SAMPLE PERFORMANCE ASSESSMENT		
BIOLOGICAL EVOLUTION	SC.7.5.5 Explain how fossils provide evidence that life and environmental conditions have changed over time	The student: Explains how fossil evidence supports the theory of biological evolution.		
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Generalize and explain how life and the environment have changed over time using fossil evidence	Explain how fossils provide evidence that life and environmental conditions have changed over time	Describes that fossils provide evidence that life or the environment have changed over time	Recognize that life and environmental conditions have changed over time
UNITY AND DIVERSITY	SC.7.5.6 Explain why variation(s) in a species' gene pool contributes to its survival in a constantly changing environment	The student: Explains why the variations in genes that determine the structure, behavior, and physiology of a species increase the likelihood that at least some members of its species will survive in a constantly changing environment.		
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Analyze how and why variations in a species' gene pool contribute to its survival in a constantly changing environment	Explain why variations in a species' gene pool contribute to its survival in a constantly changing environment	Identify variations in a species' gene pool that contribute to its survival in a constantly changing environment	Recognize that a variation in a species' gene pool contributes to its survival in a constantly changing environment



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<b>Standard 6: Physical, Earth, and Space Science: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>		
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>
	<i>No benchmark at this level</i>	

<b>Standard 7: Physical, Earth, and Space Sciences: FORCE AND MOTION—Understand the relationship between force, mass, and motion of objects; and know the major natural forces: gravitational, electric, and magnetic</b>		
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>
	<i>No benchmark at this level</i>	

<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>		
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>
	<i>No benchmark at this level</i>	

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*Grade 8*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC INQUIRY	SC.8.1.1 Determine the link(s) between evidence and the conclusion(s) of an investigation		The student: Determines if the conclusion(s) and evidence from an experiment or other sources are logically linked.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Determine and analyze the logical link(s) between evidence and the conclusion(s) of an investigation and apply to the real world	Determine the logical link(s) between the evidence and the conclusion(s) of an investigation	Identify a link between evidence and the conclusion(s) of an investigation	Recognize a link between evidence and the conclusion(s) of an investigation
SCIENTIFIC INQUIRY	SC.8.1.2 Communicate the significant components of the experimental design and results of a scientific investigation		The student: Presents formal written report and/or gives an oral presentation that communicates experimental design and results of an investigation.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Communicate, with clarity and detail, the components of the experimental design and results of a scientific investigation	Communicate the significant components of the experimental design and results of the scientific investigation	Communicate some significant details related to the experimental design and results of a scientific investigation	Communicate few details related to the experimental design and results of a scientific investigation

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SCIENCE GRADES K-12**

*Grade 8*

<b>Standard 2: The Scientific Process: Nature of Science—Understand that science, technology, and society are interrelated</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENCE, TECHNOLOGY, AND SOCIETY	SC.8.2.1 Describe significant relationships among society, science, and technology and how one impacts the other		The student: Provides earth and space examples of how science, technology, and society have impacted each other.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Evaluate and describe the relationships among society, science, and technology and how one impacts the other	Describe significant relationships among society, science, and technology and how one impacts the other	List a few relationships between society, science, or technology	Recognize relationships among society, science, and technology
UNIFYING CONCEPTS AND THEMES	SC.8.2.2 Describe how scale and mathematical models can be used to support and explain scientific data		The student: Describes the scale of a model and mathematically how it supports and explains scientific data.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Analyze and describe how scale and mathematical models can be used to support and explain scientific data, using examples	Describe how scale and mathematical models can be used to support and explain scientific data	Give some examples of how scale or mathematical models can be used to support and explain scientific data	Recognize that scale and mathematical models can be used to support and explain scientific data

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*Grade 8*

<b>Standard 3: Life and Environmental Sciences: ORGANISMS AND THE ENVIRONMENT—Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment</b>		
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>
	<i>No benchmark at this level</i>	

<b>Standard 4: Life and Environmental Sciences: STRUCTURE AND FUNCTION IN ORGANISMS—Understand the structures and functions of living organisms and how organisms can be compared scientifically</b>		
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>
	<i>No benchmark at this level</i>	

<b>Standard 5: Life and Environmental Sciences: DIVERSITY, GENETICS, AND EVOLUTION—Understand genetics and biological evolution and their impact on the unity and diversity of organisms</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>		
BIOLOGICAL EVOLUTION	SC.8.5.1 Describe how changes in the physical environment affect the survival of organisms	The student: Explains how organisms respond (e.g., some organisms adapt, some move out, others die) to changes in the physical environment, such as tsunamis and hurricanes.		
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Generalize and describe how a change in the physical environment might affect the survival of organisms	Describe how changes in the physical environment affect the survival of organisms	Identify changes in the physical environment that may affect the survival of organisms	Recognize that changes in the physical environment affect the survival of organisms

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*Grade 8*

<b>Standard 6: Physical, Earth, and Space Science: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
WAVES	SC.8.6.1 Explain the relationship between the color of light and wavelength within the electromagnetic spectrum		The student: Diagrams and explains the small band of visible light within the larger electromagnetic spectrum.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Generalize and explain the relationship between the color of light and wavelength within the electromagnetic spectrum	Explain the relationship between the color of light and the wavelength within the electromagnetic spectrum	Identify the relationship between the color of light and the wavelength within the electromagnetic spectrum	Recognize that there is a relationship between the color of light and the wavelength within the electromagnetic spectrum
WAVES	SC.8.6.2 Explain how seismic waves provide scientists with information about the structure of Earth’s interior		The student: Explain the differences between the movement of seismic waves (e.g., primary ‘p’, secondary ‘s’, surface) and provides examples.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Make inferences about the structure of Earth’s interior based on the movements of seismic waves	Explain how seismic waves provide scientists with information about the structure of Earth’s interior	Identify different seismic waves and identify how at least one type of wave provides scientists with information about Earth’s interior structure	Recall the movements of different seismic waves

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<b>Standard 6: Physical, Earth, and Space Science: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
WAVES	SC.8.6.3 Identify the characteristics and properties of mechanical and electromagnetic waves		The student: Identifies the characteristics and properties of mechanical and electromagnetic waves (e.g., reflection, refraction, absorption, wavelength).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain the key characteristics and properties of mechanical and electromagnetic waves and provide real world examples	Identify the characteristics and properties of mechanical and electromagnetic waves	Name some of the characteristics and properties of mechanical and electromagnetic waves	Define mechanical and electromagnetic waves

<b>Standard 7: Physical, Earth, and Space Sciences: FORCE AND MOTION— Understand the relationship between force, mass, and motion of objects; and know the major natural forces: gravitational, electric, and magnetic</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
FORCES OF THE UNIVERSE	SC.8.7.1. Explain that every object has mass and therefore exerts a gravitational force on other objects		The student: Explains that every object exerts a gravitational force on other objects.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain the proportional relationship between mass and gravity	Explain that every object has mass and therefore exerts a gravitational force on other objects	Recognize that every object has mass and exerts a gravitational force on other objects	Recognize there is a relationship between gravity and mass

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<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
EARTH MATERIALS	SC.8.8.1 Compare the characteristics of the three main types of rocks		The student: Compares the characteristics of igneous, metamorphic, and sedimentary rocks.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Classify rocks by their characteristics and justify their placement into the three main categories	Compare the characteristics of the three main types of rocks and give an example of each	Describe the characteristics of the three main types of rocks	Identify the three main types of rocks
EARTH MATERIALS	SC.8.8.2 Illustrate the rock cycle and explain how igneous, metamorphic, and sedimentary rocks are formed		The student: Diagrams the rock cycle, including interrelationships and formation of igneous, metamorphic, and sedimentary rocks.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Diagram the rock cycle and identify the major factors (e.g., time, pressure, temperature) in the formation of igneous, metamorphic, and sedimentary rocks	Illustrate the rock cycle and explain how igneous, metamorphic, and sedimentary rocks are formed	Illustrate and define the rock cycle	Define the rock cycle



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<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
EARTH IN THE SOLAR SYSTEM	SC.8.8.3 Describe how the Earth’s motions and tilt on its axis affect the seasons and weather patterns		The student: Diagrams and explains how Earth’s motions and tilt on its axis affect the seasons and weather patterns.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare how the Earth’s motions and tilt on its axis affect the seasons and weather patterns in different regions of the world	Describe how the Earth’s motions and tilt on its axis affect the seasons and weather patterns	Recognize that the Earth’s motions and tilt on its axis affect the seasons and weather patterns	Recognize the Earth’s motions or tilt on its axis
FORCES THAT SHAPE THE EARTH	SC.8.8.4 Explain how the sun is the major source of energy influencing climate and weather on Earth		The student: Describes how the sun’s heating of the Earth drives weather systems, ocean currents, and the water cycle.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Analyze and explain the importance of the sun’s role in influencing the climate and weather on Earth	Explain how the sun is the major source of energy influencing climate and weather on Earth	Describe how the sun is the major source of energy on Earth	Recognize that the sun is the major source of energy on Earth

