



FLORIDA
Middle School Standards
2020-21 School Year

SC.6.E Earth and Space Science

SC.6.E.6.2 Recognize that there are a variety of different landforms on Earth's surface such as coastlines, dunes, rivers, mountains, glaciers, deltas, and lakes and relate these landforms as they apply to Florida.

When students are exploring the GABIE Bus they will notice the different types of plants and animals that need different types of landforms to survive. We demonstrate the Florida wetlands and the importance to the ecological system.

SC.6.E.7.2 Investigate and apply how the cycling of water between the atmosphere and hydrosphere has an effect on weather patterns and climate.

We show and explain the different types of cloud formations that determine the imminent weather. We also discuss at the seed station the greenhouse effect. The greenhouse effect is the exchange of incoming and outgoing radiation that warms the Earth is often referred to as the greenhouse effect because a greenhouse works in much the same way. Incoming UV radiation easily passes through the glass walls of a greenhouse and is absorbed by the plants and hard surfaces inside. We also discuss how the water cycle works. Put simply, water evaporates from the land and sea, which eventually returns to Earth as rain and snow. Climate change intensifies this cycle because as air temperatures increase, more water evaporates into the air.

SC.6.L Life Science

SC.6.L.14.5 Identify and investigate the general functions of the major systems of the human body (digestive, respiratory, circulatory, reproductive, excretory, immune, nervous, and musculoskeletal) and describe ways these systems interact with each other to maintain homeostasis.

- **We discuss the respiration system and how we must interact with plants to maintain**
- 1. **Life. We discuss our respiratory system where we breathe in oxygen and exhale Carbon dioxide. Plants emit Oxygen and take in Carbon dioxide. They can learn how we must work together with other forms of living organisms to maintain homeostasis. In biology, homeostasis is the state of steady internal, physical, and chemical conditions maintained by living systems.**

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SC.6.N Nature of Science

- **SC.6.N.1 The Practice of Science**
 - **A Scientific inquiry is a multifaceted activity; The processes of science include the formulation of scientifically investigable questions, construction of investigations into those questions, the collection of appropriate data, the evaluation of the meaning of those data, and the communication of this evaluation.**
 - **Identify steps of the scientific method_(6-A.1)**
 - **Identify independent and dependent variables_(6-B.2)**
 - **Identify the experimental question_(6-B.3)**
 - **Identify questions that can be investigated with a set of materials_(6-B.4)**

- Understand an experimental protocol about plant growth_(6-B.5)
- Understand an experimental protocol about evaporation_(6-B.7)
- **B The processes of science frequently do not correspond to the traditional portrayal of "the scientific method."**
- **C Scientific argumentation is a necessary part of scientific inquiry and plays an important role in the generation and validation of scientific knowledge.**
- **D Scientific knowledge is based on observation and inference; it is important to recognize that these are very different things. Not only does science require creativity in its methods and processes, but also in its questions and explanations.**
 - **SC.6.N.1.2 Explain why scientific investigations should be replicable.**
 - **SC.6.N.1.3 Explain the difference between an experiment and other types of scientific investigation, and explain the relative benefits and limitations of each.**
 - Understand an experimental protocol about plant growth_(6-B.5)
 - Understand an experimental protocol about evaporation_(6-B.7)
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 - **SC.6.N.1.4 Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation.**
 - **SC.6.N.1.5 Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence.**

- **At our seed station we give each student their own plant to grow. We have them use a biodegradable material so they can see how it can decompose and become food for their plant (food chain) They can see how if they all water their plants and give them all equal sunlight, Should they all grow the same? We also give the teacher two separate plants to grow as an experiment. One being housed in a table-top greenhouse and the other in the window. Students can write a compare and contrast paper on the two ways to grow plants. They can chart the growth on the chart we give them and observe the differences. They create a hypothesis and wait to see if it comes true. This can be their long-term science project.**

SC.7.L Life Science

- **SC.7.L.17 Interdependence**
 - **A Plants and animals, including humans, interact with and depend upon each other and their environment to satisfy their basic needs.**
 - **We showcase the different top commodities found grown or mined in Florida and how they are important to our survival. Some are used for food, companionship and a necessity for life. Cows, chickens for food. Dogs, Cats and other animals for companionship and mental health. Plants are also used for food and for Oxygen that is needed to sustain life for all. This is shown on the bus and discussed in detail at the Seed Station.**
 - **B Both human activities and natural events can have major impacts on the environment.**
 - **The greenhouse effect (7-EE.1)**

- **We discuss at the seed station the greenhouse effect. The greenhouse effect is the exchange of incoming and outgoing radiation that warms the Earth. This is because a greenhouse works in much the same way. Incoming UV radiation easily passes through the glass walls of a greenhouse and is absorbed by the plants and hard surfaces inside. We also discuss how the water cycle works. Put simply, water evaporates from the land and sea, which eventually returns to Earth as rain and snow. Climate change intensifies this cycle because as air temperatures increase, more water evaporates into the air. During the seed station we give each teacher a tabletop green house to grow a plant in to be able to show the students firsthand this effect.**

- **C Energy flows from the sun through producers to consumers.**

- **How does matter move in food chains? (7-W.1)**

- **SC.7.L.17.1 Explain and illustrate the roles of and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.**

SC.7.L.17.3 Describe and investigate various limiting factors in the local ecosystem and their impact on native populations, including food, shelter, water, space, disease, parasitism, predation, and nesting sites.

