

RMI Science Grades 4 - 6

STANDARD	BENCHMARKS	SAMPLE PERFORMANCE INDICATORS
<p>Standard 1 Science Inquiry and Habits of Mind</p> <p>Students will use the processes of scientific inquiry while applying values, attitudes, and ways of thinking that will help them become better thinkers and problem solvers.</p>	<p>4-6.1.1 Demonstrate abilities to do processes of scientific inquiry.</p>	<p>4-6.1.1a Observe and ask (what, how, why) questions about organisms, objects, places, or events. 4-6.1.1b Make sensible predictions based on good reasoning and prior knowledge. 4-6.1.1c Carry out simple science experiments/investigations to answer questions or prove their predictions. 4-6.1.1d Collect, record, and interpret data/findings or observations. 4-6.1.1e Form an explanation supported by data. 4-6.1.1f Communicate findings and procedure (orally, in writing, graphs, drawings) clearly to enable others to replicate the investigation.</p>
	<p>4-6.1.2 Demonstrate values and attitudes important in working together as a team to solve problems.</p>	<p>4-6.1.2a Show respect for self and for others. 4-6.1.2b Show care and respect in handling organisms and in dealing with their environments. 4-6.1.2c Show honesty by reporting findings as they are observed and by giving credit to other people’s ideas and work. 4-6.1.2d Demonstrate commitment by sharing tasks and responsibilities in a team and not giving up easily even in the face of failure.</p>

RMI Science Grades 4 – 6 continued

<p>Standard 2 Safety</p>	<p>4-6.2.1 Identify and follow safety rules in different situations to prevent accidents and maintain safety.</p>	<p>4-6.2.1a Demonstrate at least one safety rule to follow in different situations (at home, in the water, on the road, in cars or boats, on playground, on field-trips, etc.)</p>
<p>Students will know and apply safety skills, rules and procedures (including traditional knowledge and practices) at school (inside and outside the classroom) and in every day life.</p>	<p>4-6.2.2 Identify organisms or objects that could cause harm and take steps to prevent accidents and injuries.</p>	<p>4-6.2.2a Name plants and animals that are poisonous or could cause harm and show proper or correct ways to handle them. 4-6.2.2b Make a list of items that are potential hazards (sharp objects, medicine, kerosene, etc.) and describe correct ways to handle them to avoid injuries.</p>
	<p>4-6.2.3 Carry out basic first aid procedures to treat minor injuries (minor wounds and cuts, burns, bites, etc.) under teacher’s supervision.</p>	<p>4-6.2.3a Take care of minor injuries, bleeding, burns, or bites. 4-6.2.3b Show/demonstrate how to get help in emergencies.</p>

Science Grade 4

STANDARD	BENCHMARKS	SAMPLE PERFORMANCE INDICATORS
<p>Standard 3 Life Science</p> <p>Students will develop understanding of and respect for the unity and diversity (similarities & differences) of living things: their life-processes and functions, and how they are all inter-connected with each other and with their environments.</p>	<p>4.3.1 Explain that different organisms live in different environments, and that these plants and animals have adaptations that enable them to live and reproduce in their environments.</p>	<p>4.3.1a Describe local examples of organisms (plants and animals) living in the sea and on their islands.</p> <p>4.3.1b Classify plants and animals on and around their islands based on similar characteristics and justify their groupings.</p> <p>4.3.1c Describe different Marshall Islands land and marine environments, and the plants and animals that live in these different environments.</p> <p>4.3.1d Compare the different adaptations that plants have such as different kinds of seeds, leaves and roots.</p> <p>4.3.1e Compare the different adaptations that animals have that enable them to get food, be safe, move fast, and get air.</p>
	<p>4.3.2 Give examples of how organisms depend on each other and on their environment to satisfy their needs.</p>	<p>4.3.2a Describe how living things depend on non-living things in their environment in order to survive.</p> <p>4.3.2b Compare and contrast some ways that animals in an environment need and use plants (such as food, shelter, and oxygen).</p> <p>4.3.2c Identify examples of ways that humans need and use plants.</p> <p>4.3.2d Compare and contrast some ways that plants in an environment need animals.</p> <p>4.3.2e Describe how animal behaviors help them meet their needs.</p>
	<p>4.3.3 Explain how the body structures of plants, animals, and humans are used to carry out life needs and processes.</p>	<p>4.3.3a Identify the structures of flowering plants and describe their functions.</p> <p>4.3.3b Describe the structures and basic functions of the digestive, circulatory, and respiratory systems.</p> <p>4.3.3c Identify the body parts of insects and give their functions.</p>
	<p>4.3.4 Distinguish between the stages of life cycles of plants, animals and humans.</p>	<p>4.3.4a Using observations, describe changes that a plant undergoes in a complete life cycle.</p> <p>4.3.4b Describe life-cycles of three different kinds of insects and animals.</p>

Science Grade 4 Continued

STANDARD	BENCHMARKS	SAMPLE PERFORMANCE INDICATORS
<p>Standard 6 Environmental Science</p> <p>Students will demonstrate understanding and appreciation of the beauty and fragility of Earth’s environments and resources by making conscious and active decisions to maintain, conserve, and preserve for now and for the future.</p>	<p>4.6.1 Recognize the importance of safeguarding, maintaining and conserving Earth’s resources and environments.</p>	<p>4.6.1a Identify the kinds and sources of water found on their islands. 4.6.1b Describe how they can help to keep their water sources clean and free from pollution. 4.6.1c Give examples of the many ways we benefit from the different natural resources found in our environments (air, water, soil, food, building materials, fuel). 4.6.1d Identify a variety of ways we can help to safeguard our natural resources and environments from pollution and/or destruction.</p>
	<p>4.6.2 Recognize that air, water and land are easily polluted by human activities on the earth.</p>	<p>4.6.2a Identify unsafe practices and conditions which contribute to pollution on/around their islands and in the Marshall Islands. 4.6.2b Propose ways to control and prevent pollution of land, water, and air.</p>
	<p>4.6.3 Explain ways they can help keep their environments clean and safe for living things.</p>	<p>4.6.3a Identify a variety of benefits of re-using recycling, and reducing trash. 4.6.3b Carry out a recycling project at home or at school.</p>
	<p>4.6.4 Determine how overpopulation of humans affect resources and environments.</p>	<p>4.6.4a Name areas that are over populated in the Marshall Islands. 4.6.4b Describe how over-population has an impact on a resource (food, plants, land area, water). 4.6.4c Give examples of how over-population contributes to pollution of the environment.</p>