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<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
FORCES THAT SHAPE THE EARTH	SC.8.8.5 Explain the concepts of continental drift and plate tectonics		The student: Describes continental drift and how the Earth’s crust is divided into plates that move on convection currents of magma in the mantle.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Defend a prediction for future continental drift based on knowledge of plate tectonics	Explain the concepts of continental drift and plate tectonics	Define continental drift and plate tectonics	Recognize that the Earth’s crust is made of moving plates
FORCES THAT SHAPE THE EARTH	SC.8.8.6 Explain the relationship between density and convection currents in the ocean and atmosphere		The student: Describes the relationships between density and convection currents and the effect on global wind patterns and major ocean currents.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain the relationship between density and convection currents and how they affect the ocean and atmosphere	Explain the relationship between density and convection currents in the ocean and atmosphere	Explain density and convection currents in the ocean and atmosphere	Define density and convection currents

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<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
FORCES THAT SHAPE THE EARTH	SC.8.8.7 Describe the physical characteristics of oceans		The student: Describes a variety of the ocean’s physical characteristics (e.g., size, depth, geologic history, ocean floor, currents).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain the physical characteristics of the oceans over geologic time	Describe and illustrate the physical characteristics of the oceans	Identify, with assistance, the physical characteristics of the oceans	List some characteristics of the oceans
THE UNIVERSE	SC.8.8.8 Describe the composition of objects in the galaxy		The student: Describes the physical properties and chemical composition (e.g., solid, gaseous, hydrogen) of objects in the galaxy (e.g., stars, planets, comets).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Analyze and compare the composition of different objects in the galaxy and make inferences about their physical and chemical properties	Describe the composition of objects in the galaxy	Identify the composition of objects in the galaxy	Recognize that all objects in the galaxy are made up of matter and energy

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<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
THE UNIVERSE	SC.8.8.9 Explain the predictable motions of the Earth and moon		The student: Explains the phenomena caused by the predictable motions of the Earth and moon (e.g., day, night, seasons, year, eclipses, phases of moon, tides).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Analyze and explain the predictable motions of the Earth and moon and its impact on Earth	Explain the predictable motions of the Earth and moon	Describe the predictable motions of the Earth or moon	Recognize the predictable motions of the Earth and moon
THE UNIVERSE	SC.8.8.10 Compare the characteristics and movement patterns of the planets in our solar system		The student: Compares the movement of the planets in our solar system (e.g., planets differ in size, orbit, number of moons, composition, surface features, and movement patterns).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Analyze and explain the characteristics and movement patterns of the planets in our solar system	Compare the characteristics and movement patterns of the planets in our solar system	Describe the characteristics or movement patterns of the planets in our solar system	Recognize that the planets in our solar system move in patterns

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<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
THE UNIVERSE	SC.8.8.11 Describe the major components of the universe		The student: Describes that the universe consists of billions of galaxies which are classified by shape and contain most of the visible mass of the universe.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain the major components in the universe, their movements, and their characteristics	Describe and give examples of major components of the universe	Identify some of the major components of the universe	Recognize a few major components of the universe
THE UNIVERSE	SC.8.8.12 Describe the role of gravitational force in the motions of planetary systems		The student: Describes how gravitational force keeps the Earth, other planets, and their moons in their orbits.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Analyze the role of gravitational force in determining the shape of the motions of planetary systems	Describe the role of gravitational force in the motions of planetary systems	Illustrate the motions of planetary systems	Recognize that gravitational force has a role in the motions of planetary systems

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**HAWAII CONTENT AND PERFORMANCE STANDARDS  
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*Physical Science*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>		
SCIENTIFIC INQUIRY	SC.PS.1.1 Describe how a testable hypothesis may need to be revised to guide a scientific investigation	The student: Describes a testable hypothesis and how it might be revised based on data from physical science investigations and primary sources (e.g., results, class data, information from a reputable source).		
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Revise a testable hypothesis based on new data to guide a scientific investigation	Describe how a testable hypothesis may need to be revised to guide a scientific investigation	Give an example of one way to revise a testable hypothesis	Recognize that a hypothesis may need revision

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*Physical Science*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>			
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC INQUIRY	SC.PS.1.2 Design and safely implement an experiment, including the appropriate use of tools and techniques to organize, analyze, and validate data	The student: Prepares a physical science lab report documenting the procedure(s) and the safe and appropriate use of tools (e.g., computer probes, meters, timers) and techniques (e.g., repeated trials, statistics, significant figures, spreadsheets, databases) to organize, analyze, and validate data.	
<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>
	Report thoroughly the significant and other relevant details related to the design selected for an experiment, including the safe and appropriate use of tools and techniques to organize, analyze, and validate data	Report the significant details related to the design selected for an experiment, including the safe and appropriate use of tools and techniques to organize, analyze, and validate data	Report some details related to the design selected for an experiment, including the safe and appropriate use of tools and techniques to organize, analyze, and validate data
			<b>Novice</b>
			Report very few details related to the design selected for an experiment, including the safe and appropriate use of tools and techniques to organize, analyze, and validate data



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*Physical Science*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC INQUIRY	SC.PS.1.3 Defend and support conclusions, explanations, and arguments based on logic, scientific knowledge, and evidence from data		The student: Prepares a physical science lab report that draws logical conclusions and formulates explanations and arguments from the results of investigations.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Defend conclusions, explanations, and arguments that are supported by logic, scientific knowledge, and evidence from data and suggest implications	Defend conclusions, explanations, and arguments that are supported by logic, scientific knowledge, and evidence from data	Present conclusions, explanations, and arguments that are partially supported by logic, scientific knowledge, or evidence from data	Present unsupported conclusions, explanations, and arguments
SCIENTIFIC INQUIRY	SC.PS.1.4 Determine the connection(s) among hypotheses, scientific evidence, and conclusions		The student: Prepares a physical science lab report that supports or refutes a hypothesis based on an analysis of experimental data.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Determine and justify logical connection(s) and implications among hypotheses, scientific evidence, and conclusions	Determine logical connection(s) among hypotheses, scientific evidence, and conclusions	Identify some connections between hypotheses, scientific evidence, or conclusions	Make unsubstantiated connection(s) among hypotheses, scientific evidence, and conclusions

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*Physical Science*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC INQUIRY	SC.PS.1.5 Communicate the components of a scientific investigation, using appropriate techniques		The student: Presents the question, testable hypothesis, experimental design, analysis of data, and conclusions to the physical science class using appropriate methods of communication (e.g., PowerPoint, essay, oral presentation, poster board, lab report, research paper).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Consistently present, in detail, all components of a scientific investigation, using appropriate techniques	Usually present all components of a scientific investigation, using appropriate techniques	Sometimes present the components of a scientific investigation, using appropriate techniques	Rarely present the components of a scientific investigation
SCIENTIFIC INQUIRY	SC.PS.1.6 Engage in and explain the importance of peer review in science		The student: Examines a peer’s physical science investigation for logic and validity based on evidence. Explains the importance of peer review to the process of scientific inquiry.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Effectively participate in peer review. Explain the principal and other relevant reasons for peer review in science	Engage actively in peer review. Explain the principal reasons for peer review in science.	Participate in peer review. Explain some reasons for peer review in science	Participate in peer review. Not able to explain the reasons for peer review in science

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*Physical Science*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC KNOWLEDGE	SC.PS.1.7 Revise, as needed, conclusions and explanations based on new evidence		The student: Reflects on new physical science evidence from other valid sources and revises conclusion and explanations as needed. Includes recommendations for improving the investigation.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Revise and justify conclusions and explanations logically, based on new evidence	Revise conclusions and explanations logically, based on new evidence	Make few revisions to conclusions and explanations partially based on new evidence	Make very few revisions to conclusions and explanations
SCIENTIFIC KNOWLEDGE	SC.PS.1.8 Describe the importance of ethics and integrity in scientific investigation		The student: Identifies and describes physical science examples of ethical and unethical experimentation, citation, and conclusions (e.g., provides guidelines concerning the appropriate treatment of living things and the environment; credits sources; reduces bias; sometimes adds constraints).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain and give examples of the principal and other relevant reasons for ethics and integrity in scientific investigation	Describe the principal reasons for ethics and integrity in scientific investigation	Describe some reasons for ethics and integrity in scientific investigation	Describe very few reasons for ethics and integrity in scientific investigation

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*Physical Science*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC KNOWLEDGE	SC.PS.1.9 Explain how scientific explanations must meet a set of established criteria to be considered valid		The student: Describes how a published study meets the criteria of scientific explanations (e.g., they must be consistent with experimental and observational evidence about nature, make accurate predictions about systems being studied, be logical, abide by the rules of evidence, be open to questions and modifications, be based on historical and current scientific knowledge, and make a commitment to making the knowledge public) in order to draw conclusions about the study’s validity.	
<b>RUBRIC</b>				
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Analyze a scientific explanation to determine if it meets a set of established criteria	Explain how a set of established criteria must be met for scientific explanations to be considered valid	Explain some of the criteria used to evaluate scientific explanations	Attempt to explain how scientific explanations must meet a set of established criteria to be considered valid

