

Sixth Grade Science Tasks

S6E1.

- A. Use classroom resources and other media to research the current scientific theories of the solar system and universe and how those views evolved. Note: You may want to organize your information in a chart such as the one suggested:

Name of Theory	Geocentric	Heliocentric	Big Bang
Origin of Theory			
Timeline of Theory			
How view evolved			

- B. Research an astronomer to learn more about how contributed to our knowledge. Suggested early astronomers include Nicolaus Copernicus, Ptolemy, Johannes Kepler, Galileo Galilei, Sir Isaac Newton. Go to <http://www.nasa.gov> to research modern astronomers and current discoveries.
- C. Research how changes in technology have impacted the theories of the universe. Find out about the roles of telescope design, NASA, and satellites in understanding our current view of the universe. Discuss if that view could change in the future.
- D. Observe the Milky Way. It is visible in the night sky as a band of hazy light. Compare the visibility under different sky conditions such as light pollution, smog, and weather.
- E. In small groups imagine that you are the staff of a Space Travel Agency. Develop a brochure of a travel tour designed to explore the universe. Make sure your brochure includes stops at various locations in our solar system, galaxy, universe, etc. Show an overall diagram or map of the Milky Way Galaxy and where our solar system is found.
- F. Demonstrate how the planets differ in size, features, distance from the sun, and ability to support life. You could make a labeled model, a detailed chart, poster, or story.
- G. Invest in Intergalactic Realty! You can own property that is “out of this world.” This is the advertisement you are placing in a major magazine. Develop a write-up of the information about each planet in our solar system for potential buyers. Include the following information: size of planet compared to the earth, features of the planet, distance the planet is from the sun, and its ability to support life.
- H. Use available satellite pictures to identify objects found in space.
- I. Compare meteors, comets, asteroids, and stars. How are stars similar and/or different from meteors, comets, or asteroids? Organize your information into a graphic organizer to share with the class. Include characteristics such as color, location, visibility, etc.
- J. Research major meteor showers to find out when they occur. Explain why they are visible the same time each year.
- K. Observe a major meteor shower (Perseids in August, Leonids in October, Lyrids in April). Collect data about your observations including number, brightness, color, trains, and speed. Compile information into a chart and compare your observations with others.
- L. If you are not able to observe a major meteor shower, go to <http://www.nasa.gov> for photographs of meteor showers. Explain what is shown in the pictures.
- M. Find out the difference between a meteor, a meteoroid, and a meteorite.
- N. Make a model of a comet demonstrating its parts. Research the media for incidences of comet sightings and the reactions of observers. Explain how comets are tracked and why they are not visible every year as meteor showers are.

S6E2.

- A. Make or find an accurate model of the sun, moon, Earth system and use it to demonstrate the position of each during the different moon phases: new moon, first quarter or half moon, full moon, last quarter or half moon. Explain in writing (narrative or labeled diagram) what causes the phases of the moon and how they are different from a lunar eclipse.
- B. Observe and chart the phases of the moon. Keep a journal. Find a position in your yard or out of a window to observe nightly for a month. If you cannot observe the moon due to weather or other reasons, include that information in your journal. Sketch what you observed. Include the date and time of the viewing. Share your information with classmates and discuss the accuracy of similarities and differences.
- C. Demonstrate the phases of the moon.
 - a. Place a bright lamp in the center of a dark room to simulate the sun. Imagine that your head is the earth and you live on the tip of your nose.
 - b. Hold a sphere such as a tennis ball or orange in front of you. This represents the moon.
 - c. Stand facing the light and look at the sphere. What you can see is a dark surface in full shadow. This is the new moon.
 - d. Now rotate one quarter of a turn. When you look at the sphere, you see half of it lighted and half of it in shadow. This is the first quarter or half moon.
 - e. Rotate one quarter of a turn. Your back is to the sun. You see the full moon unless your head (the earth) is in the way (lunar eclipse).
 - f. Rotate one quarter of a turn. You now see the last quarter or half moon.

Use what you observed about the position of the “moon, sun and Earth,” to explain why we see different phases of the moon.

- D. Collect data, research classroom resources, and compare the hours of daylight during summer, fall, spring, and winter in the Northern Hemisphere. Illustrate how the angle of the sun’s rays strike the surface of Earth during those seasons in the Northern Hemisphere. Use what you discovered to explain the hours of daylight to the angle of the sun’s rays. Hypothesize how this affects seasonal changes.
 - a. Place two similar thermometers next to each other. Prop one of the thermometers at an angle against some books. Lay the other thermometer flat. Use a heat source such as direct sunshine or a positional lamp. Place the light so it will shine directly on one of the thermometers, but will hit the other one at a slant (indirect). Record the temperature of each thermometer periodically for several minutes. Use what you observe to explain how the tilt of the earth (slant) causes the seasons.
 - b. Explain the tilt of the earth and its revolution around the sun during each season where you live. Draw a diagram or demonstrate using a globe and a light source. Use what you discovered about direct and indirect sunlight to explain the seasonal changes.
 - c. How are the seasons different in different locations on earth?
 - d. You live in the Northern Hemisphere. If it is summer where you live, what season is it in the other locations?

