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**Georgia Elementary Standards  
Addressed by  
GABIE Bus and Program  
2020-2021**

# **Gabie is our Mobile Stem/Agriculture** **in-house field trip**

## **Our field trip overview:**

We bring GABIE our Queen Honeybee Mascot out to engage with the students. We explain the Honeybees role in our daily life, not just the pollination of plants for our food source but the pollination of oxygen generating plants that are the necessity for our human survival. We go further by discussing the respiration systems of humans vs. plants. As you know, humans breathe in O<sub>2</sub> and breathe out CO<sub>2</sub>. Plants take in Co<sub>2</sub> and emit O<sub>2</sub>. Students can see that we need to be interdependent with nature to survive. Einstein states that without the Honeybees we would only survive 4 years on this earth because they are the major pollinators. We also discuss the chemical and physical reactions with respects to the worker bees making honey and beeswax. For example, your parents light a candle, what happens to the wax? It melts. You blow out the flame. What happens to the wax? it hardens. So, it goes from a liquid to a solid and a solid to a liquid. Is this a physical or chemical reaction? It is physical because no matter whether it is a liquid or a solid it is still wax. It only changed its physical appearance. We have a similar discussion concerning the creation of honey with a chemical reaction. We also discuss static electricity where students learn how Honeybees carry the pollen by rubbing the fur on their back legs together creating static electricity to pick the pollen up as they visit the plants to drink the nectar. GABIE is a huge favorite for all the students. They love her.

Next, we break the three classes up to rotate throughout our program.

## **GABIE Bus**

The first station is where the students will enter on the interactive GABIE Bus which houses the top commodities found, grown or mined in Georgia. They exist in the raw and refined form. As they explore throughout the bus interacting, they can listen to an informational Georgia Agriculture video that runs on the 4 TV's throughout the bus. We have fun facts about each commodity along with Georgia state facts and careers. We even have different landforms with our terrarium to show and explain the importance of the Georgia wetlands. This shows the different species that need these wetlands to survive and the importance to our ecological systems on this earth. On the ceiling we have the phases of the moons and the stages of the Earths' axis along with the different cloud formations that determine our imminent weather. We have the fun facts about the state. We have our hands-on touch wall so students can feel real cowhide, alligator skin are some that are there. We have careers for students to begin to think about what they

would like to be when they grow up. They learn the realization of working with science and agriculture and the importance of this field in many professions.

## **Students rotate to the Whisper Mill**

This is our Whisper Mill where students get to grind Georgia's wheat into flour. They will use our tabletop simple machine, GABIES' Whisper mill. Students will have to name the parts of the simple machine and tell its purpose. They will learn how technology has progressed throughout the years from manual labor to the different present-day energies used to assist in production including the water wheel. We have water wheel on hand to demonstrate the process of the energy created from the flowing rivers.

We will discuss all the steps in between from the 13 Colonies to present day America. They will also learn how Millers and Farmers must work together in order to plant, grow and harvest the wheat, along with other crops to serve the supply and demand of the nation. As the 13 colonies grew to America today, they can observe the different technology invented to keep up with the time. We discuss the latest energies created and the possibility of new energies to come. It is so much fun to see their faces when they get to grind their own wheat into flour.

## **Students rotate to the Seed station**

The seed station is where they learn how to grow their own food using biodegradable materials. We teach students how to use their milk cartons to re-purpose to a planter for their plant and then recycle once their plant begins to grow by poking holes in it and planting it in the ground. The paper product milk carton will decompose and become plant food for their plant. At our seed station, students learn how the sun's energy and light is used to grow our plants. Photosynthesis is the process through which plants convert light energy from the sun to chemical energy. The chemical energy is then stored as sugar. During the process of photosynthesis, plants capture light energy and use it to convert water, carbon dioxide, and minerals into oxygen (released into the air) and glucose stored in the plant and used as food.

For the lower grade levels, we do the lima bean science project to show students that plants can grow without soil using a paper towel, which is made up of biodegradable material.

For the upper levels we give each teacher two plants and a tabletop green house. We will provide the teacher with this long-term science project. We give the teacher two paper cups with different seeds of vegetables in them to grow.