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*Physical Science*

<b>Standard 2: The Scientific Process: NATURE OF SCIENCE—Understand that science, technology, and society are interrelated</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENCE, TECHNOLOGY, AND SOCIETY	SC.PS.2.1 Explain how scientific advancements and emerging technologies have influenced society		The student: Describes a current scientific advancement or emerging technology, lists its key features and uses, and its possible impact on society (e.g., transportation, communication).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Evaluate a current scientific advancement or emerging technology and predict its influence on society	Explain how scientific advancements and emerging technologies have influenced society	Provide examples of the ways scientific advancements and emerging technologies have influenced society	Recognize that science and technology have influenced society
SCIENCE, TECHNOLOGY, AND SOCIETY	SC.PS.2.2 Compare the risks and benefits of potential solutions to technological issues		The student: Compares risks and benefits (e.g., in terms of the impact on populations, resources, health, disease, environment) of alternative solutions to a specific current technological issue (e.g., alternative energy).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Analyze the risks and benefits of potential solutions to technological issues and support that perspective	Compare the risks and benefits of potential solutions to technological issues	Describe the risks and benefits of potential solutions to technological issues	List risks and benefits of potential solutions to technological issues

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*Physical Science*

<b>Standard 3: Life and Environmental Sciences: ORGANISMS AND THE ENVIRONMENT—Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment</b>		
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>
	<i>No benchmark for Physical Science</i>	

<b>Standard 4: Life and Environmental Sciences: STRUCTURE AND FUNCTION IN ORGANISMS—Understand the structures and functions of living organisms and how organisms can be compared scientifically</b>		
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>
	<i>No benchmark for Physical Science</i>	

<b>Standard 5: Life and Environmental Sciences: DIVERSITY, GENETICS, AND EVOLUTION—Understand genetics and biological evolution and their impact on the unity and diversity of organisms</b>		
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>
	<i>No benchmark for Physical Science</i>	

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*Physical Science*

<b>Standard 6: Physical, Earth and Space Science: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
ENERGY AND ITS TRANSFORMATION	SC.PS.6.1 Describe endothermic and exothermic chemical reactions		The student: Gives examples of endothermic and exothermic reactions (e.g., cold pack and hot pack).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare and give examples of endothermic and exothermic reactions	Describe endothermic and exothermic chemical reactions	Give examples of endothermic and exothermic chemical reactions	Recognize an endothermic or exothermic chemical reaction
ENERGY AND ITS TRANSFORMATION	SC.PS.6.2 Explain how the law of conservation of energy is applied to various systems		The student: Explains how the law of conservation of energy describes the dynamics of various systems (e.g., work, thermal, electrical, potential and kinetic energy).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Use the law of conservation of energy to explain how energy systems are interrelated	Explain the law of conservation of energy and how it is applied to various systems	Provide examples of the law of conservation of energy and how it is applied to various systems	Define the law of conservation of energy

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*Physical Science*

<b>Standard 6: Physical, Earth and Space Science: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
ENERGY AND ITS TRANSFORMATION	SC.PS.6.3 Describe different examples of the concept of entropy		The student: Describes different examples of the flow of energy coming from an energy source, demonstrating that while the total energy of the universe remains constant, matter tends to become steadily less ordered as various energy transfers occur.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain examples of the concept of entropy and describe the flow of energy in each	Describe different examples of the concept of entropy	Recall examples of the concept of entropy	State the concept of entropy
ENERGY AND ITS TRANSFORMATION	SC.PS.6.4 Explain that changes in thermal energy can lead to a phase change of matter		The student: Describes that thermal energy exists in the random motion of atoms and molecules (e.g., the greater the temperature, the greater the atomic or molecular motion) and explains why temperature remains constant during phase changes.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare and explain the phases of matter and describe how thermal energies change, but the temperature remains constant during phase changes	Explain the phases of matter as differences in energy and that a change in thermal energy can lead to a phase change	Describe the phases of matter as differences in energy or that a change in thermal energy can lead to a phase change	List the phases of matter and recognize that the relative thermal energies are different



**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Physical Science*

<b>Standard 6: Physical, Earth and Space Science: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
WAVES	SC.PS.6.5 Compare transverse and longitudinal waves and their properties		The student: Compares the properties of transverse waves with those of longitudinal waves and discusses how these properties can model different wave phenomenon such as sound, mechanical, and electromagnetic waves (e.g., radio waves, visual light).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare transverse and longitudinal waves and their properties and apply them to real world phenomena	Compare transverse and longitudinal waves and their properties	Describe the properties of transverse and longitudinal waves	Provide examples of transverse and longitudinal waves
WAVES	SC.PS.6.6 Explain and provide examples of electromagnetic radiation and sound using a wave model		The student: Applies the principles of wave behavior to explain observed phenomena involving electromagnetic radiation and sound (e.g., why students talking in a classroom sound louder than in an open field).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain and provide examples of electromagnetic radiation and sound using a wave model and apply the wave model to describe an observed phenomenon	Explain and provide examples of electromagnetic radiation and sound using a wave model	Provide examples of electromagnetic radiation and sound or describe a wave model	Define electromagnetic radiation and sound

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*Physical Science*

<b>Standard 6: Physical, Earth and Space Science: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
NATURE OF MATTER	SC.PS.6.7 Explain how elements are arranged in the periodic table and describe trends among elemental properties		The student: Explains the arrangement of elements on the periodic table and the repeating patterns that occur in the periodic table among elements with similar properties.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare how elements are arranged in the periodic table and analyze trends among elemental properties	Explain how elements are arranged in the periodic table and describe trends among elemental properties	Describe how elements are arranged in the periodic table	Recall some patterns of elements on the periodic table
NATURE OF MATTER	SC.PS.6.8 Describe interactions among molecules		The student: Explains interactions among molecules (e.g., electrical forces, van der Waals forces, hydrogen bonds) and their relationship to the physical properties of compounds.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare interactions among molecules	Describe interactions among molecules	Provide examples of interactions among molecules	List types of interactions among molecules

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*Physical Science*

<b>Standard 6: Physical, Earth and Space Science: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
NATURE OF MATTER	SC.PS.6.9 Describe the factors that affect the rate of chemical reactions		The student: Describes the effects of temperature, concentration, physical state, and catalysts on the rate of a chemical reaction.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Predict how a combination of factors will affect the rate of chemical reactions	Describe the factors that affect the rate of chemical reactions	Describe some of the factors that affect the rate of chemical reactions	List factors that affect the rate of chemical reactions
NATURE OF MATTER	SC.PS.6.10 Explain how atoms bond using valence electrons		The student: Explains how valence electrons are shared or exchanged during chemical bond formation.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare and provide examples of chemical bond formations and the role of valence electrons	Explain how atoms bond using valence electrons	List ways that atoms may be bonded	Recognize that atoms may be bonded by gaining, losing, or sharing valence electrons

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*Physical Science*

<b>Standard 6: Physical, Earth and Space Science: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
NATURE OF MATTER	SC.PS.6.11 Describe a variety of chemical reactions		The student: Uses chemical formulas and balanced equations to describe a variety of chemical reactions (e.g., synthesis, decomposition, replacement).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Predict the products, balance the equations, and classify the types of chemical reactions	Describe a variety of chemical reactions using chemical formulas and balanced equations	Identify simple chemical reactions using chemical formulas and balanced equations	Recall a variety of chemical reactions
ENERGY AND ITS TRANSFORMATION	SC.PS.6.12 Describe nuclear reactions and how they produce energy		The student: Describes ways energy is produced by nuclear reactions (e.g., decay, fusion and fission).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain ways that nuclear energy is produced and used	Describe nuclear reactions and how they produce energy	Provide examples of energy production in a nuclear reaction	Recall that nuclear reactions convert a fraction of the mass of interacting particles into energy

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Physical Science*

<b>Standard 7: Physical, Earth, and Space Sciences: FORCE AND MOTION—Understand the relationship between force, mass, and motion of objects; and know the major natural forces: gravitational, electric, and magnetic</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
FORCES AND MOTION	SC.PS.7.1 Apply the laws of motion to determine the effects of forces on the linear motion of objects		The student: Illustrates Newton’s laws of motion by analyzing and solving simple problems related to force and motion.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Use the laws of motion to analyze or predict events in the environment	Apply the laws of motion to determine the effects of forces on the linear motion of objects	Provide examples of how the laws of motion affect the linear motion of objects	List the laws of motion
FORCES AND MOTION	SC.PS.7.2 Use vectors to explain force and motion		The student: Solves force and motion vector problems graphically.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Construct and use vectors to solve force and motion problems	Use vectors to explain force and motion	Given force vectors, explain force and motion	Recognize that vectors describe magnitude and direction of forces or motion