Science Grade 5

STANDARD	BENCHMARKS	SAMPLE PERFORMANCE INDICATORS
<p>Standard 4 Earth and Space Science</p> <p>Students will demonstrate understanding of the Earth and objects in the universe (sun, moon, stars, other planets) by describing their structures and make-up, motions, processes and interactions.</p>	<p>5.4.1 Describe the structure and features of the planet Earth and processes and forces that shape its surface.</p>	<p>5.4.1a Identify Earth’s layers (crust, mantle, inner core, outer core) on cross section models and describe them.</p> <p>5.4.1b Describe how islands and atolls are formed.</p> <p>5.4.1c Identify and describe properties and uses of different Earth materials (soil, rocks, sand, water, coral).</p> <p>5.4.1d Describe importance of Earth’s landforms and natural resources (ocean, reef, land, lagoon, water).</p> <p>5.4.1e Give examples of how human activities can change the surface of the Earth and give their impacts.</p>
	<p>5.4.2 Describe the solar system, its composition, motion, and processes in space.</p>	<p>5.4.2a Construct a model of the solar system and describe its components and patterns of movement.</p> <p>5.4.2b Describe the sun and stars and relate their importance to life on Earth.</p> <p>5.4.2c Demonstrate the orbit of the Earth and its moon around the sun and relate it to happenings on Earth (day and night, seasons, changes in moon phases, tide)</p>
	<p>5.4.3 Describe natural occurrences on Earth and in space (weather conditions, climate, tide movements).</p>	<p>5.4.3a Record weather conditions on a daily basis on a Learning Calendar and describe patterns and changes observed.</p> <p>5.4.3b Make weather predictions based on weather data collected.</p> <p>5.4.3c Identify cloud types and describe their characteristics.</p> <p>5.4.3d Diagram and interpret the processes of the water cycle.</p>
	<p>5.4.4 Appreciate Marshallese knowledge of the universe.</p>	<p>5.4.4a Share examples of how Marshallese use their knowledge of the Earth and solar system to help them fish or predict weather conditions.</p>

Science Grade 6

STANDARD	BENCHMARKS	SAMPLE PERFORMANCE INDICATORS
Standard 5 Physical Science and Technology Students will understand the concepts of matter, energy, and motion and how technology is related to science.	6.5.1 Describe properties of objects/materials (matter) using their senses and scientific tools.	6.5.1a Compare and contrast matter based on observable properties (size, shape, texture, weight, temperature, volume). 6.5.1b Identify properties of matter or substances before and after they are mixed with other substances. 6.5.1c Compare and contrast the properties of mixtures and solutions
	6.5.2 Recognize how matter changes from one form to another.	6.5.2a Give examples of physical changes of matter. 6.5.2b Compare the forms and properties of water as it is heated and cooled or frozen. 6.5.2c Compare and contrast the properties of solids, liquids, and gases.
	6.5.3 Evaluate the impact of technology on life on their islands.	6.5.3a Describe how properties of materials are considered when designing technology. 6.5.3b Identify at least 5 different products of technology found on their islands (cars, radio, washing machines, soap, etc.) and describe their uses. 6.5.3c Describe how technology has changed life on their islands.
	6.5.4 Investigate different forms of energy and explain their importance and impact on everyday life.	6.5.4a Describe properties of light by showing how light behaves when striking different types of objects and materials (mirror, plastic, paper, wood, etc.). 6.5.4b Describe the properties of sound. 6.5.4c Demonstrate different ways of producing sound with vibrating objects and how pitch of sound can be changed. 6.5.4d Compare and contrast heat and light energy.
	6.5.5 Describe the relationship between force and motion of objects.	6.5.5a Identify the effects of force when used on objects (start, stop, change). 6.5.5b Show how force affects the rate of speed of objects. 6.5.5c Demonstrate the effect of friction and gravity on motion of objects.

RMI Science Grades 7 and 8

STANDARD	BENCHMARKS	SAMPLE PERFORMANCE INDICATORS
<p>Standard 1 Science Inquiry and Habits of Mind</p> <p>Students will use the processes of scientific inquiry while applying values, attitudes, and ways of thinking that will help them become better thinkers and problem solvers.</p>	<p>7/8.1.1 Demonstrate abilities to do processes of scientific inquiry.</p>	<p>7/8.1.1a Explain the components and steps of the scientific method (identify problem/question, hypothesis, observations, data collection, data interpretation, communicate results, replicate). 7/8.1.1b Select other methods of carrying out a scientific investigation (use of library, internet, knowledgeable people in the community). 7/8.1.1c Correctly use appropriate tools and methods to gather and analyze data. 7/8.1.1d Use the components and methods of scientific method to answer a question. 7/8.1.1e Communicate findings using charts graphs, writings and numbers.</p>
	<p>7/8.1.2 Demonstrate values and attitudes important in working together as a team to solve problems</p>	<p>7/8.1.2a Show respect for self and for others. 7/8.1.2b Work collaboratively. 7/8.1.2c Show care and respect in handling organisms and in dealing with their environments. 7/8.1.2d Show honesty by reporting findings as they are observed and by giving credit to other people’s ideas and work. 7/8.1.2e Demonstrate commitment by sharing tasks and responsibilities in a team and not giving up easily.</p>