The teacher will grow one plant in the sunlight and one in the green house. Students can write a compare and contrast paper on the two different ways to grow plants, they can chart the growth and observe the differences in the plants

Students get to observe the water cycle as the heat from the lamp turns the water into a gas and it tries to evaporate but gets caught in the plastic forming condensations. This is awesome for the students to observe. We give each grade level a clear cup of flowers to grow. This experiment allows students to watch the roots grow downward and the plant grows upward.

In middle schools, we give each grade level a clear cup of white flowers. Each grade level gets a vial of food coloring. They can choose the color. (different for each grade level) They will conduct an experiment to see if they water their plant with the mixture of water and food coloring daily, will their plant take on the color from their mixture?

We also touch upon economics with respect to gardens and roadside veg/fruit vendors. This topic not only teaches economics but also healthy eating. Growing your own food in a garden, eating some, sharing some and selling some. What is your net profit?

Depending on the grade level that we are teaching, it will determine how in depth we go with our information to go along with their standards. We also give each student an activity booklet for them to do back in the classroom to further our teachings. On the back of each activity booklet is the graph for the students to chart the growth of their plants for their long-term science project.

# All Stations:

## **Kindergarten:**

- LAFS.K.RL.1.1 With prompting and support, ask and answer questions about key details in a text.
- SC.K.E.5.2 Recognize the repeating pattern of day and night.
- SC.K.E.5.3 Recognize that the Sun can only be seen in the daytime.
- SC.K.E.5.4 Observe that sometimes the Moon can be seen at night and sometimes during the day.
- SC.K.L.14.3 Observe plants and animals, describe how they are alike and how they are different in the way they look and in the things they do.
- SC.K.L.14.2 Recognize that some books and other media portray animals and plants with characteristics and behaviors they do not have in real life.
- SC.K.P.12.1 Investigate that things move in different ways, such as fast, slow, etc.
- SS.K.A.2.1 Compare children and families of today with those in the past.

## **1st Grade:**

- LAFS.1.RL.1 Key ideas and details
- SC.1.P13.1 Demonstrate that the way to change the motion of an object is by applying a push or a pull.
- SC.1.E.5.1 Observe and discuss that there are more stars in the sky than anyone can easily count and that they are not scattered evenly in the sky.
- SC.1.E.5.4 Identify the beneficial and harmful properties of the Sun.
- SC.1.E.6.1 Recognize that water, rocks, soil, and living organisms are found on Earth's surface.
- SC.1.N.1.3 Keep records as appropriate - such as pictorial and written records - of investigations conducted.
- SC.1.E.1.4 Distinguish people as buyers, sellers, and producers of goods and services.

## **2nd Grade:**

- LAFS.K.RL.2.4 With prompting and support, ask and answer questions about unknown words in a text
- SC.2.L.17 Interdependence
- SC.2.L.16.1 Observe and describe major stages in the life cycles of plants and animals, including beans and butterflies.
- SC.2.P.13.4 Demonstrate that the greater the force (push or pull) applied to an object, the greater the change in motion of the object.
- SC.2.E.6.1 Recognize that Earth is made up of rocks. Rocks come in many sizes and shapes.
- SC.2.E.7.4 Investigate that air is all around us and that moving air is wind.
- SC.2.P.8.4 Observe and describe water in its solid, liquid, and gaseous states.
- SC.2.P.9.1 Investigate that materials can be altered to change some of their properties, but not all materials respond the same way to any one alteration.

SS.2.A.2.4 Explore ways the daily life of people living in Colonial America changed over time.

### **3rd Grade:**

- SC.3.L.14.1 Describe structures in plants and their roles in food production, support, water and nutrient transport, and reproduction.
- SC.3.L.17.2 Recognize that plants use energy from the Sun, air, and water to make their own food.
- SC.3.P.10.1 Identify some basic forms of energy such as light, heat, sound, electrical, and mechanical.
- SC.3.P.10.2 Recognize that energy has the ability to cause motion or create change.
- SC.3.E.5.1 Explain that stars can be different; some are smaller, some are larger, and some appear brighter than others; all except the Sun are so far away that they look like points of light.
- SC.3.E.5.2 Identify the Sun as a star that emits energy; some of it in the form of light.
- SC.3.N.1.3 Recognize that the Sun appears large and bright because it is the closest star to Earth.
- SC.3.L.14.2 Investigate and describe how plants respond to stimuli (heat, light, gravity), such as the way plant stems grow toward light and their roots grow downward in response to gravity.
- MA.3.FR.1.1 Represent and interpret unit fractions in the form  $\frac{1}{n}$  as the quantity formed by one part when a whole is partitioned into  $n$  equal parts.