This is just one example. We showcase cotton on the bus and explain how the Boil Weevil almost destroyed the entire Cotton Crop. Society had to come up with a way to destroy the boil weevil without hurting the crops. We ask

students to name other impacts that could or did affect an area negatively.

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 - Identify the experimental question_(7-B.3)
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 - Understand an experimental protocol about plant growth_(7-B.5)
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 - **B The processes of science frequently do not correspond to the traditional portrayal of "the scientific method."**
 - **C Scientific argumentation is a necessary part of scientific inquiry and plays an important role in the generation and validation of scientific knowledge.**
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in its methods and processes, but also in its questions and explanations.

- **SC.7.N.1.1 Define a problem from the seventh grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.**

- **Identify steps of the scientific method (7-A.1)**

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- **SC.7.N.1.2 Differentiate replication (by others) from repetition (multiple trials).**

- **SC.7.N.1.3 Distinguish between an experiment (which must involve the identification and control of variables) and other forms of scientific investigation and explain that not all scientific knowledge is derived from experimentation.**

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- **Understand an experimental protocol about plant growth (7-B.5)**

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- **At our seed station we give each student their own plant to grow. We have them use a biodegradable material so they can see how it can decompose and become food for their plant (food chain) They can see how if they all water their plants and give them all equal sunlight, Should they all grow the same? We also give the teacher two separate plants to grow as an experiment.**

One being housed in a table-top greenhouse and the other in the window. Students can write a compare and contrast paper on the two ways to grow plants. They can chart the growth on the chart we give them and observe the differences. They create a hypothesis and wait to see if it comes true. This can be their long-term science project.

SC.8.E Earth and Space Science

SC.8.E.5.9 Explain the impact of objects in space on each other including:

- **1 the Sun on the Earth including seasons and gravitational attraction**
 - What causes the seasons on Earth? (8-GG.3)
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 - **Because of Earth's axial tilt, our planet orbits the Sun on a slant which means different areas of Earth point toward or away from the Sun at different times of the year. We display the Earth's axial tilt throughout the year on our GABIE Bus for the students to read how this effects our seasons. We discuss the main 4, Winter Solstice, Spring Equinox, Summer Solstice, and Fall Equinox.**
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- **2 the Moon on the Earth, including phases, tides, and eclipses, and the relative position of each body.**
 - Identify phases of the Moon (8-GG.2)
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 - **On the GABIE bus we talk about the phases of the moon which each phase is shown on the side of the**

bus and what it represents. We also have a science project on our website as a resource for the educators to use to explain the phases of the moon.

- **As the water moves along the Earth, the combined forces of the Earth's rotation and the gravitational pull from interstellar bodies such as the moon cause ocean levels to fluctuate continuously. A spring tide, which occurs when the moon is full or new, combines with the gravitational pull of the sun and causes a large difference between high and low tides. A neap tide occurs during quarter phases and works to cancel out the tidal effect from the sun, resulting in commensurate waves.**

SC.8.L Life Science

- **SC.8.L.18 Matter and Energy Transformations**
 - **A Living things share basic needs for life.**
 - **B Living organisms acquire the energy they need for life processes through various metabolic pathways (photosynthesis and cellular respiration).**

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How do plants use and change energy?_(8-U.1)

Photosynthesis:

The process by which green plants and some other organisms use sunlight to synthesize foods from carbon dioxide and water. Photosynthesis in plants generally involves the green pigment chlorophyll and generates oxygen as a byproduct. The sunlight is used as the energy needed to create this change.

This is discussed at the seed station when we are talking about the parts of the plant and how they grow. We discuss how the green parts of the plant produce oxygen. We also talk about living organisms sharing the basic needs for life, such as water, food, Oxygen and Carbon Dioxide.

SC.8.L.18.1 Describe and investigate the process of photosynthesis, such as the roles of light, carbon dioxide, water and chlorophyll; production of food; release of oxygen.

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SC.8.N.1.6 Understand that scientific investigations involve the collection of relevant empirical evidence, the use of logical reasoning, and the application of imagination in devising hypotheses, predictions, explanations and models to make sense of the collected evidence.

- Understand an experimental protocol about plant growth_(8-B.5)
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SC.8.P.9 Changes in Matter

- **A Matter can undergo a variety of changes.**
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- **B When matter is changed physically, generally no changes occur in the structure of the atoms or molecules composing the matter.**
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- **C When matter changes chemically, a rearrangement of bonds between the atoms occurs. This results in new substances with new properties.**
 - **SC.8.P.9.2 Differentiate between physical changes and chemical changes.**
 - Compare physical and chemical changes_(8-F.5)
 - **SC.8.P.9.3 Investigate and describe how temperature influences chemical changes.**
 - Describe energy changes in chemical reactions_(8-F.4)

- **We discuss this topic during the GABIE Honeybee presentation. We discuss how bees make honey. They drink nectar and water and it goes into one of their stomachs and mixes together and turns into honey. A chemical reaction is a chemical change that occurs when two or more substances combine to form a new substance. Chemical reaction is any change that results in the formation of new chemical substances.**
- **We talk about how honeybees have glands all over their bodies that produce wax. The balls of wax are used to seal the honey in the honeycomb. We talk about how when you lite a candle the wax melts and when you blow out the flame it hardens.**
- **This is called a physical reaction because whether it is in liquid form or solid form it is still wax.**
- **Physical reaction is a change affecting the form of a chemical substance, but not its chemical composition.**
- **We explain the difference between the two:**
- **Physical modifications do not change the composition of the substance often whereas in chemical reactions molecules react chemically to change the composition of the substance chemically.**