RMI Science Grades 7 and 8 continued

<p>Standard 2 Safety</p> <p>Students will know and apply safety skills, rules and procedures (including traditional knowledge and practices) at school (inside and outside the classroom) and in every day life.</p>	<p>7/8.2.1 Demonstrate knowledge of and apply safety procedures when carrying out science investigations.</p>	<p>7/8.2.1a Follow directions when carrying out science activities or when out on field trips.</p> <p>7/8.2.1b Follow the procedures of a science activity correctly and carefully to prevent accidents.</p> <p>7/8.2.1c Practice correct or proper conduct with each other when carrying out science activities.</p> <p>7/8.2.1d Show/practice correct ways of handling science instruments/equipment and other materials (sharp tools glass, chemicals, live specimens, etc) when doing science activities.</p>
	<p>7/8.2.2 Identify potential hazards in all conditions, situations, and investigations (including poisonous organisms and matters) and take measures to prevent accidents.</p>	<p>7/8.2.2a Identify hazards or ‘danger signs’ in all kinds of situations and learning activities (field-trips, experiments) and take steps to prevent or avoid accidents.</p> <p>7/8.2.2b Identify plants and animals that are poisonous or could cause harm and describe how ways to prevent harm or injuries from them.</p>
	<p>7/8.2.3 Carry out simple first-aid procedures (including traditional practices) in emergency situations when requested to when the teacher or other responsible adults are not available.</p>	<p>7/8.2.3a Treat minor wounds and minor bleeding, using western and/or traditional treatments.</p> <p>7/8.2.3b Demonstrate skill in and knowledge of handling/dealing with emergency situations.</p>
	<p>7/8.2.4 Identify and follow safety rules in their daily lives (at home, on the road, in the water, in the air) to prevent accidents and injuries.</p>	<p>7/8.2.4a Create posters of safe practices to follow in different situations.</p>

RMI Science Grade 7

STANDARD	BENCHMARKS	SAMPLE PERFORMANCE INDICATORS
<p>Standard 3 Life Science</p> <p>Students will develop understanding of and respect for the unity and diversity (similarities & differences) of living things: their life-processes and functions, and how they are all interconnected with each other and with their environments.</p>	<p>7.3.1 Identify the main organisms found in different land and marine areas (such as forests, beaches, wetlands, villages, tidal pools, reefs, lagoon, and open ocean), and classify these organisms in a variety of ways.</p>	<p>7.3.1a Classify organisms that live on or around the island as to whether they are plants or animals, and how they get their food (make their own food, eat plants, eat animals, eat dead organisms or eat the waste products of organisms).</p> <p>7.3.1b Compare the different animal body structures, and how these structures enable the animal to live in its environment.</p> <p>7.3.1c Classify ten different local organisms and explain the reasons for grouping.</p> <p>7.3.1d Analyze a classification of local organisms, and use evidence to explain how you think the person grouped and separated the organisms.</p> <p>7.3.1e Explain why it is important to classify animals into groups.</p>
	<p>7.3.2 Compare different ecosystems on and around the island, including places where people live or grow food, and describe how the organisms interact with each other and with the nonliving parts of their environment.</p>	<p>7.3.2a Define ecosystems and use local examples to identify the boundary of an ecosystem, and the living and nonliving parts of an ecosystem.</p> <p>7.3.2b Explain how the organisms that live in an ecosystem are adapted to live in that environment and with each other.</p> <p>7.3.2c Describe niches and habitats in an ecosystem.</p> <p>7.3.2d Draw simple food chains to show how organisms obtain their food.</p>
	<p>7.3.3 Explain that plants make their own food, and draw food webs to illustrate the flows of matter and energy in different ecosystems.</p>	<p>7.3.3a Describe that plants make their own food using energy from sunlight and carbon dioxide from the air (photosynthesis).</p> <p>7.3.3b Compare and contrast how plants and animals obtain their matter and energy, including that plants do both photosynthesis and respiration.</p> <p>7.3.3c Illustrate the oxygen and carbon dioxide cycle.</p> <p>7.3.3d Draw food webs in different ecosystems to illustrate the flows of matter and energy from one kind of plant or animal to other kinds of animals.</p> <p>7.3.3e Explain that ecosystems have the same general pattern of relationships, and use the terms producers, consumers and decomposers.</p> <p>7.3.3f Predict how changes to the population of an organism would affect the populations of other organisms.</p>

	<p>7.3.4 Explain the levels of organization of organism (cells, tissues, organs, body systems) to carry out life needs and processes.</p>	<p>7.3.4a Explain that cells are the basic unit of life. 7.3.4b Recognize basic structures that most cells share (nucleus, cytoplasm, outer boundary such as cell membrane or cell wall). 7.3.4c Draw the basic structures of plant and animal cells. 7.3.4d Describe how the body of organisms (including plants) are organized from cells to body systems (such as the circulatory system). 7.3.4e Identify the parts of the nervous, circulatory, and reproductive systems and describe their functions.</p>
	<p>7.3.5 Describe different ways that traits are passed down from parents to offspring.</p>	<p>7.3.5a Compare the life-cycles of local plants and animals. 7.3.5b Illustrate the difference between complete and incomplete metamorphosis of a common insect. 7.3.5c Compare and contrast between sexual and asexual reproduction in organisms. 7.3.5d Give examples of ways offspring are similar to their parents.</p>
	<p>7.3.6 Explore spawning of egg-bearing grounds of valued organisms (fish, plants, lobsters, crabs, turtles) on and around islands, and investigate ways to protect populations of those valued organisms.</p>	<p>7.3.6a Identify spawning ground of valued fish used for food around the islands. 7.3.6b Work with the community to implement conservation measures to protect the grounds and these valuable species. 7.3.6c Explain how environmental conditions that do not harm the adult members of a species can still significantly reduce the population of that species and affect the populations of other organisms.</p>
	<p>7.3.7 Describe that rising sea level and higher sea surface temperatures affect coral reef ecosystems and the organisms that depend on these ecosystems.</p>	<p>7.3.7a Illustrate how rising sea level and higher sea surface temperatures are related to global warming, and how these climate change impacts can harm coral reef ecosystems. 7.3.7b Explain that corals are animals that obtain their food primarily from algae that live symbiotically within them, and explain the causes and effects of coral reef bleaching. 7.3.7c Illustrate how damage to coral reef ecosystems affect many different organisms.</p>

