

CURRICULUM

GUIDE

Science - Grade 6

Providence
Schools

Background

Providence Schools teachers and administrators worked collaboratively with consultants from the Charles A. Dana Center at the University of Texas at Austin to develop the mathematics and science curriculum frameworks. The curriculum frameworks encompass two critical questions:

- Content Standards that establish clearly defined expectations for all students, helping to answer the question, ***What do students have to learn?***
- Performance Standards that determine performance expectations for content standards, helping to answer the question, ***How well do the students have to learn it?***

The curriculum framework provides a work plan that directs the instruction delivered in every classroom in every school in the district. Instruction—the way the curriculum is presented to students—will focus on the needs of students.

Purpose and Use of Curriculum Guides

Curriculum Guides for the curriculum for each grade and subject outline the approximate number of days that each unit in the curriculum will be taught; describe the content to be learned; and list the essential questions that students should be able to answer by the end of the unit.

Parents should become familiar with the Curriculum Guides. You should know when your child is being taught different topics. You should also know the essential questions that your child should be able to answer by the end of each unit.

It is important that you understand that you do not have to be familiar with the content that your child is learning in order to help them with their studies. There are basic questions that you can ask to determine if your child understands the content.

Ask your child what she is learning in each subject
Does she understand the topic? Is the unit exciting or boring?
What specifically does she like or dislike about the topic?
Does she understand how the topic relates to the real world?

You know your child better than anyone. You will be able to tell if she or he is benefiting from the instruction and understanding the content of the material by the way they answer you. Speak to your child's teacher if you suspect there is a problem.

Ask your child about his assignments

What is the required work? Has he finished the work on time? Is he having difficulty? If he is having difficulty, why?

Encourage your child to talk to her teachers if she is having difficulty understanding a concept or completing an assignment. If your child continues to experience difficulty, speak to the teacher yourself so that the two of you can work together to support your child.

Even if you do not understand the content that your child is learning, the fact that you are showing interest in his or her school work and believe that it is important that he or she does well sends a powerful message.

Sharon Contreras
Chief Academic Officer
Providence Public School Department

SEMESTER A

Content students will be learning

Essential questions students should be able to answer by end of unit

Unit A.1 - Atmospheric Conditions (7 days)

- Observe and measure atmospheric conditions that affect local weather.
- Predict changes in weather conditions, such as wind and temperature, by examining and measuring atmospheric conditions.

- » What is weather?
- » How are tools used to measure atmospheric conditions?
- » How can the impact of changing weather conditions be reduced?

Unit A.2 - Air Mass (8 days)

- Identify the atmosphere as the layer of gases surrounding the earth.
- Understand that the earth's atmosphere is made up of layers and that each layer has its own unique characteristics.
- Know that weather occurs in the troposphere, the layer of the atmosphere closest to Earth.
- Understand that air is matter; it occupies space, has mass, and can be compressed.

- » Why are some of the gases that make up the atmosphere called permanent gases while others are called variable gases?
- » Why is the troposphere important to meteorologists?
- » How do atmospheric gases change as their altitude increases?

Unit A.3 - Seasons (7 days)

- Describe how the tilt of the earth results in the sun's energy striking the earth at different angles.
- Understand that the intensity of light experienced on the earth depends on the angle that the sunlight strikes the earth.
- Explain how the tilt of the earth's rotation on its axis and revolution around the sun results in seasons.

- » What causes the seasons that we experience on Earth?
- » How does the tilt of the earth's axis influence the amount of heat energy absorbed by the surface of the earth?
- » What is the relationship among the following factors: Earth's tilt on its axis, rotation on its axis, and revolution around the sun and the seasonal variation in day length?

Unit A.4 - Energy Transformation (7 days)

- Compare the differential heating of a variety of earth materials.
- Demonstrate that heat energy can be transferred through conduction and radiation.

- » What is heat transfer?
- » How does the surface of the earth affect how hot the air gets?
- » What is the relationship between the properties of earth materials and the absorption and release of heat?
- » How do conduction and radiation result in the heating of Earth's atmosphere?

Unit A.5 - Convection (5 days)

- Explain density as a ratio between a mass and its volume.
- Describe how materials of different densities interact.
- Explain how energy transfer drives the process of convection.

- » How is density related to mass and volume?
- » Why is it possible that two solutions that are made with the same materials can have different densities?
- » How does energy transfer drive the process of convection?

SEMESTER A (CONTINUED)

Content students will be learning

Essential questions students should be able to answer by end of unit

Unit A.6 - Changes in the Atmosphere (10 days)

- Identify the relationship between temperature change and evaporation, and condensation.
- Explain how dew and clouds form when humid air cools to its dew point and condenses.

- » Why is it more difficult to cool off after exercising if the relative humidity is very high?
- » How is a dense fog similar to a cloud?
- » What are condensation and evaporation and what effect do they have on weather?

Unit A.7 - Water Cycle (5 days)

- Identify various paths a water molecule might follow in the earth's water cycle.
- Explain condensation, precipitation, and other processes that cause variations in the water cycle.

