

## Science Curriculum

### Grade 3

The Fairfax County Elementary Science Program of Studies is a hands-on, inquiry based curriculum designed to provide students with a basic understanding of scientific investigation as it applies to the concepts of force, motion, and energy; matter; life processes; living systems; resources; Earth patterns, cycles, and change; interrelationships in Earth and space systems. Through science process skills and the practice of experimental design, students will develop abilities to solve problems, communicate, and make connections to science in our everyday world. The program materials include activity-centered units, science trade books, Windows on Science videodiscs, Fresh Science DVDs and specific web sites correlated to each science unit.



### SCI.G3

#### Standard 1

#### PLAN AND CONDUCT INVESTIGATIONS

The student will plan and conduct investigations.



#### Benchmark 1.a

##### Make Predictions and Observations

The student will plan and conduct investigations in which predictions and observations are made.



##### Indicator 1.a.1

##### Make and communicate predictions about the outcomes of investigations

Make and communicate predictions about the outcomes of investigations.



##### Indicator 1.a.2

##### Make and communicate careful observations

Make and communicate careful observations.



#### Benchmark 1.b

##### Classify Objects into at Least Two Sets and Two Subsets

The student will plan and conduct investigations in which objects with similar characteristics are classified into at least two sets and two subsets.



##### Indicator 1.b.1

##### Classify objects into at least two major sets and subsets

Classify objects into at least two major sets and subsets based on similar characteristics, such as predator/prey and herbivore, carnivore, and omnivore.



#### Benchmark 1.c

##### Develop Questions to Formulate Hypotheses

The student will plan and conduct investigations in which questions are developed to formulate hypotheses.



##### Indicator 1.c.1

##### Develop hypotheses from simple questions

Develop hypotheses from simple questions. These questions should be related to the concepts in the third grade standards.



##### Indicator 1.c.2

##### State hypotheses in "If... then..." terms


State hypotheses in terms such as: "If an object is cut into smaller pieces, then the physical properties of the object and its smaller pieces will remain the same."

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 **Benchmark 1.d**

**Measure Volume to the Nearest Milliliter and Liter**

The student will plan and conduct investigations in which volume is measured to the nearest milliliter and liter.

 **Indicator 1.d.1**

**Measure volume to the nearest milliliter and liter**


Measure volume to the nearest milliliter and liter using the appropriate instrument.

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 **Benchmark 1.e**

**Measure Length to the Nearest Centimeter**

The student will plan and conduct investigations in which length is measured to the nearest centimeter.

 **Indicator 1.e.1**

**Measure length to the nearest centimeter**


Measure length to the nearest centimeter using the appropriate instrument.

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 **Benchmark 1.f**

**Measure Mass to the Nearest Gram**

The student will plan and conduct investigations in which mass is measured to the nearest gram.

 **Indicator 1.f.1**

**Measure mass to the nearest gram**


Measure mass to the nearest to the nearest gram using the appropriate instrument.

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 **Benchmark 1.g**


**Gather, Chart and Graph Data**

The student will plan and conduct investigations in which data are gathered, charted, and graphed (line plot, picture graph, and bar graph).

 **Indicator 1.g.1**

**Communicate results of investigations by displaying data in**

Communicate results of investigations by displaying data in the form of tables, charts, and graphs.

 **Indicator 1.g.2**

**Construct bar and picture graphs and line plots to display data**


Construct bar and picture graphs and line plots to display data. (Example: 3.7 — comparison of types of soil and their effect on plant growth)

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 **Benchmark 1.h**

**Measure Temperature to the Nearest Degree Celsius**

The student will plan and conduct investigations in which temperature is measured to the nearest degree Celsius.

 **Indicator 1.h.1**

**Measure temperature to the nearest degree Celsius**


Measure temperature to the nearest degree Celsius using the appropriate instrument.

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 **Benchmark 1.i**

**Measure Time to the Nearest Minute**

The student will plan and conduct investigations in which time is measured to the nearest minute.

 **Indicator 1.i.1**

**Measure time to the nearest minute**


Measure time to the nearest minute using the appropriate instrument.

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 **Benchmark 1.j**


**Make Inferences and Draw Conclusions**

The student will plan and conduct investigations in which inferences are made and conclusions are drawn.