RMI Science Grade 7 Continued

STANDARD	BENCHMARKS	SAMPLE PERFORMANCE INDICATORS
<p>Standard 4 Earth and Space Science</p> <p>Students will demonstrate understanding of the Earth and objects in the universe (sun, moon, stars, other planets) by describing their structures and make-up, motions, processes and interactions.</p>	<p>7.4.1 Give examples of different types of landforms and explain how Earth’s surface can be changed by natural or man-made forces and processes.</p>	<p>7.4.1a Compare atolls and high islands with respect to similar and different landforms. 7.4.1b Identify forces/processes that can cause changes in Earth’s surface (erosion, digging, waves, rain, drought). 7.4.1c Suggest ways that can be used to slow down, prevent, or minimize damage of the Earth’s surface features. 7.4.1d Explain the impacts of natural disasters (volcanoes, erosion, typhoons, flooding) on the surface of Earth.</p>
	<p>7.4.2 Explain how movements and interactions of the sun and moon with Earth affect the tides.</p>	<p>7.4.2a Compare characteristics of the sun, moon and Earth with respect to size, temperature, distances, and composition. 7.4.2b Make a model of the sun, moon and Earth that accurately represents their sizes and distances from each other, and explain the role of gravity in Earth’s orbit around the sun and the moon’s orbit around Earth. 7.4.2c Explain how the position and appearance of the moon change over the course of a month, and relate those changes to the moon’s monthly orbit around Earth. 7.4.2d Describe and draw the position of the sun, Earth, and moon during eclipses and tide conditions. 7.4.2e Explain how the gravity of the sun and moon can cause particularly high tides at specific times of the month.</p>
	<p>7.4.3 Describe that Earth’s orbit around the sun causes the changes in seasons, and that those changes are different at different latitudes.</p>	<p>7.4.3a Model how Earth’s rotation around its axis results in the 24-hour cycle of day and night. 7.4.3b Describe the seasonal changes in the Marshall Islands particularly with respect to amount of rain and location of sunrise and sunset. 7.4.3c Compare the seasonal climate changes that happen near the equator, in Earth’s temperate regions, and near the poles. 7.4.3d Model how Earth’s orbit around the sun and its tilted axis result in the annual cycle of seasonal changes at different latitudes.</p>

	<p>7.4.4 Measure weather conditions, and compare climate in the Marshall Islands with the climate in other Earth locations.</p>	<p>7.4.4a Collect, measure and record weather data on a daily basis on Learning Calendar and evaluate patterns observed over weeks and months. 7.4.4b Analyze weather data and make predictions of weather conditions. 7.4.4c Distinguish climate from weather by explaining that climate describes the ranges of typical weather conditions in an area and how those conditions change over years to centuries. 7.4.4d Identify examples of severe weather conditions (drought, typhoon) that are part of local climate, and how best to prepare for them. 7.4.4e Explain how their latitude (close to the equator) and location in the Pacific Ocean cause the tropical Pacific islands to have a climate of warm weather and steady temperatures throughout the year.</p>
	<p>7.4.5 Diagram the water cycle and explain its changes in physical state, and how the water cycle influences weather.</p>	<p>7.4.5a Diagram the water cycle, and explain the changes in physical state that occur, including that water exists as a gas in the atmosphere. 7.4.5b Interpret how the water cycle and the weather are related, particularly with respect to equatorial atolls and high islands. 7.4.5c Describe how temperature affects evaporation and condensation in the atmosphere.</p>
	<p>7.4.6 Appreciate Marshallese knowledge of the land, ocean, air and sky.</p>	<p>7.4.6a Share examples of how Marshallese use their knowledge of the land, ocean, air and sky to help them fish, predict weather conditions or find directions/navigate.</p>
	<p>7.4.7 Explain that global climate change is happening, is causing sea levels to rise, and that rising sea levels impact ecosystems and human systems.</p>	<p>7.4.7a Use graphs to show that Earth’s average temperature is warmer than it has been for more than a thousand years, and that the largest increase in temperature is happening in the arctic region. 7.4.7b Analyze evidence that Earth’s climate has changed many times over hundreds of thousands of years, but that the current climate change is being caused by human activities 7.4.7c Explain that sea levels are rising because warm water expands, and because mountain glaciers and polar ice sheets are melting. 7.4.7d Describe ways that rising sea levels cause damage to island ecosystems and to human systems (shelter, transportation, agriculture, drinking water), and compare threats to atolls and to high islands.</p>

RMI Science Grade 8

STANDARD	BENCHMARKS	SAMPLE PERFORMANCE INDICATORS
<p>Standard 5 Physical Science and Technology</p> <p>Students will understand the concepts of matter, energy, and motion and how technology is related to science.</p>	<p>8.5.1 Describe the composition of matter: atoms, molecules, elements and compounds.</p>	<p>8.5.1a Differentiate between atoms and molecules.</p> <p>8.5.1b Use water as an example to illustrate how the states of matter are different depending on arrangement of the molecules.</p> <p>8.5.1c Identify common examples of elements and compounds (such as oxygen, nitrogen, water, carbon dioxide and methane) and explain how they are similar and different.</p>
	<p>8.5.2 Describe properties of matter and compare physical changes and chemical changes.</p>	<p>8.5.2a Compare and contrast properties of matter that do not depend on the amount of matter (e.g., boiling point, density) with properties that do depend on the amount of matter (volume, mass).</p> <p>8.5.2b Describe that the properties of a substance (such as carbon dioxide or sugar) depend on the kinds of atoms that make up the substance and how those atoms are connected to each other.</p> <p>8.5.2c Compare and contrast examples of physical changes and chemical changes of matter.</p> <p>8.5.2d Explain that chemical changes in matter involve changes in the ways that atoms within a molecule are bonded to each other whereas with physical changes (such as the melting of ice into liquid water) the bonding within the molecules remains the same (both ice and liquid water are H₂O).</p>
	<p>8.5.3 Explore and describe different forms of energy and different ways that energy moves.</p>	<p>8.5.3a Identify some forms of energy such as energy of motion, chemical energy, electrical energy, heat energy, and light energy.</p> <p>8.5.3b Provide examples of energy changing from one form to another such as absorption involving light energy changing to heat energy.</p> <p>8.5.3c Illustrate familiar examples of heat energy moving by conduction (metal spoon in soup bowl becoming hot), convection (hot water in a heated pot) and radiation (feeling heat from a fire).</p> <p>8.5.3d Illustrate Earth system examples of conduction (hot land heating air that comes into contact with it), convection (hot air rising), and radiation (sunlight heating the planet).</p>