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
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*Physical Science*

**Standard 7: Physical, Earth, and Space Sciences: FORCE AND MOTION—Understand the relationship between force, mass, and motion of objects; and know the major natural forces: gravitational, electric, and magnetic**

TOPIC	BENCHMARK	SAMPLE PERFORMANCE ASSESSMENT		
FORCES OF THE UNIVERSE	SC.PS.7.3 Explain the relationship among the gravitational force, the mass of the objects, and the distance between objects	The student: Describes what happens to the magnitude of the gravitational force as distance between and/or masses of the objects change.		
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Mathematically explain the effect of changing mass and changing distance on the gravitational force	Explain the relationship among the gravitational force, the mass of the objects, and the distance between objects	Describe the effect of changing mass and changing distance on the gravitational force	Recognize that the gravitational force is dependent on the masses of the objects and the distance between them
FORCES OF THE UNIVERSE	SC.PS.7.4 Explain the magnetic and electric forces in the universe	The student: Describes the magnetic and electric forces in the universe.		
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare and explain how magnetic forces are closely related to electric forces	Explain how magnetic forces are closely related to electric forces	Describe that magnetic forces are closely related to electric forces	Recognize that magnetic forces are closely related to electric forces

**Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents**

TOPIC	BENCHMARK	SAMPLE PERFORMANCE ASSESSMENT		
	<i>No benchmark for Physical Science</i>			

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Biological Science*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>		
SCIENTIFIC INQUIRY	SC.BS.1.1 Describe how a testable hypothesis may need to be revised to guide a scientific investigation	The student: Describes a testable hypothesis and revises it based on data from biological science investigations and primary sources (e.g., results, class data, information from a reputable source).		
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Revise a testable hypothesis based on new data to guide a scientific investigation	Describe how a testable hypothesis may need to be revised to guide a scientific investigation	Give an example of one way to revise a testable hypothesis	Recognize that a hypothesis may need revision

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Biological Science*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>			
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC INQUIRY	SC.BS.1.2 Design and safely implement an experiment, including the appropriate use of tools and techniques to organize, analyze, and validate data	The student: Prepares a biological science lab report documenting the procedure(s) and the safe and appropriate use of tools (e.g., computer probes, meters, timers) and techniques (e.g., repeated trials, statistics, significant figures, spreadsheets, databases) to organize, analyze, and validate data.	
<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>
	Report thoroughly the significant and other relevant details related to the design selected for an experiment, including the safe and appropriate use of tools and techniques to organize, analyze, and validate data	Report the significant details related to the design selected for an experiment, including the safe and appropriate use of tools and techniques to organize, analyze, and validate data	Report some details related to the design selected for an experiment, including the safe and appropriate use of tools and techniques to organize, analyze, and validate data
			<b>Novice</b>
			Report very few details related to the design selected for an experiment, including the safe and appropriate use of tools and techniques to organize, analyze, and validate data



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*Biological Science*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC INQUIRY	SC.BS.1.3 Defend and support conclusions, explanations, and arguments based on logic, scientific knowledge, and evidence from data		The student: Prepares a biological science lab report that draws logical conclusions and formulates explanations and arguments from the results of investigations.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Defend conclusions, explanations, and arguments that are supported by logic, scientific knowledge, and evidence from data and suggest implications	Defend conclusions, explanations, and arguments that are supported by logic, scientific knowledge, and evidence from data	Present conclusions, explanations, and arguments that are partially supported by logic, scientific knowledge, or evidence from data	Present unsupported conclusions, explanations, and arguments
SCIENTIFIC INQUIRY	SC.BS.1.4 Determine the connection(s) among hypotheses, scientific evidence, and conclusions		The student: Prepares a biological science lab report that supports or refutes a hypothesis based on an analysis of experimental data.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Determine and justify logical connection(s) and implications among hypotheses, scientific evidence, and conclusions	Determine logical connection(s) among hypotheses, scientific evidence, and conclusions	Identify some connections between hypotheses, scientific evidence, or conclusions	Make unsubstantiated connection(s) among hypotheses, scientific evidence, and conclusions

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
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*Biological Science*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC INQUIRY	SC.BS.1.5 Communicate the components of a scientific investigation, using appropriate techniques		The student: Presents the question, testable hypothesis, experimental design, analysis of data, and conclusions to the biological science class using appropriate methods of communication (e.g., PowerPoint, essay, oral presentation, poster board, lab report, research paper).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Consistently present, in detail, all components of a scientific investigation, using appropriate techniques	Usually present all components of a scientific investigation, using appropriate techniques	Sometimes present the components of a scientific investigation, using appropriate techniques	Rarely present the components of a scientific investigation
SCIENTIFIC INQUIRY	SC.BS.1.6 Engage in and explain the importance of peer review in science		The student: Examines a peer’s biological science investigation for logic and validity based on evidence. Explains the importance of peer review to the process of scientific inquiry.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Effectively participate in peer review. Explain the principal and other relevant reasons for peer review in science	Engage actively in peer review. Explain the principal reasons for peer review in science	Participate in peer review. Explain some reasons for peer review in science	Participate in peer review. Not able to explain the reasons for peer review in science

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*Biological Science*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC KNOWLEDGE	SC.BS.1.7 Revise, as needed, conclusions and explanations based on new evidence		The student: Reflects on new biological science evidence from other valid sources and revises conclusion and explanations as needed. Includes recommendations for improving the investigation.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Revise and justify conclusions and explanations based on new evidence	Revise conclusions and explanations logically based on new evidence	Make few revisions to conclusions and explanations partially based on new evidence	Make very few revisions to conclusions and explanations
SCIENTIFIC KNOWLEDGE	SC.BS.1.8 Describe the importance of ethics and integrity in scientific investigation		The student: Identifies and describes biological science examples of ethical and unethical experimentation, citation, and conclusions (e.g., provides guidelines concerning the appropriate treatment of living things and the environment, credits sources, reduces bias, sometimes adds constraints).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain and give examples of the principal and other relevant reasons for ethics and integrity in scientific investigation	Describe the principal reasons for ethics and integrity in scientific investigation	Describe some reasons for ethics and integrity in scientific investigation	Describe very few reasons for ethics and integrity in scientific investigation

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Biological Science*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>			
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>
SCIENTIFIC KNOWLEDGE	SC.BS.1.9 Explain how scientific explanations must meet a set of established criteria to be considered valid		The student: Describes how a published study meets the criteria of scientific explanations (e.g., they must be consistent with experimental and observational evidence about nature, make accurate predictions about systems being studied, be logical, abide by the rules of evidence, be open to questions and modifications, be based on historical and current scientific knowledge, and make a commitment to making the knowledge public) in order to draw conclusions about the study’s validity.
	<b>RUBRIC</b>		
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>
Analyze a scientific explanation to determine if it meets a set of established criteria	Explain how a set of established criteria must be met for scientific explanations to be considered valid	Explain some of the criteria used to evaluate scientific explanations	Attempt to explain how scientific explanations must meet a set of established criteria to be considered valid

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Biological Science*

<b>Standard 2: The Scientific Process: NATURE OF SCIENCE—Understand that science, technology, and society are interrelated</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENCE, TECHNOLOGY, AND SOCIETY	SC.BS.2.1 Explain how scientific advancements and emerging technology have influenced society		The student: Describes a current scientific advancement or emerging technology, lists its key features and uses, and possible impact on society (e.g., applications of DNA technology, microscopy, stem cell research).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Evaluate a current scientific advancement or emerging technology and predict its influence on society	Explain how scientific advancements and emerging technology have influenced society	Provide examples of the ways scientific advancements and emerging technology have influenced society	Recognize that science and technology have influenced society
SCIENCE, TECHNOLOGY, AND SOCIETY	SC.BS.2.2 Compare the risks and benefits of potential solutions to technological issues		The student: Compares risks and benefits (e.g., in terms of the impact on populations, resources, health, disease, environment) of alternative solutions to a specific current technological issue (e.g., biotechnology).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Analyze the risks and benefits of potential solutions to technological issues and support that perspective	Compare the risks and benefits of potential solutions to technological issues	Describe the risks and benefits of potential solutions to technological issues	List risks and benefits of potential solutions to technological issues