 **Indicator 1.j.1**

**Make inferences**

Make inferences.

 **Indicator 1.j.2**

**Draw conclusions**


Draw conclusions.

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 **Benchmark 1.k**

**Sequence Natural Events Chronologically**

The student will plan and conduct investigations in which natural events are sequenced chronologically.

 **Indicator 1.k.1**

**Sequence natural events chronologically**

Sequence natural events chronologically. (Example: 3.9 — plant and animal life cycles, phases of the moon, the water cycle, and tidal change)

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 **SCI.G3**

**Standard 2**

**UNDERSTAND SIMPLE MACHINES AND THEIR USES**


**The student will investigate and understand simple machines and their uses.**

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 **Benchmark 2.a**

**Understand Types of Simple Machines**

The student will investigate and understand types of simple machines (lever, screw, pulley, wheel and axle, inclined plane, and wedge).

 **Indicator 2.a.1**

**Identify and differentiate the six types of simple machines**

Identify and differentiate the six types of simple machines: lever, screw, pulley, wheel and axle, inclined plane, and wedge.

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**Benchmark 2.b**

## **Understand how Simple Machines Function**

The student will investigate and understand how simple machines function.

### **Indicator 2.b.1**

#### **Analyze the application of and explain the function of simple machines**

Analyze the application of and explain the function of each of the six types of simple machines. An example would be that an inclined plane is a ramp to make it easier for a heavy object to be moved up or down.

### **Indicator 2.b.2**

#### **Design and construct an apparatus that contains a simple machine**

Design and construct an apparatus that contains a simple machine.

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## **Benchmark 2.c**

### **Understand Compound Machines: Scissors, Wheelbarrow, Bicycle**

The student will investigate and understand compound machines (scissors, wheelbarrow, and bicycle).

### **Indicator 2.c.1**

#### **Identify the simple machines which compose a compound machine**

Identify and classify the simple machines which compose a compound machine, such as scissors, wheelbarrow, and bicycle.

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## **Benchmark 2.d**

### **Understand Examples of Simple and Compound Machines**

The student will investigate and understand examples of simple and compound machines found in the school, home, and work environment.

### **Indicator 2.d.1**

#### **Classify examples of simple machines found in school and at home**

Differentiate and classify specific examples of simple machines found in school and household items. These include a screwdriver, nutcracker, screw, flagpole pulley, ramp, and seesaw.

### **Indicator 2.d.2**

#### **Classify examples of compound machines found in school and at home**

Differentiate and classify examples of compound machines found in school and at home. These include a wheelbarrow, bicycle, and scissors.

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## **SCI.G3**

### **Standard 3**

#### **OBJECTS ARE MADE OF MATERIALS DESCRIBED BY PHYSICAL PROPERTIES**

The student will investigate and understand that objects are made of materials that can be described by their physical properties.

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## **Benchmark 3.a**

### **Understand Objects are Made of One or More Materials**

The student will investigate and understand objects are made of one or more materials.

### **Indicator 3.a.1**

#### **Use observations to infer that objects are made of 1 or more materials**

Infer that objects are made of one or more materials based on observations of the physical properties that are common to each individual object.



### **Benchmark 3.b**

#### **Understand Materials are Made of Parts Too Small To Be Seen**

The student will investigate and understand materials are composed of parts that are too small to be seen without magnification.



#### **Indicator 3.b.1**

##### **Recognize that materials are composed of parts too small to be seen**

Recognize that materials are composed of parts that are too small to be seen without magnification.



### **Benchmark 3.c**

#### **Understand That Physical Properties Remain the Same As Size is Reduced**

The student will investigate and understand that physical properties remain the same as the material is reduced in size.



#### **Indicator 3.c.1**

##### **Compare physical properties of smaller pieces to the entire material**

Compare the physical properties of smaller pieces of a material to those physical properties of the entire material.



#### **Indicator 3.c.2**

##### **Conclude that materials have unique observable physical properties**

Conclude that materials have their own set of physical properties that are observable.



#### **Indicator 3.c.3**

##### **Explain that observable physical properties allow differentiation**

Explain that physical properties are observable characteristics that enable one to differentiate objects.



#### **Indicator 3.c.4**

##### **Determine if physical properties remain the same when size is reduced**

Design an investigation to determine if the physical properties of a material will remain the same if the material is reduced in size.