	<p>8.5.4 Evaluate the impact of technology on life on their islands and the RMI in general.</p>	<p>8.5.4a Identify some examples of traditional technology (fishing, ocean navigation, weather predicting, weaving) and importance of maintaining such technologies. 8.5.4b Describe how technology has greatly improved the way people live today and can also decrease the quality of life. 8.5.4c Evaluate a technological design for helping to make an island human system (such as transportation or obtaining fresh water) more resilient with respect to climate change. 8.5.4d Analyze and communicate the desired features, costs, and benefits of a technological solution to a problem</p>
	<p>8.5.5 Describe the effects of simple machines on force and motion of objects.</p>	<p>8.5.5a Identify examples of simple machines and describe their functions or uses. 8.5.5b Demonstrate how a simple machine can be used to change force, motion and speed of objects. 8.5.5c Find the mass and volume of objects using metric units. 8.5.5d Demonstrate how mass or volume of objects affect the speed or motion of objects.</p>
	<p>8.5.6 Explain acid-base balance in aquatic systems, and relate to ocean acidification and its effects on marine organisms.</p>	<p>8.5.6a Describe that some substances have the property of making water more acidic whereas other substances have the property of making water more basic. 8.5.6b Give familiar examples of substances that are acidic, neutral and basic. 8.5.6c Describe that carbon dioxide makes water become more acidic, and that the extra carbon dioxide in the atmosphere is dissolving in the ocean and changing the ocean's acid-base balance (a process known as ocean acidification). 8.5.6d Explain that ocean acidification can harm marine organisms that have carbonate shells, such as coral and other kinds of sea animals and plankton</p>

RMI Science Grade 8 Continued

STANDARD	BENCHMARKS	SAMPLE PERFORMANCE INDICATORS
<p>Standard 6 Environmental Science</p> <p>Students will demonstrate understanding and appreciation of the beauty and fragility of Earth's environments and resources by making conscious and active decisions to maintain, conserve, and preserve for now and for the future.</p>	<p>8.6.1 Recognize that air, water, and land are easily polluted by human activities on the earth.</p>	<p>8.6.1a Identify unsafe practices and conditions that contribute to pollution on the Marshall Islands.</p> <p>8.6.1b Use evidence to propose and explain ways to control and prevent pollution of land, water and air.</p> <p>8.6.1c Describe different kinds of local pollution, and evaluate the costs and benefits of different ways to reduce the pollution.</p> <p>8.6.1d Provide examples of how protecting ecosystems from pollution and other human damage can help the ecosystems become more resilient with respect to climate change.</p>
	<p>8.6.2 Describe ways people use Earth's natural resources (land/soil, coral, water, plants, animals, oil, etc.) and explain ways to better manage them so that they can last for the future.</p>	<p>8.6.2a Compare and contrast renewable and non-renewable natural resources.</p> <p>8.6.2b Evaluate ways people use natural resources in the Marshall Islands with respect to the effects on ecosystems.</p> <p>8.6.2c Identify practices that are contributing to the reduction and depletion of ocean resources and describe what could be done to prevent depletion.</p> <p>8.6.2d Participate meaningfully in local practices that encourage conservation of marine resources.</p>
	<p>8.6.3 Explain how climate change and its impacts will affect Marshall Island ecosystems, and analyze which adaptation strategies are likely to be most effective.</p>	<p>8.6.3a Research the ways that different human activities protect or damage different local ecosystems.</p> <p>8.6.3b Research the ways that current and predicted changes in climate damage different local ecosystems.</p> <p>8.6.3c Evaluate the costs and benefits of different ways to protect ecosystems from the impacts of current and predicted climate changes such as increased temperatures, higher sea levels, ocean acidification, and changes in precipitation patterns.</p> <p>8.6.3d Evaluate which ecosystem adaptation strategies will provide the best cost/benefit ratio in terms of helping important local ecosystems become more resilient with respect to climate change.</p>

	<p>8.6.4 Explain how climate change and its impacts will affect Marshall Island human systems (shelter, transportation, freshwater, food, economy, and health), and analyze which adaptation strategies are likely to be most effective.</p>	<p>8.6.4a Research the ways that different human activities protect or damage different island human systems.</p> <p>8.6.4b Research the ways that predicted changes in climate will damage different local human systems.</p> <p>8.6.4c Evaluate the costs and benefits of different ways to protect island human systems from the impacts of current and predicted climate changes such as increased temperatures, higher sea levels, ocean acidification, and changes in precipitation patterns.</p> <p>8.6.4d Evaluate which adaptation strategies will provide the best cost/benefit ratio in terms of helping important island human systems become more resilient with respect to climate change.</p> <p>8.6.1e Analyze evidence whether promoting flexibility, community health and sustainability help island human systems become more resilient with respect to climate change.</p>
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RMI Earth and Space Science Grade 9

STANDARD	BENCHMARKS	SAMPLE PERFORMANCE INDICATORS
<p>Standard 1 Science in our World</p> <p>The student will use scientific knowledge in order to carry out careful observations and clear reasoning to understand processes and patterns of nature, and to solve practical problems.</p>	<p>9.1.1 Ask scientific questions based on information that has been gathered.</p>	<p>9.1.1a Locate and collect reliable information about a topic using several methods and sources.</p> <p>9.1.1b Distinguish between questions that can be answered by scientific investigation and questions that are not scientific questions.</p> <p>9.1.1c Develop a scientific question related to weather or climate that can be answered with available resources in or outside of the school.</p> <p>9.1.1d Identify a possible way to reduce damage caused by climate change that can be investigated with available resources in or outside of the school.</p>
	<p>9.1.2 Plan and carry out an investigation to answer a scientific question or solve a practical problem.</p>	<p>9.1.2a Demonstrate knowledge of and apply safety and ethical procedures when conducting an investigation.</p> <p>9.1.2b Demonstrate values and attitudes that are important in working together as a team to answer a scientific question or solve a practical problem.</p> <p>9.1.2c Measure and record a variety of weather data after figuring out what tools will be needed and how the data will be recorded.</p> <p>9.1.2d Evaluate the accuracy of various methods for collecting data needed to answer the question or solve the problem.</p>
	<p>9.1.3 Develop and use models that help in answering a scientific question or designing a solution to a practical problem.</p>	<p>9.1.3a Explain the uses and limitations of a model that describes a scientific concept such as the carbon cycle, the greenhouse effect or plate tectonics.</p> <p>9.1.3b Explain the uses and limitations of a model that describes a practical problem and how it can be solved, such as getting enough fresh water for a community or protecting a road from rising sea level.</p>
	<p>9.1.4 Analyze and interpret data related to a scientific question or the design of a solution to a practical problem.</p>	<p>9.1.4a Make, analyze and interpret graphical displays of data.</p> <p>9.1.4b Organize collected data and display the information in ways that help the analysis and interpretation of the data.</p> <p>9.1.4c Use math concepts such as averages, percents, ratios and linear relationships to analyze a scientific question and interpret related data.</p>