### **4th Grade:**

- SC.4.L.17.4 Recognize ways plants and animals, including humans, can impact the environment.
- SC.4.P.10.1 Observe and describe some basic forms of energy, including light, heat, sound, electrical, and the energy of motion.
- SC.4.P.10.4 Describe how moving water and air are sources of energy and can be used to move things.
- SC.4.E.5.1 Observe that the patterns of stars in the sky stay the same although they appear to shift across the sky nightly, and different stars can be seen in different seasons.
- SC.4.E.5.2 Describe the changes in the observable shape of the moon over the course of about a month.
- SC.4.E.5.3 Recognize that Earth revolves around the Sun in a year and rotates on its axis in a 24-hour day.
- SC.4.E.5.4 Relate that the rotation of Earth (day and night) and apparent movements of the Sun, Moon, and stars are connected.
- SC.4.E.6.6 Identify resources available in Georgia (water, phosphate, oil, limestone, silicon, wind, and solar energy).
- SC.4.P.9.1 Identify some familiar changes in materials that result in other materials with different characteristics, such as decaying animal or plant matter, burning, rusting, and cooking.
- SS.4.E.1.2 Explain Georgia's role in the national and international economy and conditions that attract businesses to the state.

## 5th Grade:

- SC.5.L.17.1 Compare and contrast adaptations displayed by animals and plants that enable them to survive in different environments such as life cycles variations, animal behaviors and physical characteristics.
- SC.5.P.9.1 Investigate and describe that many physical and chemical changes are affected by temperature.
- SC.5.P.13.4 Investigate and explain that when a force is applied to an object but it does not move, it is because another opposing force is being applied by something in the environment so that the forces are balanced.
- SC.5.E.5.1 Recognize that a galaxy consists of gas, dust, and many stars, including any objects orbiting the stars. Identify our home galaxy as the Milky Way.
- SC.5.E.5.2 Recognize the major common characteristics of all planets and compare/contrast the properties of inner and outer planets.
- SC.5.E.5.3 Distinguish among the following objects of the Solar System -- Sun, planets, moons, asteroids, comets -- and identify Earth's position in it.

## Separated by Station:

### Bus Station:

- LAFS.K.RL.1.1 With prompting and support, ask and answer questions about key details in a text. - As the students tour the bus, they are constantly asking questions and getting appropriate answers. We do have a scavenger hunt for the students to find the different products and objects all over the bus.
- SC.K.E.5.2 Recognize the repeating pattern of day and night. – This is covered by our solar system display on the bus so the students recognize that during the day the sun is nourishing the plants.
- SC.K.E.5.4 Observe that sometimes the Moon can be seen at night and sometimes during the day. We have a display of the phases of the moon that shows the full cycle from waxing crescent to the new moon.
- SC.1.E.5.1 Observe and discuss that there are more stars in the sky than anyone can easily count and that they are not scattered evenly in the sky. - Falls under the observe and discuss portion of our program as the students are viewing the solar system and using our interactive display.