## **SCI.G3**

### **Standard 4**

#### **BEHAVIORAL AND PHYSICAL ADAPTATIONS ALLOW ANIMALS TO RESPOND TO NEEDS**

The student will investigate and understand that behavioral and physical adaptations allow animals to respond to life needs.



### **Benchmark 4.a**

#### **Understand Methods Used by Animals to Gather Food, Find Shelter, etc.**

The student will investigate and understand methods used by animals for gathering and storing food, finding shelter, defending themselves, and rearing young.



#### **Indicator 4.a.1**

##### **Give examples of methods used by animals to find food, shelter, etc.**

Give examples of methods that animals use to gather and store food, find shelter, defend themselves, and rear young.



#### **Indicator 4.a.2**

##### **Design a model of a habitat for an animal with a specific adaptation**

Design and construct a model of a habitat for an animal with a specific adaptation.

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 **Benchmark 4.b**

**Understand Hibernation, Migration, Camouflage, Mimicry, Instinct, etc.**

The student will investigate and understand hibernation, migration, camouflage, mimicry, instinct, and learned behavior.



**Indicator 4.b.1**

**Describe the terms hibernation, migration, camouflage, mimicry, etc.**

Describe and explain the terms hibernation, migration, camouflage, mimicry, instinct, and learned behavior.



**Indicator 4.b.2**

**Compare the physical characteristics of animals & how they are adapted**

Compare the physical characteristics of animals, and explain how the animals are adapted to a certain environment.



**Indicator 4.b.3**

**Explain how an animal's behaviors help it live in its specific habitat**

Explain how an animal's behavioral adaptations help it live in its specific habitat.



**Indicator 4.b.4**

**Distinguish between physical and behavioral adaptations of animals**

Distinguish between physical and behavioral adaptations of animals.



**Indicator 4.b.5**

**Create a camouflage pattern for an animal in a specific environment**

Create (model) a camouflage pattern for an animal living in a specific dry-land or water-related environment. (Relates to 3.6.)



**Indicator 4.b.6**

**Compare and contrast instinct and learned behavior**

Compare and contrast instinct and learned behavior.



**SCI.G3**

**Standard 5**

**RELATIONSHIPS AMONG ORGANISMS IN FOOD CHAINS**

The student will investigate and understand relationships among organisms in aquatic and terrestrial food chains.



**Benchmark 5.a**

**Understand the Terms Producer, Consumer and Decomposer**

The student will investigate and understand the terms producer, consumer and decomposer.



**Indicator 5.a.1**

**Distinguish among producers, consumers and decomposers**

Distinguish among producers, consumers and decomposers.



**Indicator 5.a.2**

**Create/interpret a model of a food chain showing producers & consumers**

Create and interpret a model of a food chain showing producers and consumers.



**Indicator 5.a.3**

**Explain how a change in one part of a food chain might affect the rest**

Explain how a change in one part of a food chain might affect the rest of the food chain.



#### **Indicator 5.a.4**

#### **Infer that most food chains begin with a green plant**

Infer that most food chains begin with a green plant.

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#### **Benchmark 5.b**

#### **Understand the terms Herbivore, Carnivore and Omnivore**

The student will investigate and understand the terms herbivore, carnivore and omnivore.



#### **Indicator 5.b.1**

#### **Distinguish among herbivores, omnivores and carnivores**

Distinguish among herbivores, omnivores and carnivores.



#### **Indicator 5.b.2**

#### **Identify sequences of feeding relationships in a food chain**

Identify sequences of feeding relationships in a food chain.

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#### **Benchmark 5.c**

#### **Understand the Terms Predator and Prey**

The student will investigate and understand the terms predator and prey.



#### **Indicator 5.c.1**

#### **Understand the terms predator and prey**

Understand the terms predator and prey.



#### **Indicator 5.c.2**

#### **Differentiate between predators and prey**

Differentiate between predators and prey.

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### **SCI.G3**

#### **Standard 6**

#### **ENVIRONMENTS SUPPORT MANY PLANTS & ANIMALS THAT SHARE RESOURCES**

The student will investigate and understand that environments support a diversity of plants and animals that share limited resources.