	<p>9.1.5 Make and evaluate explanations related to data collected to answer a scientific question or to help solve a practical problem.</p>	<p>9.1.5a Logically explain observations and conclusions related to a scientific question.</p> <p>9.1.5b Logically explain how the data and results support a plan to help solve a practical problem.</p> <p>9.1.5c Evaluate which explanations and conclusions are best supported by the evidence.</p> <p>9.1.5d Suggest other scientific explanations or design plans, and explain how the evidence supports them.</p>
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RMI Earth and Space Science Grade 9 continued

STANDARD	BENCHMARKS	SAMPLE PERFORMANCE INDICATORS
<p>Standard 2 Earth in the Solar System</p> <p>Students will develop an understanding of the Earth as a planet in the solar system, and the central role of the sun.</p>	<p>9.2.1 Describe that the universe has billions of galaxies, and that galaxies often have billions of stars.</p>	<p>9.2.1a Explain that the Big Bang theory of the universe is based on scientific evidence that our universe began about 14 billion years ago.</p> <p>9.2.1b Research different kinds of galaxies in the universe, and illustrate the spiral shape of the Milky Way galaxy.</p> <p>9.2.1c Indicate on an illustration of the Milky Way galaxy the approximate location of our solar system.</p>
	<p>9.2.2 Explain the central role of the sun in the solar system.</p>	<p>9.2.2a Describe that the solar system began about 4.5 billion years ago when the sun formed and began shining.</p> <p>9.2.2b Explain that the sun's gravity holds the planets in their orbits and keeps them from flying off to outer space.</p> <p>9.2.2c Explain that sunlight provides energy for all the planets, but the amount of energy decreases further away from the sun.</p> <p>9.2.2d Compare the size of the sun to the sizes of the largest planet (Jupiter) and to Earth.</p> <p>9.2.2e Research the size and life span of other stars, and conclude that the sun is an average star, and that it is expected to keep shining for about 5 billion more years.</p>
	<p>9.2.3 Compare the planets and other major objects in the solar system.</p>	<p>9.2.3a Relate the composition of planets in the solar system to their distance from the sun.</p> <p>9.2.3b Compare and contrast planets, moons, asteroids and comets.</p> <p>9.2.3c Research the planets and report on their sizes, distances from the sun, temperatures, composition, orbital period, and moons.</p> <p>9.2.3d Use evidence to support a statement about whether a specific planet or moon (such as Mars, Venus, Titan, or Europa) could have life on it now or could have had organisms living on it in the past.</p> <p>9.2.3e Explain how new scientific evidence changed the classification of Pluto so that is no longer considered a planet.</p>

	<p>9.2.4 Describe important features of Earth's orbit around the sun, and relate these features to observations that we can make every day or over the course of a year.</p>	<p>9.2.4a Make a model that shows that Earth's rotation on its axis results in the cycle of day and night.</p> <p>9.2.4b Explain that a year is the time that it takes for Earth to complete one orbit around the sun.</p> <p>9.2.4c Use a model to show that Earth is tilted on its axis of rotation as it orbits the sun.</p>
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RMI Earth and Space Science Grade 9 continued

STANDARD	BENCHMARKS	SAMPLE PERFORMANCE INDICATORS
<p>Standard 3 Earth System Science</p> <p>Students will develop a basic understanding of planet Earth as a system whose parts include the atmosphere, geosphere, hydrosphere, and biosphere, and also explain a systems view of Earth’s matter, energy and life.</p>	<p>9.3.1 List the major parts of the Earth system, and explain that each of these parts is itself a system that is made of parts.</p>	<p>9.3.1a List the atmosphere, geosphere, hydrosphere, and biosphere as being the major parts of the Earth system. 9.3.1b Research on the parts of the atmosphere, geosphere or hydrosphere, and report on the parts of that Earth system. 9.3.1c Conclude that Earth systems are often made of parts that are themselves systems made of parts. 9.3.1d Analyze the components of different kinds of soil, and explain the importance of soil for island life. 9.3.1e Describe methods of soil conservation including adding nutrients from compost to atoll soil.</p>
	<p>9.3.2 Compare and contrast matter, energy and life in the Earth system.</p>	<p>9.3.2a Explain that Earth can also be analyzed as a system whose parts are Earth’s matter, Earth’s energy, and Earth’s life 9.3.2b Research Earth’s cycles of matter (water cycle, carbon cycle) and conclude that Earth is essentially a closed system for matter. 9.3.2c Describe that energy continuously enters and leaves the Earth system, and conclude that Earth is an open system with respect to energy. 9.3.2d Justify that Earth is a networked system for life by showing that Earth’s organisms interconnect with each other and with Earth’s cycles of matter and flows of energy</p>
	<p>9.3.3 Conclude that the properties of the Earth system arise from the interactions among its parts.</p>	<p>9.3.3a Describe that systems often have properties that are very different than the properties of their parts. 9.3.3b Cite examples of properties of other systems, such as the fuel efficiency of a vehicle, the health of an organism or the stable temperature of a warm-blooded animal, and explain how those properties result from the interactions of the parts of the system. 9.3.3c Explain that Earth’s web of life and its global climate are both examples of the Earth system having properties that result from the interactions of its parts.</p>