Northern Hemisphere	Summer
Southern Hemisphere	
Equator	
Poles	

Use what you have learned about the tilt of the earth, the Earth's revolution around the sun, and direct/indirect light to explain your conclusions about the seasons.

S6E3.

- A. Brainstorm a list of water names (rivers, lakes, etc.). Organize the list according to distribution of water on the Earth.
- B. Find out the ratio of water to land on the Earth's surface. Create a visual to show the amount of each category from your list of water names.
- C. Identify the major types of clouds (cumulus, cirrus, stratus, nimbus, etc.) Keep a weather journal for a period of time of observations of sky conditions listing the type of cloud and the weather conditions. Look for relationships and explain how major cloud types associate with the movement of fronts and the resulting weather.
- D. Illustrate the movement of water through the water cycle, showing that it is a solvent moving minerals and gases along to the oceans.
- E. Explain how weather is composed of air temperature, humidity, wind speed and direction, and precipitation in a particular place and time.

Teacher note: Oceans – 97%, Ice sheets and glaciers—1.9%, Groundwater-- 0.5%, Rivers, lakes, and inland seas—0.02%, Soil moisture—0.01%, Atmosphere—0.0001%

- F. Summarize the role of evaporation, condensation, precipitation, and freezing on Georgia's water systems including the Atlantic Ocean and the Gulf of Mexico. Determine the influence of water on the climate and weather of Georgia.

S6E4.

- A. Demonstrate that land and water absorb and lose heat at different rates and explain the resulting effects on weather patterns.
- B. Gather cups, sand, soils, and water, and similar thermometers. You will also need a heat source such as sunlight or lamp. Put one thermometer in each cup and fill each cup with different materials, such as a cup of water, a cup of sand, a cup of soil, etc. Record the temperature of each on a chart. Put the cups directly under the heat source and record the temperature every 15 minutes for a period of time such as 1 hour. Take the cups away from the source of heat and record the temperature every 15 minutes for the same amount of time. Use the data collected to explain the heating and cooling rates of different materials on the Earth's surface.
- C. Compare temperatures in the sunshine with temperatures in the shade. Compare temperatures at different heights above the ground. Compare temperatures above grassy surfaces with temperatures above paved surfaces. Compare temperatures on the north, east, south, and west sides of a building at different times of the day. Analyze the data and conclude about unequal heating and cooling of surfaces.
- D. Use classroom resources to research the Beaufort Wind Scale and how meteorologists use wind conditions in weather forecasting.
- E. Identify major air masses and their influence on weather. Research the use of weather maps and data used for weather forecasting. In groups, use what you have learned about major air masses, sky conditions, and weather data to present a weather forecast to the class. Compare your forecast with a forecast of local media.

- F. Demonstrate the location of large global wind systems on a map or globe. Use what you know about the unequal heating of the surface of the earth to explain these patterns. Find out what large global wind system affects the weather patterns of Georgia

Teacher note: The National Weather Service provides current weather conditions, instrument readings, and forecast information: <http://weather.noaa.gov>

S6E5.

- A. Use resources to view how earthquakes, volcanoes, and sea-floor spreading create mountains and ocean basins.
- B. Gather several types of rocks. Conduct tests on the rocks to collect information about their physical properties. (Physical properties can include magnification using a hand lens to see texture and composition of particles, cleavage, and see if it will make a streak, hardness, buoyancy in water, color, etc.) Sort the rocks into similar groups according to their physical properties.
- C. Simulate the formation of different kinds of rocks. For example, mud pies are similar to sedimentary rock formation, and making marshmallow fudge simulates metamorphic rock formation.
- D. Categorize and compare rocks from various regions of Georgia by contacting other students around the state.
- E. Describe the role of energy in the processes that change rocks. Construct a flow chart to demonstrate energy flow as rocks change from one type to another.
- F. In a class presentation, discuss the effect of copper mining on the topography of McCaysville, Georgia and Copperhill, Tennessee. Find other examples of human impact on the topography of Georgia.
- G. Collect and analyze soil samples from various locations in the community.

S6E6.

- A. Brainstorm a list of Earth processes impacted by the sun. Divide into small groups. Each group should choose one of the processes and diagram the cause and effect relationship. (Example of Earth's processes could include water cycle, ocean currents, winds, seasons, weather events, etc.)
- B. Research renewable and nonrenewable resources. Investigate the need for and use of alternative energy sources (hydroelectricity, nuclear, geothermal, thermal, wind, solar). Find examples of alternative energy use in Georgia. Share your findings with the class.
- C. Imagine you are the CEO of a large company looking to relocate in Georgia. Compare the advantages and disadvantages for using various alternative energy sources.