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Biological Science*

<b>Standard 3: Life and Environmental Sciences: ORGANISMS AND THE ENVIRONMENT—Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
CYCLES OF MATTER AND ENERGY	SC.BS.3.1 Describe biogeochemical cycles within ecosystems		The student: Describes, using diagrams, the cycling of biogeochemical compounds (e.g., water, carbon, nitrogen, oxygen, potassium) through living and nonliving systems and explains the importance of these cycles to support life.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare, through descriptions and illustrations, biogeochemical cycles within ecosystems	Describe biogeochemical cycles within ecosystems	Name biogeochemical cycles within ecosystems	Recall that biogeochemical cycles exist within ecosystems
CYCLES OF MATTER AND ENERGY	SC.BS.3.2 Explain the chemical reactions that occur in photosynthesis and cellular respiration that result in cycling of energy		The student: Describes the interrelationships between cellular respiration and photosynthesis (inputs and outputs) that result in the cycling of energy.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare the chemical reactions that occur in photosynthesis and cellular respiration that result in cycling of energy and explain the interrelationship that occurs between the two processes	Explain the chemical reactions that occur in photosynthesis and cellular respiration that result in cycling of energy	Describe the chemical reactions that occur in photosynthesis or the chemical reactions that occur in cellular respiration that result in cycling of energy	Recall that chemical reactions occur in photosynthesis and cellular respiration

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
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*Biological Science*

<b>Standard 3: Life and Environmental Sciences: ORGANISMS AND THE ENVIRONMENT—Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
CYCLES OF MATTER AND ENERGY	SC.BS.3.3 Explain how matter and energy flow through living systems and the physical environment		The student: Describes and illustrates the path of energy and matter through living systems and the physical environment (e.g. food chains, food webs, trophic levels, biomass).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Diagram and explain the flow of matter and energy through living systems and the physical environment. Compare different energy pathways	Explain how matter and energy flow through living systems and the physical environment	Describe how matter or how energy flows through living systems or through the physical environment	Recall that matter and energy flow through living systems and the physical environment

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*Biological Science*

<b>Standard 3: Life and Environmental Sciences: ORGANISMS AND THE ENVIRONMENT—Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment</b>			
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
INTERDEPENDENCE	SC.BS.3.4 Explain dynamic equilibrium in organisms, populations, and ecosystems; explain the effect of equilibrium shifts	The student: Describes dynamic equilibrium in an organism, population, and ecosystem, including how a fluctuating state of approximate equilibrium is maintained (e.g., homeostatic mechanisms; growth of a population held in check by environmental factors such as depletion of food or nesting sites, predators, or parasites) and explains what happens if the equilibrium shifts (e.g., due to climate changes, immigration, emigration, birth and death rates).	
	<b>RUBRIC</b>		
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>
Explain and give examples of dynamic equilibrium in organisms, populations, and ecosystems; and compare the effect of equilibrium shifts	Explain dynamic equilibrium in organisms, populations, and ecosystems; and explain the effect of equilibrium shifts	Describe dynamic equilibrium in organisms, populations, and ecosystems or describe the effect of equilibrium shifts	Define dynamic equilibrium in organisms, populations, and ecosystems



**HAWAII CONTENT AND PERFORMANCE STANDARDS  
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*Biological Science*

<b>Standard 4: Life and Environmental Sciences: STRUCTURE AND FUNCTION IN ORGANISMS—Understand the structures and functions of living organisms and how organisms can be compared scientifically</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
CELLS, TISSUES, ORGANS, AND ORGAN SYSTEMS	SC.BS.4.1 Describe different cell parts and their functions		The student: Describes the parts of a cell (e.g., cell wall, cell membrane, cytoplasm, cell organelles such as the nucleus, chloroplast, mitochondrion, Golgi apparatus, flagella) and explains the functions of each part (e.g., transport of materials, storage of genetic information, photosynthesis and respiration, synthesis of new molecules, locomotion).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain the relationship among specific cell parts in key cellular processes	Describe different cell parts and their functions	Identify some of the cell parts and their functions	Recall that cells contain parts that serve different functions
CELLS, TISSUES, ORGANS, AND ORGAN SYSTEMS	SC.BS.4.2 Explain how cells are specialized into different tissues and organs		The student: Describes how cell structure and function are specific to tissues and organs (e.g., blood cells carry oxygen, muscle cells contract, liver cells detoxify poisons).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare and explain how cells are specialized into different tissues and organs based on function	Explain how cells are specialized into different tissues and organs	Describe cells that are specialized into different tissues and organs	Recall that cells are specialized into different tissues and organs

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Biological Science*

<b>Standard 4: Life and Environmental Sciences: STRUCTURE AND FUNCTION IN ORGANISMS—Understand the structures and functions of living organisms and how organisms can be compared scientifically</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
CELLS, TISSUES, ORGANS, AND ORGAN SYSTEMS	SC.BS.4.3 Differentiate between the processes of mitosis and meiosis		The student: Compares the processes of mitosis and meiosis.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare the differences between mitosis and meiosis and their role in reproduction	Differentiate between the processes of mitosis and meiosis	Describe the processes of mitosis and of meiosis	Recall that mitosis and meiosis have different processes
CELLS, TISSUES, ORGANS, AND ORGAN SYSTEMS	SC.BS.4.4 Describe how homeostatic balance occurs in cells and organisms		The student: Explains how a specific system responds to or compensates for a change in physiological or environmental conditions (e.g., cell, tissue, organ, organ system; osmosis and diffusion).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain how one homeostatic process affects another in maintaining balance in cells and organisms	Describe how homeostatic balance occurs in cells and organisms	Give examples that homeostatic balance occurs in cells or in organisms	Define homeostatic balance in cells and organisms

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SCIENCE GRADES K-12**

*Biological Science*

<b>Standard 4: Life and Environmental Sciences: STRUCTURE AND FUNCTION IN ORGANISMS—Understand the structures and functions of living organisms and how organisms can be compared scientifically</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
CELLS, TISSUES, ORGANS, AND ORGAN SYSTEMS	SC.BS.4.5 Describe the components and functions of a variety of macromolecules active in biological systems		The student: Identifies the building blocks and explains the functions of a variety of macromolecules active in biological systems (i.e., carbohydrates, nucleic acids, lipids, and proteins).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain how macromolecules interact in biological systems	Describe the functions and components of a variety of macromolecules active in biological systems	Identify the components of macromolecules and some of the functions of the macromolecules active in biological systems	Recall that macromolecules are composed of smaller components and serve a specific function in biological systems
CLASSIFICATION	SC.BS.4.6 Explain the organization of life on Earth using the modern classification system		The student: Classifies a variety of organisms using the modern classification system and explains the evidence that supports the system's organization (e.g., structural similarities, the fossil records, genetic relationships among organisms).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Decide how to classify organisms that do not easily fit into the modern classification system	Explain the evidence supporting the modern classification system and use this to classify various organisms	Identify the levels used in the modern classification system	Recall that organisms can be classified using the modern classification system

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*Biological Science*

**Standard 5: Life and Environmental Sciences: DIVERSITY, GENETICS, AND EVOLUTION—Understand genetics and biological evolution and their impact on the unity and diversity of organisms**

TOPIC	BENCHMARK	SAMPLE PERFORMANCE ASSESSMENT			
BIOLOGICAL EVOLUTION	SC.BS.5.1 Explain the theory of evolution and describe evidence that supports this theory	The student: Explains that the Earth’s present day life forms have evolved from earlier distinctly different species and describes molecular and anatomical evidences (e.g., DNA, protein sequence analysis, comparative embryology, fossil records) that support the theory of evolution.			
	<b>RUBRIC</b>				
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>	
Explain the evolution of a present day organism based on molecular and anatomical evidence	Explain the theory of evolution and describe the evidence that supports it	Define the theory of evolution and name the evidence that supports it	Recognize the theory of evolution		
BIOLOGICAL EVOLUTION	SC.BS.5.2 Explain the theory of natural selection	The student: Describes the theory of natural selection and gives examples of how it accounts for the diversity and unity of past and present life forms (e.g., Darwin’s finches, snails, Nene, lobelia, silverswords, honeycreepers).			
	<b>RUBRIC</b>				
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>	
Use the theory of natural selection to analyze the differences between related organisms	Explain the theory of natural selection and cite specific examples	Define the theory of natural selection	Recognize the theory of natural selection		

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*Biological Science*

**Standard 5: Life and Environmental Sciences: DIVERSITY, GENETICS, AND EVOLUTION—Understand genetics and biological evolution and their impact on the unity and diversity of organisms**

TOPIC	BENCHMARK	SAMPLE PERFORMANCE ASSESSMENT		
UNITY AND DIVERSITY	SC.BS.5.3 Explain the structural properties of DNA and the role of DNA in heredity and protein synthesis	The student: Diagrams and explains the role of DNA in heredity and protein synthesis (e.g., DNA replication, translation, transcription, mRNA, codons).		
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain how changes in the structure of DNA can lead to changes in proteins and inherited traits	Explain the structural properties of DNA and the role of DNA in protein synthesis and heredity	Describe the structural properties of DNA and the role of DNA in heredity	Recall the structural properties of DNA and that DNA is involved in heredity
UNITY AND DIVERSITY	SC.BS.5.4 Explain how Mendel’s laws of heredity can be used to determine the traits of possible offspring	The student: Describes the various gene combinations of two parents to determine the genotype and phenotype of possible offspring using Mendel’s laws.		
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain Mendel’s laws of segregation and independent assortment and use them to predict the genotype and phenotype of possible offspring	Explain the genotype and phenotype of possible offspring using Mendel’s laws of segregation and independent assortment	Describe that genes are passed to offspring according to Mendel’s laws of heredity	Recognize that Mendel’s laws demonstrate heredity