RMI Earth and Space Science Grade 9 continued

STANDARD	BENCHMARKS	SAMPLE PERFORMANCE INDICATORS
<p>Standard 4 Energy and the Earth System</p> <p>The students will develop a basic understanding of Earth's internal energy and its role in plate tectonics, and how solar energy flows into the Earth system, circulates within the Earth system, and eventually leaves the Earth system.</p>	<p>9.4.1 Describe the main source of energy for plate tectonics, and demonstrate how motions at plate boundaries change Earth's surfaces.</p>	<p>9.4.1a Explain that radioactive decay is a major source of Earth's internal heat energy.</p> <p>9.4.1b Model Earth's internal structure (crust, mantle and core) and how convection currents move heat energy within Earth's mantle.</p> <p>9.4.1c Identify the major plates of Earth's surface, and cite evidence for their existence (locations of volcanoes and earthquakes, fit of continents, and magnetic striping of the sea floor).</p> <p>9.4.1d Use world maps and other media (photographs, video, animation) to explain how motions at convergent, divergent and transform plate boundaries result in mountains, high plateaus, volcanoes, earthquakes, mid-ocean ridges, and oceanic trenches.</p>
	<p>9.4.2 Explain the processes that formed the Marshall Islands and tropical Pacific high islands.</p>	<p>9.4.2a Use maps and images of the islands of Hawaii to explain hot spots and the northwest motion of the Pacific plate.</p> <p>9.4.2b Explain that the Marshall Islands and many other equatorial Pacific islands started as volcanoes from hot spots within the Pacific plate.</p> <p>9.4.2c Illustrate how atolls form as a result of the volcanic mountain sinking below sea level, and leaving at the surface only its surrounding coral reef.</p> <p>9.4.2d Explain that many high volcanic islands will become atolls millions of years from now.</p>
	<p>9.4.3 Illustrate that energy from the sun provides the vast majority of Earth's energy.</p>	<p>9.4.3a Explain that the energy from sunlight provides the vast majority of the energy for heating the planet, and for providing the energy for the water cycle and Earth's winds.</p> <p>9.4.3b Describe sunlight as electromagnetic radiation that flows from the sun through space to Earth.</p> <p>9.4.3c Illustrate that about one-third of the incoming sunlight is reflected by clouds and by Earth's surface, and does not heat the planet.</p> <p>9.4.3d Diagram that most of the incoming sunlight is transmitted through the atmosphere and is then absorbed at Earth's surface by land and by water, changing from light energy to heat energy.</p>

	<p>9.4.4 Illustrate the roles of conduction and convection in moving heat energy around the planet, and how these processes result in Earth's wind patterns and ocean currents.</p>	<p>9.4.4a Illustrate that air very near the ground is heated by directly touching warmer land and ocean, and that this heat transfer is an example of conduction.</p> <p>9.4.4b Diagram that convection causes warmer air to rise above the surface and cooler air in the atmosphere to come closer to the surface.</p> <p>9.4.4c Compare how sunlight shines more directly on areas near the equator than on areas at higher latitudes (closer to the poles), and use this information to explain why the areas near the equator are much warmer.</p> <p>9.4.4d Explain that winds in the atmosphere and currents in the ocean move heat energy by convection from the equator toward the poles.</p> <p>9.4.4e Interpret diagrams of global wind pattern and global ocean currents to show the roles of convection and of Earth's rotation on its axis (Coriolis Effect).</p>
	<p>9.4.5 Explain that Earth's surface materials emit infrared radiation (IR), and the roles of this emitted IR in Earth's global climate.</p>	<p>9.4.5a Explain that warm objects emit infrared radiation.</p> <p>9.4.5b Illustrate that Earth's surface emits infrared radiation, that nitrogen and oxygen in the atmosphere transmit this infrared radiation, but that other atmospheric gases (especially water vapor and carbon dioxide) absorb this infrared radiation.</p> <p>9.4.5c Diagram that greenhouse gases in the atmosphere absorb and emit infrared radiation, and keep this heat energy longer within the Earth system (greenhouse effect).</p> <p>9.4.5d Explain that Earth's natural greenhouse effect is very important in keeping Earth warm enough for plants and animals to live.</p> <p>9.4.5e Describe that greenhouse gases emitted into the atmosphere by human activities are increasing Earth's greenhouse effect and causing global warming.</p>

RMI Earth and Space Science Grade 9 continued

STANDARD	BENCHMARKS	SAMPLE PERFORMANCE INDICATORS
<p>Standard 5 Global and Regional Climate</p> <p>Students will develop a basic understanding of climate in the Marshall Islands, and the wide range of climates on the planet.</p>	<p>9.5.1 Use data to illustrate the main features of climate in the Marshall Islands.</p>	<p>9.5.1a Use graphs of Marshall Island climate data to describe the local climate as being warm all year, and also as having warm temperatures during the night.</p> <p>9.5.1b Compare the amounts of rain in the wet season and dry season in different parts of the Marshall Islands, especially contrasting more northern atolls with more southern atolls.</p> <p>9.5.1c Collect data on local wind direction and determine whether the data confirm that winds in the Marshall Islands generally blow from east to west as shown on a map of global wind patterns.</p> <p>9.5.1d Interpret data from several decades to conclude that the amount of rain is naturally very variable from year to year.</p> <p>9.5.1e Gather information from community members, elders and other sources about extreme weather events, particularly droughts and tropical storms.</p>
	<p>9.5.2 Explain how the ocean influences climate in the Marshall Islands and climate globally, and include the concept of heat capacity in the explanations.</p>	<p>9.5.2a Experiment with heating air and water, and conclude that it takes more heat to raise the temperature of water compared with air, and that water also stays warm longer than air does.</p> <p>9.5.2b Use the term heat capacity to compare how much transfer of heat energy is required to increase or decrease the temperature of different materials (air, rock, water).</p> <p>9.5.2c Explain that the high heat capacity of water means that the ocean can hold a large amount of heat energy, and can release that heat energy very slowly to the air.</p> <p>9.5.2d Describe that the ocean plays very important roles in storing the heat energy from sunlight, and moving that heat energy around the planet.</p> <p>9.5.2e Illustrate how the ocean helps keep the air temperature in the Marshall Islands warm at night, and the air humid all the time.</p>