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#### **Benchmark 6.a**

#### **Understand Water-Related Environments**

The student will investigate and understand water-related environments (pond, marshland, swamp, stream, river, and ocean environments).



#### **Indicator 6.a.1**

#### **Describe major water-related environments**

Describe major water-related environments.



#### **Indicator 6.a.2**

#### **Cite examples of animals and plants that live in ponds, swamps, etc.**

Cite examples of animals and plants that live in each water-related environment.



#### **Indicator 6.a.3**

#### **Analyze and interpret diagrams of water-related environments**

Analyze models or diagrams of different water-related environments in order to describe the community of organisms each contains and interpret how the organisms use the resources in that environment.



**Indicator 6.a.4**

**Explain how living things use resources in water-related environments**

Explain how animals and plants use resources in water-related environments.

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**Benchmark 6.b**

**Understand Dry-Land Environments**

The student will investigate and understand dry-land environments (desert, grassland, rain forest, and forest environments).



**Indicator 6.b.1**

**Describe major dry-land environments**

Describe major dry-land environments.



**Indicator 6.b.2**

**Cite examples of animals & plants that live in deserts, forests, etc.**

Cite examples of animals and plants that live in each dry-land environment.



**Indicator 6.b.3**

**Compare and contrast water-related and dry-land environments**

Compare and contrast water-related and dry-land environments.



**Indicator 6.b.4**

**Analyze dry-land environments to describe the organisms each contains**

Analyze models or diagrams of different dry-land environments in order to describe the community of organisms each contains and interpret how the organisms use the resources in that environment.



**Indicator 6.b.5**

**Explain how animals and plants use resources in dry-land environments**

Explain how animals and plants use resources in dry-land environments.

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**Benchmark 6.c**

**Understand the Terms Population and Community**

The student will investigate and understand the terms population and community.



**Indicator 6.c.1**

**Distinguish between a population and a community**

Distinguish between a population and a community.



**Indicator 6.c.2**

**Predict what would occur if a population in an environment were to die**

Predict what would occur if a population in a specific environment were to die.

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**SCI.G3**

**Standard 7**

**SOIL: MAJOR COMPONENTS, ORIGIN AND IMPORTANCE TO PLANTS & ANIMALS**

The student will investigate and understand the major components of soil, its origin, and importance to plants and animals including humans.

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## **Benchmark 7.a**

### **Understand The Rock Cycle Including Identification Of Rock Types**

The student will investigate and understand the rock cycle including identification of rock types.



#### **Indicator 7.a.1**

##### **Recognize that soil provides the support & nutrients for plant growth**

Observe and recognize that soil, as a natural resource, provides the support and nutrients necessary for plant growth.



#### **Indicator 7.a.2**

##### **Investigate to compare how different types of soil affect plant growth**

Design an investigation to compare how different types of soil affect plant growth.



#### **Indicator 7.a.3**

##### **Use plant growth data to organize tables and construct simple graphs**

Use plant growth data to organize tables and construct simple graphs.



#### **Indicator 7.a.4**

##### **Comprehend terminology related to soil: nutrients**

Comprehend the key terminology related to soil, including nutrients.

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## **Benchmark 7.b**

### **Understand that Topsoil is a Natural Product of Subsoil and Bedrock**

The student will investigate and understand that topsoil is a natural product of subsoil and bedrock.



#### **Indicator 7.b.1**

##### **Explain how soil forms over time**

Explain how soil forms over time.



#### **Indicator 7.b.2**

##### **Interpret a basic diagram showing major soil layers**

Interpret and illustrate a basic diagram showing major soil layers, including bedrock, subsoil, and topsoil.



#### **Indicator 7.b.3**

##### **Comprehend terminology related to soil: topsoil and bedrock**

Comprehend the key terminology related to soil, including topsoil and bedrock.

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## **Benchmark 7.c**

### **Understand that Rock, Clay, Silt, Sand & Humus are Components of Soils**

The student will investigate and understand that rock, clay, silt, sand, and humus are components of soils.



#### **Indicator 7.c.1**

##### **Analyze and describe the different components of soil**

Analyze and describe the different components of soil, including rock fragments, clay, silt, sand and humus.