- SC.1.E.5.4 Identify the beneficial and harmful properties of the Sun. This is explained when discussing the need for sun when growing plants, and how we need plants for oxygen. We also talk about the different landforms caused by the effects of the sun.
- SC.1.E.6.1 Recognize that water, rocks, soil, and living organisms are found on Earth's surface. – We have displays depicting the scientific reasoning why we have the different rocks. We discuss the uses of the different soils in the regions and how the different plants are grown due to the soil. We discuss the regions and what makes them different.
- SC.1.N.1.3 Keep records as appropriate - such as pictorial and written records - of investigations conducted. – An activity booklet is given for students to use in the classroom and at home to further their education about our program. We also have a graph on the back for the students to use to record and chart their findings when doing their science project given by GABIE.
- SC.1.E.1.4 Distinguish people as buyers, sellers, and producers of goods and services'. - This is explained in detail on the wall of the bus along with in the video that is shown on the bus. We discuss the different people and how their jobs effect our daily lives. For example: the farmers, the millers, the scientists. These are all discussed on the bus and more in depth at the whisper mill and seed station where we explain each professions job.
- SC.2.E.6.1 Recognize that Earth is made up of rocks. Rocks come in many sizes and shapes. – We have displays depicting the different the scientific reasoning why we have the different rocks. We show the students geodes and how they are the metamorphic rock that is created by the shifting of the techtonic plates and the heat and pressure in the earths crust. .
- SC.3.E.5.1 Explain that stars can be different; some are smaller, some are larger, and some appear brighter than others; all except the Sun are so far away that they look like points of light. – This is explained on the bus. We have an interactive solar system machine that houses these questions and answers for the students to explore. Plus, they can look on our ceiling to see the twinkling lights of the stars.
- SC.3.E.5.2 Identify the Sun as a star that emits energy; some of it in the form of light. – This is explained on the bus. We have an interactive solar system machine that houses these questions and answers for the students to explore. At our seed station students learn how the suns energy and light is used to grow our plants. Photosynthesis is the process through which plants convert light energy from the sun to chemical energy. The chemical energy is then stored as sugar. During the process of photosynthesis, plants capture light energy and use it to convert water, carbon dioxide, and minerals into oxygen (released into the air) and glucose stored in the plant and used as food.
- SC.4.E.5.1 Observe that the patterns of stars in the sky stay the same although they appear to shift across the sky nightly, and different stars can be seen in different seasons. – This standard is covered with the display of the Earths' axis and its rota-



tion throughout the year. We have each stage that the Earth rotates explained, including Winter solstice, spring equinox, summer solstice and fall equinox.

- SC.4.E.5.2 Describe the changes in the observable shape of the moon over the course of about a month. – We have the phases of the moon station with the description of each phase displayed on the bus wall. We also have additional teacher resources on our website. We have dittos and a science project that they can do to show this action.
- SC.4.E.5.3 Recognize that Earth revolves around the Sun in a year and rotates on its axis in a 24-hour day. This standard is covered with the display of the Earth's axis and its rotation throughout the year. We have each stage that the Earth rotates explained, including Winter solstice, spring equinox, summer solstice and fall equinox.
- SC.4.E.5.4 Relate that the rotation of Earth (day and night) and apparent movements of the Sun, Moon, and stars are connected. - The entire ceiling of the bus is dedicated to the solar system and all its components in order to provide the necessary information that the students need including but not limited to : phases of the moon, Earth's axis, gravity, formations, and weather.
- SC.4.E.6.6 Identify resources available in Georgia (water, phosphate, oil, limestone, silicon, wind, and solar energy). – This is covered in multiple displays on our bus ex: Georgia wetlands, soil, sugar cane and is discussed at each of the outside stations as it relates to topic being taught at that station.
- SS.4.E.1.2 Explain Georgia's role in the national and international economy and conditions that attract businesses to the state. We show the different commodities that are either grown, found or mined in the state of Georgia. These are there for the students to touch in their raw and refined form. It is also discussed that these commodities are traded and sold to other states and countries which helps the state of Georgia prosper. Due to Georgia's weather conditions and its diverse landforms, companies find it attractive to have their businesses in Georgia.
- SC.5.E.5.2 Recognize the major common characteristics of all planets and compare/contrast the properties of inner and outer planets. The entire ceiling of the bus is dedicated to the solar system and all its components in order to provide the necessary information that the students need including but not limited to: phases of the moon, Earth's axis, gravity, formations, and weather.
- SC.5.E.5.3 Distinguish among the following objects of the Solar System -- Sun, planets, moons, asteroids, comets -- and identify Earth's position in it. - The entire ceiling of the bus is dedicated to the solar system and all its components in order to provide the necessary information that the students need including but not limited to: phases of the moon, Earth's axis, gravity, formations, and weather.
- SC.5.P.9.1 Investigate and describe that many physical and chemical changes are affected by temperature. – This explained through the raw and refined forms of the different commodities on the bus. For example, A strawberry is in its raw form when

picked from the plant. If you take that same strawberry, put it in a pot, add water and sugar, heat it to a boil, it turns into a thick substance called jelly. The water cycle is a physical change. Water changes from a liquid in the ocean to a gas and then back to a liquid when it becomes rain. You must understand that water can be in any one of three PHYSICAL states, liquid, solid or a gas. Changing physical states is not a chemical change, but a direct result of heat or cold application.