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*Biological Science*

**Standard 5: Life and Environmental Sciences: DIVERSITY, GENETICS, AND EVOLUTION—Understand genetics and biological evolution and their impact on the unity and diversity of organisms**

TOPIC	BENCHMARK	SAMPLE PERFORMANCE ASSESSMENT		
UNITY AND DIVERSITY	SC.BS.5.5 Explain chromosomal mutations, their possible causes, and their effects on genetic variation	The student: Describes a human chromosomal disorder, its causes, and its effects on genetic variation (e.g., sickle cell anemia, Down Syndrome, Cystic Fibrosis).		
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain chromosomal mutations, possible causes, and predict the effect of a specific mutation on genetic variation in an organism or species	Explain chromosomal mutations, possible causes, and their effect on genetic variation	Describe chromosomal mutations and some of the possible causes and effects on genetic variation	Recognize that chromosomal mutations occur

**Standard 6: Physical, Earth, and Space Sciences: NATURE OF MATTER AND ENERGY—Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe**

TOPIC	BENCHMARK	SAMPLE PERFORMANCE ASSESSMENT
	<i>No benchmark for Biological Science</i>	

**Standard 7: Physical, Earth, and Space Sciences: FORCE AND MOTION—Understand the relationship between force, mass, and motion of objects; and know the major natural forces: gravitational, electric, and magnetic**

TOPIC	BENCHMARK	SAMPLE PERFORMANCE ASSESSMENT
	<i>No benchmark for Biological Science</i>	

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*Biological Science*

<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>		
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>
	<i>No benchmark for Biological Science</i>	

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**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Earth Space Science*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>		
SCIENTIFIC INQUIRY	SC.ES.1.1 Describe how a testable hypothesis may need to be revised to guide a scientific investigation	The student: Describes a testable hypothesis and revises it based on data from earth and space science investigations and primary sources (e.g., results, class data, information from a reputable source).		
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Revise a testable hypothesis based on new data to guide a scientific investigation	Describe how a testable hypothesis may need to be revised to guide a scientific investigation	Give an example of one way to revise a testable hypothesis	Recognize that a hypothesis may need revision

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
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*Earth Space Science*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>			
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC INQUIRY	SC.ES.1.2 Design and safely implement an experiment, including the appropriate use of tools and techniques to organize, analyze, and validate data	The student: Prepares an earth and space science lab report documenting the procedure(s) and the safe and appropriate use of tools (e.g., computer probes, meters, timers) and techniques (e.g., repeated trials, statistics, significant figures, spreadsheets, databases) to organize, analyze, and validate data.	
<b>RUBRIC</b>			
<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
Report thoroughly the significant and other relevant details related to the design selected for an experiment, including the safe and appropriate use of tools and techniques to organize, analyze, and validate data	Report the significant details related to the design selected for an experiment, including the safe and appropriate use of tools and techniques to organize, analyze, and validate data	Report some details related to the design selected for an experiment, including the safe and appropriate use of tools and techniques to organize, analyze, and validate data	Report very few details related to the design selected for an experiment, including the safe and appropriate use of tools and techniques to organize, analyze, and validate data

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*Earth Space Science*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC INQUIRY	SC.ES.1.3 Defend and support conclusions, explanations, and arguments based on logic, scientific knowledge, and evidence from data		The student: Prepares an earth and space science lab report that draws logical conclusions and formulates explanations and arguments from the results of investigations.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Defend conclusions, explanations, and arguments that are supported by logic, scientific knowledge, and evidence from data, and suggest implications	Defend conclusions, explanations, and arguments that are supported by logic, scientific knowledge, and evidence from data	Present conclusions, explanations, and arguments that are partially supported by logic, scientific knowledge, or evidence from data	Present unsupported conclusions, explanations, and arguments
SCIENTIFIC INQUIRY	SC.ES.1.4 Determine the connection(s) among hypotheses, scientific evidence, and conclusions		The student: Prepares an earth and space science lab report that supports or refutes a hypothesis based on an analysis of experimental data.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Determine and justify logical connection(s) and implications among hypotheses, scientific evidence, and conclusions	Determine logical connection(s) among hypotheses, scientific evidence, and conclusions	Identify some connections between hypotheses, scientific evidence, or conclusions	Make unsubstantiated connection(s) among hypotheses, scientific evidence, and conclusions

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*Earth Space Science*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC INQUIRY	SC.ES.1.5 Communicate the components of a scientific investigation, using appropriate techniques		The student: Presents the question, testable hypothesis, experimental design, analysis of data, and conclusions to the earth and space science class, using appropriate methods of communication (e.g., PowerPoint, essay, oral presentation, poster board, lab report, research paper).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Consistently present, in detail, all components of a scientific investigation, using appropriate techniques	Usually present all components of a scientific investigation, using appropriate techniques	Sometimes present the components of a scientific investigation, using appropriate techniques	Rarely present the components of a scientific investigation
SCIENTIFIC INQUIRY	SC.ES.1.6 Engage in and explain the importance of peer review in science		The student: Examines a peer’s earth and space science investigation for logic and validity based on evidence. Explains the importance of peer review to the process of scientific inquiry.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Effectively participate in peer review. Explain the principal and other relevant reasons for peer review in science	Engage actively in peer review. Explain the principal reasons for peer review in science.	Participate in peer review. Explain some reasons for peer review in science	Participate in peer review. Not able to explain the reasons for peer review in science

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*Earth Space Science*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENTIFIC KNOWLEDGE	SC.ES.1.7 Revise, as needed, conclusions and explanations based on new evidence		The student: Reflects on new earth and space science evidence from other valid sources and revises conclusion and explanations as needed. Includes recommendations for improving the investigation.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Revise and justify conclusions and explanations based on new evidence	Revise conclusions and explanations logically based on new evidence	Make few revisions to conclusions and explanations partially based on new evidence	Make very few revisions to conclusions and explanations
SCIENTIFIC KNOWLEDGE	SC.ES.1.8 Describe the importance of ethics and integrity in scientific investigation		The student: Identifies and describes earth and space science examples of ethical and unethical experimentation, citation, and conclusions (e.g., provides guidelines concerning the appropriate treatment of living things and the environment; credits sources; reduces bias; sometimes adds constraints).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain and give examples of the principal and other relevant reasons for ethics and integrity in scientific investigation	Describe the principal reasons for ethics and integrity in scientific investigation	Describe some reasons for ethics and integrity in scientific investigation	Describe very few reasons for ethics and integrity in scientific investigation

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*Earth Space Science*

<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION—Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>			
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>
SCIENTIFIC KNOWLEDGE	SC.ES.1.9 Explain how scientific explanations must meet a set of established criteria to be considered valid		The student: Describes how a published or an original earth and space science study meets the criteria of scientific explanations (e.g., they must be consistent with experimental and observational evidence about nature, make accurate predictions about systems being studied, be logical, abide by the rules of evidence, be open to questions and modifications, be based on historical and current scientific knowledge, and make a commitment to making the knowledge public) in order to draw conclusions about the study’s validity.
<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>
	Analyze a scientific explanation to determine if it meets a set of established criteria	Explain how a set of established criteria must be met for scientific explanations to be considered valid	Explain some of the criteria used to evaluate scientific explanations
			<b>Novice</b>
			Attempt to explain how scientific explanations must meet a set of established criteria to be considered valid

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Earth Space Science*

<b>Standard 2: The Scientific Process: NATURE OF SCIENCE—Understand that science, technology, and society are interrelated</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENCE, TECHNOLOGY, AND SOCIETY	SC.ES.2.1 Explain how scientific advancements and emerging technology have influenced society		The student: Describes a current scientific advancement or emerging technology, lists its key features and uses, and possible influence on society (e.g., space explorations, weather prediction, the Doppler effect).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Evaluate a current scientific advancement or emerging technology and predict its influence on society	Explain how scientific advancements and emerging technology have influenced society	Provide examples of the ways scientific advancements and emerging technology have influenced society	Recognize that science and technology have influenced society
SCIENCE, TECHNOLOGY, AND SOCIETY	SC.ES.2.2 Compare the risks and benefits of potential solutions to technological issues		The student: Compares risks and benefits (e.g., in terms of the impact on populations, resources, health, disease, environment) of alternative solutions to a specific current technological issue (e.g., satellite communication, alternative energy).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Analyze the risks and benefits of potential solutions to technological issues and support that perspective	Compare the risks and benefits of potential solutions to technological issues	Describe the risks and benefits of potential solutions to technological issues	List risks and benefits of potential solutions to technological issues

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
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*Earth Space Science*