#### **Indicator 7.c.2**

##### **Comprehend terminology related to soil: humus**

Comprehend the key terminology related to soil, including *humus*

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## **Benchmark 7.d**

### **Understand that Soil is a Natural Resource and Should be Conserved**

The student will investigate and understand that soil is a natural resource and should be conserved.



#### **Indicator 7.d.1**

##### **Collect and analyze data on soil conservation on the school grounds**

Collect, chart, and analyze data on soil conservation on the school grounds.



#### **Indicator 7.d.2**

##### **Evaluate the importance of soil to people**

Evaluate the importance of soil to people.



#### **Indicator 7.d.3**

##### **Describe how soil can be conserved**

Describe how soil can be conserved.



## **SCI.G3**

### **Standard 8**

#### **BASIC PATTERNS AND CYCLES OCCURRING IN NATURE**

The student will investigate and understand basic patterns and cycles occurring in nature.



## **Benchmark 8.a**

### **Understand Patterns of Natural Events**

The student will investigate and understand patterns of natural events (day and night, seasonal changes, phases of the moon, and tides).



#### **Indicator 8.a.1**

##### **Explain how some events in nature occur in a pattern or cycle**

Explain how some events in nature occur in a pattern or cycle, such as the seasons, day and night, phases of the moon, and tides.



#### **Indicator 8.a.2**

##### **Recognize the effects of the Earth, sun and moon relationships**

Recognize that the relationships that exist between and among the Earth, sun, and moon result in day and night, seasonal changes, phases of the moon, and the tides.



#### **Indicator 8.a.3**

##### **Model and describe how the Earth's rotation causes day and night**

Model and describe how the Earth's rotation causes day and night.



#### **Indicator 8.a.4**

##### **Model & describe how the sun's rays strike the Earth to cause seasons**

Model and describe how the sun's rays strike the Earth to cause seasons.



#### **Indicator 8.a.5**

##### **Illustrate the moon's phases and describe the moon's changing patterns**

Observe, chart, and illustrate phases of the moon, and describe the changing pattern of the moon as it revolves around the Earth.



#### **Indicator 8.a.6**

##### **Analyze tide tables to determine a pattern of high and low tides**

Analyze data from simple tide tables to determine a pattern of high and low tides.



## **Benchmark 8.b**

### **Understand Animal and Plant Life Cycles**

The student will investigate and understand animal and plant life cycles.



#### **Indicator 8.b.1**

##### **Explain the patterns that organisms undergo during their life cycle**

Explain the pattern of growth and change that organisms, such as the butterfly and frog, undergo during their life cycle.



#### **Indicator 8.b.2**

##### **Explain how some events in nature occur in a pattern or cycle**

Explain how some events in nature occur in a pattern or cycle, such as life cycles.

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## **SCI.G3**

### **Standard 9**

#### **THE WATER CYCLE AND ITS RELATIONSHIP TO LIFE ON EARTH**

The student will investigate and understand the water cycle and its relationship to life on Earth.

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## **Benchmark 9.a**

### **Understand that Energy From the Sun Drives the Water Cycle**

The student will investigate and understand that the energy from the sun drives the water cycle.



#### **Indicator 9.a.1**

##### **Identify the sun as the origin of energy that drives the water cycle**

Identify the sun as the origin of energy that drives the water cycle.

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## **Benchmark 9.b**

### **Understand the Processes Involved in the Water Cycle**

The student will investigate and understand the processes involved in the water cycle (evaporation, condensation, precipitation).



#### **Indicator 9.b.1**

##### **Describe the processes of evaporation, condensation and precipitation**

Describe the processes of evaporation, condensation and precipitation as they relate to the water cycle.



#### **Indicator 9.b.2**

##### **Construct and interpret a model of the water cycle**

Construct and interpret a model of the water cycle.

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## **Benchmark 9.c**

### **Understand that Water is Essential for Living Things**

The student will investigate and understand that water is essential for living things.



#### **Indicator 9.c.1**

##### **Appraise the importance of water to people and to other living things**

Appraise the importance of water to people and to other living things.



#### **Indicator 9.c.2**

##### **Realize living things get water from the environment in different ways**

Realize living things get water from the environment in different ways.

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 **Benchmark 9.d**

**Understand Water Supply and Water Conservation**

The student will investigate and understand water supply and water conservation.