## Seed Station:

- SC.K.L.14.3 Observe plants and animals, describe how they are alike and how they are different in the way they look and in the things they do. – We have cows and chickens on the bus. They are able to touch them and feel the differences of their fur and feathers and read how the dairy cows produce milk and the chickens produce eggs. They are alike as they need to be fed and taken care of in order to receive what each animal produces. They both produce a food product.
- SC.1.N.1.3 Keep records as appropriate - such as pictorial and written records - of investigations conducted. – An activity booklet is given for students to use in the classroom and at home to further their education about our program.
- SC.2.L.16.1 Observe and describe major stages in the life cycles of plants and animals, including beans and butterflies. - These two are scene both on the bus and at the seed station. We identify the stages of life in the plant and how it grows and how it interacts with human life. Plant life cycle comprises successive stages, including seed germination, seedling growth, plant maturity, flower development, fertilization, and seed production.
- We have a board that show the students the life cycle and we explain it when we teach them how a plant grows. We explain that the seed is planted
- We do explain how the life cycle of a bee on the bus with an actual visual prop with the stages of the bee. We explain how the life cycle of the plant occurs.
- Many plants are grown from seeds. One of the best ways to help kids learn about growing plants is by introducing them to the basic plant life cycle. . Start by explaining what a seed is. All seeds contain new plants, called embryos. Most seeds have an outer cover, or seed coat, which protects and nourishes the embryo. Depending on the type of seed, it may or may not require soil or light to germinate. However, most all plants need water for this process to occur. As water is absorbed by the seed, it begins to expand or swell, eventually cracking or splitting the seed coat.
- (We give the teacher a lima bean inside a paper towel and put it in a plastic baggie. This science project allows the students can watch the hard covering of the bean soften and open to allow the seed to grow. This is a favorite of all teachers and students)
- Once germination occurs, the new plant will gradually begin to emerge. The root,

which anchors the plant to the soil, grows downward. We show this by giving the teacher a flower plant in a clear cup so the students can watch the roots grow downward as the plant grows upward. This also enables the plant to take up water and nutrients required for growth. The shoot then grows upward as it reaches for light. Once the shoot reaches the surface, it becomes a sprout. The sprout will eventually take on a green color (chlorophyll) upon developing its first leaves, at which time the plant becomes a seedling. Once the seedling develops these first leaves, it makes its own food through photosynthesis. Light is important for this process to occur, as this is where the plant gets its energy. As it grows and becomes stronger, the seedling changes into a young adult plant, with many leaves.

Over time, the young plant will begin to produce buds at the growing tips. These will eventually open into flowers. Bees pollinate the flowers in exchange for the nectar to make honey. Pollination must occur for fertilization to happen, which creates new seeds. After pollination has occurred, the flowers transform and produce fruit, which protect the numerous seeds inside. As the seeds mature or ripen, the flowers will eventually fade away or drop. Once the seeds have dried, they are ready to be planted (or stored), repeating the life cycle of a flowering plant all over again.

**SC.2.L.17 Interdependence**

We explain the process of the respiration system between plants and humans/animals and how we are interdependent. Photosynthesis is the process through which plants convert light energy from the sun to chemical energy. The chemical energy is then stored as sugar. During the process of photosynthesis, plants capture light energy and use it to convert water, carbon dioxide, and minerals into oxygen (released into the air) and glucose stored in the plant and used as food. This explains one aspect of the human/earth interdependence.

**SC.2.P.8.4 Observe and describe water in its solid, liquid, and gaseous states.**

We discuss at the seed station 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. The water cycle shows the continuous movement of water within the Earth and atmosphere. It is a complex system that includes many different processes. Water is essential to life on Earth. In its three phases (solid, liquid, and gas), water ties together the major parts of the Earth's climate system — air, clouds, the ocean, lakes, vegetation, snowpack, and glaciers. Liquid water evaporates into water vapor, condenses to form clouds, and precipitates back to earth in the form of rain and snow. 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 as they watch the plants grow in their classroom.