<b>Standard 2: The Scientific Process: NATURE OF SCIENCE—Understand that science, technology, and society are interrelated</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
SCIENCE, TECHNOLOGY, AND SOCIETY	SC.ES.2.3 Explain the impact of humans on the Earth system		The student: Explains how humans have affected the Earth system (e.g., renewable vs. nonrenewable resources, water and air pollution).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Analyze and propose solutions to reduce the human impact on the Earth system	Explain the impact of humans on the Earth system	Provide examples of how humans impact the Earth system	Recognize that humans impact the Earth system
SCIENCE, TECHNOLOGY, AND SOCIETY	SC.ES.2.4 Describe technologies used to collect information about the universe		The student: Describes several different technologies used to study the universe (e.g., optical, radio, and X-ray telescopes, space probes, satellites, spectroscope) and the types of information gathered from each.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain how the evolution of technology is related to our understanding of the universe	Describe technologies used to collect information about the universe	Provide examples of technologies used to collect information about the universe	Recall that different technologies are used to collect information about the universe



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*Earth Space Science*

<b>Standard 3: Life and Environmental Sciences: ORGANISMS AND THE ENVIRONMENT—Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment</b>		
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>
	<i>No benchmark for Earth Space Science</i>	

<b>Standard 4: Life and Environmental Sciences: STRUCTURE AND FUNCTION IN ORGANISMS—Understand the structures and functions of living organisms and how organisms can be compared scientifically</b>		
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>
	<i>No benchmark for Earth Space Science</i>	

<b>Standard 5: Life and Environmental Sciences: DIVERSITY, GENETICS, AND EVOLUTION—Understand genetics and biological evolution and their impact on the unity and diversity of organisms</b>		
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>
	<i>No benchmark for Earth Space Science</i>	

<b>Standard 6: Physical, Earth, and Space Sciences: NATURE OF MATTER AND ENERGY— Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe</b>		
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>
	<i>No benchmark for Earth Space Science</i>	

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*Earth Space Science*

<b>Standard 7: Physical, Earth, and Space Sciences: FORCE AND MOTION— Understand the relationship between force, mass, and motion of objects; and know the major natural forces: gravitational, electric, and magnetic</b>		
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>
	<i>No benchmark for Earth Space Science</i>	

<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>			
<b>TOPIC</b>	<b>BENCHMARK</b>	<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
FORCES THAT SHAPE THE EARTH	SC.ES.8.1 Describe how elements and water move through solid Earth, the oceans, atmosphere, and living things as part of geochemical cycles	The student: Describes the flow of elements in their geochemical cycles (e.g., water cycle, carbon cycle) as they pass through the lithosphere, hydrosphere, and atmosphere.	
	<b>RUBRIC</b>		
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>
Explain the impact of alterations to any of the geochemical cycles	Describe how elements and water move through solid Earth, the oceans, atmosphere and living things as part of geochemical cycles	Diagram how the elements and water move through solid Earth, the oceans, atmosphere and living things as part of geochemical cycles	Provide examples of how elements and water move through solid Earth, the oceans, atmosphere and living things as part of geochemical cycles

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*Earth Space Science*

<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
FORCES THAT SHAPE THE EARTH	SC.ES.8.2 Describe how to estimate geologic time		The student: Describes how scientists use rock sequences, fossils, and radioactive dating to estimate the age of fossils and the age of Earth itself.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare the various methods used to estimate geologic time	Describe how different methods are used to estimate geologic time	Give examples of some methods used to estimate geologic time	Recognize that the Earth’s history is divided into geologic time periods
EARTH IN THE SOLAR SYSTEM	SC.ES.8.3 Explain the possible origins and evolution of the solar system		The student: Describes and diagrams the formation of the solar system.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Predict the impact of the aging solar system on the Earth	Explain the possible origins and evolution of the solar system	Name possible origins and evolution of the solar system	Recognize that everything in the solar system was formed from the same stellar material

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
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*Earth Space Science*

<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
FORCES THAT SHAPE THE EARTH	SC.ES.8.4 Describe how heat and energy transfer into and out of the atmosphere and their involvement in global climate		The student: Diagrams heat transfer into and out of the atmosphere, labels the type of energy transfer (e.g., radiation, conduction, convection/advection), and explains how it affects changes in global climate.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
Predict how changes in heat and energy transfer into and out of the atmosphere would affect global climate	Describe how heat and energy transfer into and out of the atmosphere and their involvement in global climate	Provide examples of how heat and energy transfer into and out of the atmosphere and their involvement in global climate	Recognize that heat and energy transfer into and out of the atmosphere	

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*Earth Space Science*

<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
FORCES THAT SHAPE THE EARTH	SC.ES.8.5 Explain the effects of movements of crustal plates		The student: Explains the effects produced at each boundary (e.g., mountain building, earthquakes, tsunami), and the impact on society (e.g., natural disaster safety, building requirements).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Develop safety recommendations for living in tectonically active areas	Explain the effects of movements of crustal plates	Provide examples of the effects of movements of crustal plates	Recognize the effects of movements of crustal plates
FORCES THAT SHAPE THE EARTH	SC.ES.8.6 Describe how winds and ocean currents are produced on the Earth’s surface		The student: Labels and explains wind and ocean currents on weather maps and explains some of the factors that cause them (e.g., differential heating of the Earth’s land masses, oceans, and air by the sun; gravitational forces acting on different temperatures and densities in the ocean and air; effects of the Earth’s rotation).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Analyze how winds and ocean currents affect the climatic and ocean conditions of Hawaii	Describe how winds and ocean currents are produced on the Earth’s surface	Identify how winds or ocean currents are produced on the Earth’s surface	Provide examples of winds and ocean currents in Hawaii

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*Earth Space Science*

<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
FORCES THAT SHAPE THE EARTH	SC.ES.8.7 Describe climate and weather patterns associated with certain geographic locations and features		The student: Describes the relationships between certain geographic locations (e.g., latitude, proximity to large bodies of water, mountain range) and specific weather patterns (e.g., tornado alley, hurricane, drought, orographic rainfall).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Analyze how climate and weather patterns are associated with certain geographic locations and features	Describe climate and weather patterns associated with certain geographic locations and features	Provide examples of climate and weather patterns associated with certain geographic locations and features	Recognize that climate and weather patterns are associated with certain geographic locations and features
EARTH IN THE SOLAR SYSTEM	SC.ES.8.8 Describe the major internal and external sources of energy on Earth		The student: Explains that while the sun is the major source of energy on Earth, the Earth also contributes its own internal energy to the Earth System (e.g., radioactive isotopes and gravitational energy from the Earth’s formation).	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Explain how the major internal and external sources of energy drive the Earth’s systems	Describe the major internal and external sources of energy on Earth	Identify the major internal or the major external sources of energy on Earth	Recognize that the Earth has internal and external sources of energy

**HAWAII CONTENT AND PERFORMANCE STANDARDS  
SCIENCE GRADES K-12**

*Earth Space Science*

<b>Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE—Understand the Earth and its processes, the solar system, and the universe and its contents</b>				
<b>TOPIC</b>	<b>BENCHMARK</b>		<b>SAMPLE PERFORMANCE ASSESSMENT</b>	
THE UNIVERSE	SC.ES.8.9 Describe the physical and nuclear dynamics involved in the life cycle of a star		The student: Illustrates the life cycle of a star, including the physical and nuclear processes involved in the formation, evolution, and death of a star, and notes that life cycles vary among stars.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Analyze the patterns of various stars (e.g., mass, temperature) to determine its specific life cycle	Describe the physical and nuclear dynamics involved in the life cycle of a star	Provides examples of the physical or nuclear processes involved in the life cycle of a star	Recognize that physical and nuclear processes are involved in the life cycle of a star
THE UNIVERSE	SC.ES.8.10 Compare different theories concerning the formation of the universe		The student: Compares the Big Bang Theory to another theory of the origin of the universe (includes supporting evidence for both theories and evidence that refutes the theories) and recommends which theory is more plausible.	
	<b>RUBRIC</b>			
	<b>Advanced</b>	<b>Proficient</b>	<b>Partially Proficient</b>	<b>Novice</b>
	Compare different theories and recommend and justify which theory is more plausible	Compare different theories concerning the formation of the universe	Illustrate the Big Bang Theory	Recognize that there are different theories concerning the formation of the universe

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## APPENDIX B: GLOSSARY OF SCIENCE TERMS

**Anatomical evidence:** evidence gathered from body structure and its composition.

**Big Bang Theory:** theory that our universe began with the start of an expansion from a highly condensed point of matter long ago.

**Biological abnormalities:** abnormalities rooted in the life processes.

**Biotic/Abiotic:** biotic refers to features of the biosphere that are living or were once living. Abiotic refers to the non-living, physical features of the biosphere. Examples of abiotic features include sunlight, air, water, soil, temperature, and climate.

**Carrying capacity:** the largest number of individuals of a specific species that an ecosystem can support over time.

**Celestial:** of or relating to that which exists outside of the earth (as contrasted with terrestrial).

**Chemical reaction:** chemicals interacting with each other to form something new.

**Communication technology:** technology that deals with the speed and transfer of information and the assurance that what is sent is also received.