- » What is the water cycle and how does it affect weather?
- » Why is it true that the water used today is the same water used by people hundreds of years ago?
- » Why isn't all of the earth's water available to the water cycle?

Unit A.8 - Effects of Air Pressure (8 days)

- Describe the relationship between changing air pressure and wind.
- Explain how differential heating of the earth by the sun creates local winds.
- Investigate the effect of air pressure on weather.

- » What happens in the atmosphere to cause winds?
- » What information can be gathered by observing a pressure map, and how can this information be used to determine where winds will blow?
- » What factors in the atmosphere are responsible for variations in air pressure?
- » How are conduction, radiation, and convection involved with the energy transfer that results in winds?

Unit A.9 - Climate (8 days)

- Explain the interactions between two air masses.
- Distinguish between weather and climate.
- Explain how a global temperature increase could affect the water cycle and the earth's climate.

- » What causes global warming and how does it affect climate?
- » How can an understanding of condensation account for the rain that occurs when a warm front and cold front collide?
- » How do the gases that make up warm, moist air masses compare to the gases that make up cold, dry air masses, and how does that account for how the air masses behave when they meet?

SEMESTER B

Content students will be learning

Essential questions students should be able to answer by end of unit

Unit B.1 - Earth's Surface (4 days)

- Explain that a person's specific location can be described in many ways, depending on the particular frame of reference.
- Explain that the number of Earth structures that can be identified decreases with elevation due to the ability of the eye (and other optical instruments) to resolve detail.

- » How can a map help a person determine where they are on the surface of earth?
- » Why is it important to be aware of your frame of reference before making a map?

Unit B.2 - Characteristics of Earth (3 days)

- Make connections between how objects disappear over the horizon and the shape of the earth.
- Gather evidence that the earth is round.
- Use latitude, longitude, and shadow length as evidence for a round Earth.

- » How can the use of observational data be used to prove that Earth has a spherical shape?
- » What are the advantages of using models and simulations when studying the shape of Earth?
- » What are the disadvantages of using models and simulations when studying the shape of Earth?

Unit B.3 - Earth's Movement (6 days)

- Explain the day/night cycle as a consequence of an illuminated sphere rotating on an axis.
- Explain how to determine the direction of Earth's rotation.
- Explain, using time zones, why it is a different time in other parts of the world.

- » How does the rotation of Earth on its axis cause us to have regular periods of day and night?
- » How can we determine the direction of Earth's rotation?

Unit B.4 - Characteristics of the Moon (5 days)

- Explain an aspect of the moon's natural history.
- Learn a convention for recording the appearance of the moon.

- » How can a long-term study of the moon help people understand its surface features?
- » Why is it important to observe the moon during both day and night?

Unit B.5 - The Surface of the Moon (8 days)

- Examine variables that determine the appearance of craters on the moon and on Earth.
- Reconstruct the history of impact events that resulted in the present appearance of the surface of the moon.
- Explain the differences in appearance between the surface of the moon and of Earth.

- » Why do the craters on the moon's surface have such a wide range of characteristics?
- » What must be considered when you design a controlled experiment?
- » How does science explain the differences in appearance between the surface of the moon and of Earth?

SEMESTER B (CONTINUED)

Content students will be learning

Essential questions students should be able to answer by end of unit

Unit B.6 - Moon Physical Features (3 days)

- Use mathematical reasoning to describe how to determine the size of lunar features.

- » How can the ability to use scale calculations contribute to our understanding of the surface features of objects in our solar system?

Unit B.7 - Space Travel (5 days)

- Understand the similarities and differences between day and night on the Earth and the moon.
- Describe the relationship between the moon's rotation and lunar day and night.

- » What are the similarities and differences between day and night on the moon and on Earth?

Unit B.8 - Properties of Moon Materials (7 days)

- Explain how the density of a rock can be used to identify which layer of the moon it is located in.
- Identify and measure the physical properties of a mineral.

- » How can information about the density of a rock be used to help make decisions about where the rock will be found on the surface of the moon or the earth?
- » How can the properties of a rock be used to identify the minerals that make up the rock?

Unit B.9 - Phases of the Moon (5 days)

- Explain how the rotation and revolution of the Earth and moon affect the moon's phases and when and where they are observed.
- Predict relative positions of the sun, Earth, and moon when shown a representation of a moon phase.
- Describe how the moon revolves around Earth once a month, resulting in the moon rising about 50 minutes later each day.

- » Why does the moon appear to go through phases over a period of a month?
- » What causes the rising and apparent motion of the sun and moon across the sky?

Unit B.10 - Solar System (9 days)

- Examine the features of objects in the solar system.
- Review current knowledge about the planets and propose a planetary tour to apply the knowledge.

- » What kind of information would need to be collected about a planet in order to determine if humans could survive a visit to its surface?
- » How can technology be used to collect information about remote objects in our solar system?



Providence
Schools

797 Westminster Street
Providence, RI 02903
www.providenceschools.org