**SC.3.L.17.2 Recognize that plants use energy from the Sun, air, and water to make their own food. – This is explained while planting the vegetable seeds and explaining to the students the need for sunlight.** Photosynthesis is the process through which plants convert light energy from the sun to chemical energy. The chemical energy is then stored as sugar. During the process of photosynthesis, plants capture

light energy and use it to convert water, carbon dioxide, and minerals into oxygen (released into the air) and glucose stored in the plant and used as food

- SC.3.L.14.1 Describe structures in plants and their roles in food production, support, water and nutrient transport, and reproduction. – This is explained while showing the students the different seeds and how they grow with the things they need. Example – sunlight, water, soil etc. A plant is made up of many different parts. The three main parts are: the roots, the leaves, and the stem. Each part has a set of jobs to do to keep the plant healthy. The roots absorb water and minerals from the soil and anchor the plant in the ground. The stem supports the plant above ground and carries the water and minerals to the leaves. The leaves collect energy from the sun and makes food for the plant.
- SC.3.L.14.2 Investigate and describe how plants respond to stimuli (heat, light, gravity), such as the way plant stems grow toward light and their roots grow downward in response to gravity. – We have 2 experiments for the teachers, one we give the teachers a clear cup with seeds planted so the students can watch the root system grow.
- MA.3.FR.1.1 Represent and interpret unit fractions in the form  $\frac{1}{n}$  as the quantity formed by one part when a whole is partitioned into  $n$  equal parts. – This is explained when we are planting the seeds with the children and how much soil is in needed in their cup. Example: Fill cup  $\frac{3}{4}$  full. Another example: when planting a seed in a garden dig  $\frac{1}{2}$  inch deep.
- SC.4.L.17.4 Recognize ways plants and animals, including humans, can impact the environment. – We use students milk cartons from their schools to teach them how to recycle paper products to turn them into food for their plants while saving the Earth from trash. We also teach students about composting using their uneaten fruit peel and all to help make compost for their plants.
- SC.4.P.9.1 Identify some familiar changes in materials that result in other materials with different characteristics, such as decaying animal or plant matter, burning, rusting, and cooking. – This explained through the raw and refined forms of the different commodities on the bus. For example, A strawberry is in its raw form when picked from the plant. If you take that same strawberry, put it in a pot, add water and sugar, heat it to a boil, it turns into a thick substance called jelly. We also touch on these topics with respect to bees making honey and bees wax.
- SC.5.L.17.1 Compare and contrast adaptations displayed by animals and plants that enable them to survive in different environments such as life cycles variations, animal behaviors and physical characteristics. – We have an experiment where we have the teachers plant 2 different vegetables. One goes in the window and the other goes under a water bottle which acts as a greenhouse. Students can write a compare and contrast paper by charting the growth and differences. We also have displays showing the different landforms that animals live in. We have Georgia wetlands and the types of animals and reptiles that need this type of environment to survive vs. Cows and chickens that require a different type of environment to survive.

## Whisper Mill:

- SC.K.P.12.1 Investigate that things move in different ways, such as fast, slow, etc. – We allow the students to have a hands-on experience while grinding wheat seeds into flour. We have the students demonstrate by turning the crank faster and slower to show the different amounts produced due to the speed.
- SC.1.P13.1 Demonstrate that the way to change the motion of an object is by applying a push or a pull. . – We allow the students to have a hands-on experience while grinding wheat seeds into flour. We have the students demonstrate by turning the crank faster and slower to show the amount that is produced. Also tightening and loosening the screw helps determine the coarseness or fineness of the product.
- SC.2.P.13.4 Demonstrate that the greater the force (push or pull) applied to an object, the greater the change in motion of the object. – When the students turn the lever faster the wheels of the simple machine turn faster grinding more wheat. Also, we tighten the screw of the wheel and show the students the tighter the force between the stationary wheel and the wheel with the teeth determines the coarseness or fineness of the flour.
- SS.K.A.2.1 Compare children and families of today with those in the past. – This is explained when talking about the 13 colonies and how wheat was harvested back then along with the evolution of farming.
- SC.2.E.7.4 Investigate that air is all around us and that moving air is wind. – This is where we discuss the different types of energies throughout the years. One being the windmill. When the wind is faster it turns the windmill and creates energy.