	<p>9.5.3 Explain variations in the El Niño Southern Oscillation (ENSO) and how they affect the Marshall Islands.</p>	<p>9.5.3a Compare the wind patterns during the El Niño and La Niña phases of the El Niño Southern Oscillation (ENSO). 9.5.3b Explain the effects of ENSO on ocean levels and ocean temperatures across the Pacific Ocean. 9.5.3c Describe the effects of ENSO on the Marshall Islands especially with respect to drought.</p>
	<p>9.5.4 Compare regional climates in different parts of the Earth with the climate conditions in the Marshall Islands.</p>	<p>9.5.4a Research climates in temperate and in polar locations, and compare with climate in the Marshall Islands with respect to temperatures, seasons, precipitation, wind patterns, humidity, and extreme weather events. 9.5.4b Research climates in a variety of Pacific island locations, particularly high islands, and compare with climate in the Marshall Islands with respect to temperatures, seasons, precipitation, wind patterns, humidity, and extreme weather events. 9.5.4c Research climates in locations that are at similar latitudes but different altitudes, and make conclusions about the effects of altitude on temperatures, seasons, precipitation, and extreme weather events. 9.5.4d Use evidence to show that latitude, altitude and closeness to the ocean play very important roles in regional climates.</p>

RMI Earth and Space Science Grade 9 continued

<p>Standard 6</p> <p>Climate Change</p> <p>Students will develop a basic understanding of the causes of climate change, the impacts of climate change in the Pacific islands, and the ways that communities can increase their resilience with respect to climate change.</p>	<p>9.6.1 Analyze the evidence that Earth’s climate has changed in the past.</p>	<p>9.6.1a Use a graph of past global temperatures to explain that the global climate has changed many times in Earth’s history.</p> <p>9.6.1b Research and describe some of the ways that scientists investigate climate and other conditions in Earth’s past (tree rings, sediment layers, ice cores).</p> <p>9.6.1c Describe that higher concentration of carbon dioxide in the atmosphere is closely associated with warmer global climate, and lower concentration of carbon dioxide is closely associated with colder global climate.</p> <p>9.6.1d Research and describe environmental conditions (sea level, polar ice caps, organisms) when Earth was much warmer and when Earth was much colder.</p> <p>9.6.1e Explain that global climate can change if there are changes in the amount of sunlight that is absorbed by the Earth, or changes in how the absorbed energy circulates within the Earth system, or changes in how fast the energy leaves the Earth system.</p>
	<p>9.6.2 Explain that the current global warming is due to human activities, especially the emission of greenhouse gases into the atmosphere.</p>	<p>9.6.2a Use a graph to illustrate that Earth’s climate is warming.</p> <p>9.6.2b Provide evidence that the concentration of greenhouse gases (especially carbon dioxide) in the atmosphere is increasing.</p> <p>9.6.2c Identify human activities that are causing the increase in carbon dioxide concentration in the atmosphere (burning of fossil fuels, destruction of forests).</p> <p>9.6.2d Explain that humans are changing the concentration of carbon dioxide much faster than has happened in Earth’s history.</p>

	<p>9.6.3 Describe climate changes in the Marshall Islands, and the impacts on ecosystems and human systems (shelter, transportation, freshwater, food, economy, and health).</p>	<p>9.6.3a Identify that global warming causes other changes to climate and Earth conditions, and that we call all those changes “climate change.”</p> <p>9.6.3b Explain that global warming causes sea level to rise because the ocean expands in volume as it becomes warmer (thermal expansion), and because mountain glaciers and polar ice sheets are melting.</p> <p>9.6.3c Analyze evidence that air temperatures and surface ocean temperatures have been increasing</p> <p>9.6.3d Explain that dissolved carbon dioxide is causing the ocean’s acid/base balance to become more acidic, and that this ocean acidification is included in descriptions of climate change.</p> <p>9.6.3e Describe that patterns of rainfall, droughts and storms in the Marshall Islands could also change as a result of global warming.</p> <p>9.6.3f Illustrate the damages to ecosystems that can occur because of sea level rise, increased ocean temperatures, ocean acidification, and changing weather patterns.</p> <p>9.6.5g Illustrate the damages to Marshall Island human systems (shelter, transportation, freshwater, food, economy, and health) that can occur because of sea level rise, increased ocean temperatures, ocean acidification, and changing weather patterns.</p>
	<p>9.6.4 Compare climate change in the equatorial Pacific and in other parts of the Earth, especially the arctic, and how those changes can affect the Marshall Islands.</p>	<p>9.6.4a Research and report on the kinds of climate changes that are happening in other parts of the planet (temperatures, drought, sea level, ocean acidification).</p> <p>9.6.4b Describe changes that are happening in the arctic (higher temperatures, melting of land and sea ice), and explain how those changes can affect the Marshall Islands.</p> <p>9.6.4c Explain how melting of sea ice can result in more warming of the Earth (less reflection of sunlight), and how this change can cause global warming to increase even faster.</p>

	<p>9.6.5 Evaluate climate adaptation strategies to help make Marshall Island ecosystems and human systems more resilient with respect to climate change.</p>	<p>9.6.5a Explain that climate change adaptation involves actions that decrease the problems that occur because of the climate changes that are happening and that are predicted to continue or increase.</p> <p>9.6.5b Evaluate which adaptation strategies will provide the best cost/benefit ratio in terms of helping Marshall Island ecosystems become more resilient with respect to climate change.</p> <p>9.6.5c Evaluate which adaptation strategies will provide the best cost/benefit ratio in terms of helping Marshall Island human systems become more resilient with respect to climate change.</p>
	<p>9.6.6 Explain climate change mitigation and relate to human actions in other countries and in the Marshall Islands.</p>	<p>9.6.6a Explain that climate change mitigation involves actions that aim to decrease the amount of climate change that will happen in the future.</p> <p>9.6.6b Research and report on which countries are releasing the most greenhouse gases.</p> <p>9.6.6c Graph data about the amounts and kinds of greenhouse gases being released by different countries or different kinds of human activities.</p> <p>9.6.6d Research and report about actions that Marshall Island communities and citizens can do to reduce their releases of greenhouse gases.</p>