 **Indicator 9.d.1**


**Identify water sources for a community: rivers, reservoirs, wells**

Identify major water sources for a community, including rivers, reservoirs, and wells. Describe the major water sources for the local community.

 **Indicator 9.d.2**

**Explain methods of water conservation in the home and school**

Explain methods of water conservation in the home and school.

 **Indicator 9.d.3**

**Analyze possible sources of water pollution in neighborhoods, etc.**

Analyze possible sources of water pollution in neighborhoods, at school, and in the local community. This includes runoff from over-fertilized lawns and fields, oil from parking lots, eroding soil, and animal waste.

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 **SCI.G3**

**Standard 10**

**NATURAL EVENTS AND HUMAN INFLUENCES CAN AFFECT THE SURVIVAL OF SPECIES**

The student will investigate and understand that natural events and human influences can affect the survival of species.

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 **Benchmark 10.a**

**Understand the Interdependency of Plants and Animals**

The student will investigate and understand the interdependency of plants and animals.

 **Indicator 10.a.1**

**Explain how living things in an area are dependent on each other**


Explain how living things in an area are dependent on each other.

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 **Benchmark 10.b**

**Understand the Effects of Human Activity on Air, Water and Habitat**

The student will investigate and understand the effects of human activity on the quality of air, water and habitat.

 **Indicator 10.b.1**

**Compare and contrast human influences on air, water & habitat quality**

Compare and contrast human influences on the quality of air, water, and habitats.

 **Indicator 10.b.2**

**Analyze the effects of fire, flood, disease and erosion on habitat**

Analyze the effects of fire, flood, disease and erosion on habitat.

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 **Benchmark 10.c**

**Understand the Effects of Fire, Flood, Disease & Erosion on Organisms**

The student will investigate and understand the effects of fire, flood, disease and

erosion on organisms.



**Indicator 10.c.1**

**Analyze the effects of fire, flood, disease and erosion on organisms**

Analyze the effects of fire, flood, disease and erosion on organisms.

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**Benchmark 10.d**

**Understand Conservation and Resource Renewal**

The student will investigate and understand conservation and resource renewal.



**Indicator 10.d.1**

**Describe how conservation practices affect the survival of a species**

Describe how conservation practices can affect the survival of a species.



**Indicator 10.d.2**

**Describe a conservation practice in the local community**

Describe a conservation practice in the local community.

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**SCI.G3**

**Standard 11**

**DIFFERENT SOURCES OF ENERGY**

**The student will investigate and understand different sources of energy.**

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**Benchmark 11.a**

**Understand Different Sources of Energy**

The student will investigate and understand different sources of energy.



**Indicator 11.a.1**

**Identify sources of energy and their uses**

Identify sources of energy and their uses.

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**Benchmark 11.b**

**Understand Sources of Energy: Sunlight, Water, Wind**

The student will investigate and understand sources of energy (sunlight, water, wind).



**Indicator 11.b.1**

**Explain that the sun is the major source of energy for the Earth**

Explain that the sun is the major source of energy for the Earth.



**Indicator 11.b.2**

**Design an investigation to determine the warming effects of sunlight**

Design a basic investigation to determine the effects of sunlight on warming various objects and materials, including water.




**Indicator 11.b.3**

**Describe how solar energy, wind & moving water can produce electricity**

Describe how solar energy, wind, and moving water can be used to produce electricity.

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**Benchmark 11.c**

 **Understand Fossil Fuels (Coal, Oil, Natural Gas) and Wood**

The student will investigate and understand fossil fuels (coal, oil, natural gas) and wood.

 **Indicator 11.c.1**

**Describe how fossil fuels are used as an energy source**

Describe how fossil fuels are used as an energy source.

 **Indicator 11.c.2**

**Describe how wood is used as an energy source**

Describe how wood is used as an energy source.

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 **Benchmark 11.d**


**Understand Renewable and Nonrenewable Energy Resources**

The student will investigate and understand renewable and nonrenewable energy resources.

 **Indicator 11.d.1**

**Analyze the pros and cons of using naturally occurring energy sources**

Analyze the advantages and disadvantages of using different naturally occurring energy sources.

 **Indicator 11.d.2**

**Compare and contrast renewable and nonrenewable energy sources**

Compare and contrast renewable and nonrenewable energy sources.