**Configuration of atoms and molecules:** the three-dimensional positions, and energy levels unique to particular atoms (electron cloud model) and molecules.

**Consumer:** in the biological sense, an organism that can not produce its own food (energy-rich molecules) and must eat other organisms for food.

**Cultivated plants and domestic animals:** refer to plants and animals raised, bred, and cared for by humans.

**“Cycles of matter and energy”:** covers the important nutrient cycles, how living things contribute and take from their environment, and how energy flows through living systems, primarily through the processes of photosynthesis and cellular respiration.

**Darwin’s Theory of Evolution (Biological evolution):** Developed from Charles Darwin’s hypothesis that organisms inherited traits. Those traits that gave organisms advantages in competition and survival were more likely to survive, reproduce, and pass on their traits to the next generation [natural selection]. Over time, as evidence was collected, Darwin’s hypothesis became the Theory of Evolution by Natural Selection, which is accepted by most scientists today.

**Degree of relatedness:** the extent to which two or more organisms are similar genotypically.

**Earth materials:** the geochemicals that make up the Earth. It includes elements and compounds, rocks and minerals, renewable and non-renewable resources.

**Earth's subsystems:** interacting parts within the Earth and having unique properties. Examples include: Geochemical Cycles, Atmospheric Systems, Oceanic Systems, and Ecosystems.

**Ecosystem:** all the living things in a given area and their non-living environment.

**Electric force:** the attractive or repulsive force exerted by all charged objects on each other.

**Electromagnetic waves vs. electromagnetic radiation vs. electromagnetic spectrum:** wave that is both electric and magnetic and carries energy from vibrating electric charges in atoms; a broad range of wavelengths of electromagnetic waves, from the shortest gamma rays to the longest radio wave, including visible light; a narrow band of the electromagnetic spectrum that has the characteristics defined by its wavelengths.

**Element:** in the chemical sense, a basic chemical substance in which all the [atoms](#) are the same, and different from the atoms of any other substance. It may be material that is natural or synthetic and that cannot be broken down into simpler materials by ordinary means. It has unique properties. Generally, elements are classified as a metal, non-metal, or metalloid.

**Empirical evidence (empirical data):** data collected from a controlled, scientific experiment.

**Energy levels of atoms/molecules:** forces and internal structure holding electrons to atoms and the atoms of a molecule together. Each atom and molecule has unique energy levels, which contribute to its properties and reactivity.

**Energy transfer:** occurs every time a change takes place in objects. For example, the energy from wind which strikes the coconut leaves, causing it to move (energy transfer from wind to leaves), and make a rustling sound (energy transfer from leaf to your ears.)

**Energy transformation:** energy can have different forms. Examples include: Thermal, chemical, radiant, nuclear, and electrical. Energy is neither created or destroyed (law of conservation of energy), but changes form. When energy changes from one form to another, the action is termed, "energy transformation."

**Evolution vs. creation:** two approaches to help explain the origin of life; the former based on Darwin’s Theory of Evolution and the latter on divine intervention.

**First Law of Thermodynamics:** the basic nature of energy – that it is neither created nor destroyed, but changes from one form to another.

**Force:** a push or a pull. According to Newton’s Second Law of Motion,  $F = ma$  (an object acted upon by a force will accelerate in the direction of the force). Thus, force equals the mass of the object multiplied by its acceleration.

**Geo-chemical (rock) cycles:** the process of change that rocks goes through as they are formed and reformed into various types.

**Gravitational force:** force between two objects due to gravity. This force depends on the mass of the objects and the distance between them. The force of gravity causes all objects near Earth’s surface to fall with an acceleration of  $9.8 \text{ m/s}^2$ .

**Habits of Mind:** the shared attitudes, values, and science skills that directly influence a person’s outlook on knowledge, learning, ways of thinking and carrying oneself to promote lifelong learning. Also known as the “rules” for knowing.

**Hypothesis:** a tentative answer to a research question, based on what is known by the researcher, and what has been observed.

**Inference:** a conclusion formed by reasoning what was observed; an assumption.

**Investigation, Simple vs. Scientific:** investigation using the main concepts from Scientific Inquiry but not adhering to strict research protocols versus a more rigorous application of Scientific Inquiry that adheres to scientific protocols, including the study design, data collection, mathematical analysis, comparison against what is known and sound communication.

**Laws of Conservation of Energy:** energy can change its form but it is neither created nor destroyed.

**Laws of heredity:** refers to the passing of traits from parent to offspring. The traits are passed on through genes on a chromosome in the sex cells.

**Magnetic force:** a push or pull of an object without being touched as it passes through a magnetic field.

**Model:** a design, representation, set plan, description or analogy for an idea or object.

**Nature of matter:** the essence, traits, or properties of matter.

**Nature of Scientific Knowledge:** observation → hypothesis → fact → concept → Law → Theory.

**Natural vs. designed systems:** refer to different parts working as a whole in the natural world (as a waterfall in the mountain) vs. a system that has been manipulated and/or altered by humans (as the waterfall at Ala Moana Shopping Center).

**Natural selection:** the process by which, according to Darwin’s Theory, living things that are best adapted to their environment survive and multiply to dominate over those less well adapted.

**Niche:** a unique part of an ecosystem for an organism and the ways this organism survives, by obtaining food, shelter, and avoiding danger; how it finds a mate, reproduces and cares for its young.

**Nuclear reaction:** a process of releasing energy stored in the nucleus of an atom.

**“Organisms and the environment”** refers to the different types of living things (primarily plants and animals in the lower elementary grades) and their environmental requirements—the things they need to survive.

**Oscillating Universe Theory:** theory which predicts that an expanding universe would eventually slow down and collapse, followed by another expansion ad infinitum.

**Physical vs. Chemical Properties:** matter has characteristic properties which can be used to identify what it is. Physical properties describe the “matter” or substance in question without changing it into a new substance. For example, its state (solid, liquid, gas, plasma) and density are two such properties. A chemical property describes a change that occurs only when one substance reacts with another. It depends on what elements are in that substance and how they are arranged.

**Problem-solving process:** a process of devising and implementing a strategy for finding a solution to a scientific problem.

**Producer:** an organism that makes energy-rich molecules from an external energy source, such as the sun (through photosynthesis), or inorganic molecules (through chemosynthesis). These energy-rich molecules serve as food to fuel life processes.

**Refraction:** the bending a wave as it moves from one medium into another medium.

**Rotation vs. Revolution:** rotation refers to the Earth spinning on its north/south axis, once in approximately 24 hours, causing day and night to occur. Revolution refers to Earth’s elliptical orbit around the Sun, which takes approximately 365 days (one year).

**Scale:** a progressive classification (e.g., by size, mass, or importance).

**Selective breeding:** a process for selecting a male and a female having one or more desirable traits with the intent of breeding offspring having the desirable trait(s).

**Simple machine:** a device that has only one movement, to make work easier. Examples are: pulley, lever, inclined plane, and wheel and axle.

**Steady State Theory:** the theory that accounts for decrease in density of the universe as it expanded by the continuous creation of matter to maintain a static universe.

**Structure and function:** the arrangement of body parts and how they perform (work).

**System:** a whole consisting of components that mutually interact and interrelate.

**Technology:** the totality of the means used to make life easier, i.e., tools, processes and innovations, to improve the quality of life.

**Themes:** major ideas that give organization and focus to a group of interrelated concepts.

**Theory:** an overarching explanation that has been well substantiated. Theories are endpoints of science.

**Theory of Plate Tectonics:** evolved from Alfred Wegener's hypothesis of continental drift, and Harry Hess' theory of seafloor spreading. The Theory of Plate Tectonics accounts for evidence that sections of the seafloor and continents move in relation to each other. Considered as an Earth System, the crust (lithosphere) and part of the upper mantle are broken into plates, which move on a plastic-like mantle (asthenosphere).

**Trait:** observable characteristics in an organism (as relates to genetics).

**Unbalanced force:** when two forces act on each other and one of them is greater than the other, resulting in some kind of motion of an object.

**“Unity, diversity, and interrelationships”** looks at similarities and differences between organisms, how environment affects behavior, the various trophic (feeding) relationships, and equilibrium in whole ecosystems.

**Water Cycle:** the movement of water between the atmosphere and hydrosphere. Driven by the sun's energy, liquid water in the hydrosphere turns into a gas (evaporation) and enters the atmosphere. When the water vapor gets cooled enough, it changes back to a liquid (condensation). As the liquid drops grow, they fall to Earth as rain (precipitation), which completes the cycle by returning water to the hydrosphere.

**Weather vs. Climate:** weather refers to the state of the atmosphere at a specific place and time. Climate is the pattern of weather occurring in an area over a period of many years.

**Work:** in the physical science sense, work equals Force times distance ( $W = F \times D$ ).