- SC.3.P.10.1 Identify some basic forms of energy such as light, heat, sound, electrical, and mechanical. We explain to the students starting from the 13 colonies when energy was produced by manual labor then by hand tools, including the simple machine, then the water wheel- which produced energy with water flow. Then by fuel powered machines. Then to electricity, solar power, and thermal. We then discuss the new energies now found in present day America and the possibility of new energies to come.
- SC.3.P.10.2 Recognize that energy has the ability to cause motion or create change. – This is explained through the waterwheel. As the river flows it produces energy. When the water is in the wheel it creates energy that grinds the seeds. Students are told that the only way to stop this energy is to build a dam stopping the constant flow of water. Also, we speak about how Geodes are formed by the shifting of the tectonic plates and the heat and pressure of the earth's crust. This energy bonds the minerals together to form jewels and other precious metals that can be used to conduct electricity.
- SC.4.P.10.1 Observe and describe some basic forms of energy, including light, heat, sound, electrical, and the energy of motion.- We explain to the students starting from the 13 colonies when energy was produced by manual labor then by hand tools, including the simple machine, then the water wheel- which produced energy with water flow. Then by fuel powered machines. Then to electricity, solar power, and thermal.
- SC.4.P.10.4 Describe how moving water and air are sources of energy and can be used to move things. - We discuss this form of energy at the Whisper mill station, by showing the student the how energy has evolved from the 13 colonies to present day America. The invention of the water wheel to help turn the mill to grind the seeds. The flowing river produces energy and as the wheel catches the flowing water it turns the wheel which turns the mill to grind the seeds. We discuss other forms of energy such as windmills that the wind turns the wheels to create the energy. These are two types of energy explained using water and air. '
- SS.2.A.2.4 Explore ways the daily life of people living in Colonial America changed over time. - We explain to the students starting from the 13 colonies when energy was produced by manual labor then by hand tools, including the simple machine, then the water wheel- which produced energy with water flow. Then by fuel powered machines. Then to electricity, solar power, and thermal. We also talk about how the colonies expansion and the effects of farming and milling to meet the supply and demand of the ever-changing world.

## GABIE Presentation:

- SC.K.L.14.2 Recognize that some books and other media portray animals and plants with characteristics and behaviors they do not have in real life. . - While planting the plants students learn the major components needed to grow plants. We have GABIE, our Honeybee queen mascot present when we are discussing the importance of honeybees to our survival. Although Gabie is not real they respond to the lesson at hand. They know she cannot fly or pollinate but real bees can. We have our Gabie's Buzzin Beats CD that the students listen to songs all about agriculture where GABIE our mascot is singing to them.
- SC.1.L.14.3 Differentiate between living and nonliving things. – This is show on the bus where we have the different commodities found or grown in Georgia. They can see the difference in the living plants and animals vs. the rocks and minerals. All living things need food to get energy to carry out all the activities. Plants make their own food in the presence of water, sunlight and soil. Animals and human beings depend on plants for food. Non-living things do not need food for their survival.
- SC.2.P.9.1 Investigate that materials can be altered to change some of their properties, but not all materials respond the same way to any one alteration. – This explained through the raw and refined forms of the different commodities on the bus. For example, A strawberry is in its raw form when picked from the plant. If you take that same strawberry, put it in a pot, add water and sugar, heat it to a boil, it turns into a thick substance called jelly. We also touch on these topics with respect to bees making honey and bees wax.
- SC.5.P.9.1 Investigate and describe that many physical and chemical changes are affected by temperature. – This explained through the raw and refined forms of the different commodities on the bus. For example, A strawberry is in its raw form when picked from the plant. If you take that same strawberry, put it in a pot, add water and sugar, heat it to a boil, it turns into a thick substance called jelly. We also touch on these topics with respect to bees making honey and bees wax. How the bees drink water and nectar, a chemical change happens and it turns into honey. The water cycle is a physical change. Water changes from a liquid in the ocean to a gas and then back to a liquid when it becomes rain. You must understand that water can be in any one of three PHYSICAL states, liquid, solid or a gas. Changing physical states is not a chemical change, but a direct result of heat or cold application.

