

GLE 0107.Inq.2 Ask questions, make logical predictions, plan investigations, and represent data.

GLE 0107.Inq.3 Explain the data from an investigation.

0007.Inq.2 Communicate interest in simple phenomena and plan for simple investigations.

0007.Inq.3 Communicate understanding of simple data using age-appropriate vocabulary.

0007.Inq.4 Collect, discuss, and communicate findings from a variety of investigations

Lesson One

All About Stars

Objective:

The student will review the elements of a star

Materials

The Star Gift by Flavia and Lisa Weedn
poster--Vincent van Gogh's "A Starry Night"

Procedure

Ask students what the term "astronomer" means. Ascertain that astronomers are those who study the stars, planets, and other heavenly bodies.

Read *The Star Gift* asking the students to decide whether the story is true or false (the terms fiction or non-fiction should also be used). Suggest they listen carefully and try to remember what they know about stars so they can resolve the question of whether the story is fiction or non-fiction.

Discuss the story in general (a young girl selflessly gives to others and is rewarded). Ask the following questions to lead children toward what will become a review of the elements of a star:

1. The story states that stars fall from the heavens. Do stars fall from the heavens and land on the ground?

Answer: No. They are not solid like a desk or the floor. They are made up of invisible gases.

2. Could you possibly catch a star in an apron? If not, why not?

Answer: You could not catch a star in an apron because most stars are huge. They just look tiny because they are so far away.

3. The little girl (rabbit) in the story states that stars provide her with warmth. Are stars just warm?

Answer: No. Stars are different temperatures. The hottest stars are blue but some others are white, red, or yellow-orange. It all depends on how hot they are. Stars are fiery hot balls of gas.

4. Do stars suddenly vanish as the book suggests?

Answer: No. Stars shine all the time but during the day the light from the sun is so bright that the light from the stars cannot be seen so people might think they vanish.

5. The sun is not mentioned in this story. If this is a story about the stars, what about the sun? Is the sun a star?

Answer: Yes. The sun is a star. It is our closest star and looks like the biggest star because it is so close to us but it is only a medium-sized star.

6. The person in the story says that stars twinkle? Do they really twinkle?

Answer: No. They only seem to twinkle when we look at them from Earth.

Write all factual information on the board and elicit other information children may remember about stars. Fill in any gaps in knowledge.

Take a class vote on whether *The Star Gift* was fiction or non-fiction.

Display Vincent van Gogh's poster "A Starry Night." Stars begin their lives in a swirling cloud of dust and invisible gas. As these tiny particles swirl about they begin to cling together gathering even more gas and dust. Mention this is referred to as gravity. The cloud begins to spin faster and faster which makes it become extremely hot at the center. The spinning and whirling takes billions of years until, finally, a star is born!

Lesson Two

Our Amazing Sun

Objectives

The student will:

- recognize the importance of the sun
- be introduced to the solar system

Materials

a spinning top
model of the solar system
colored pencils
drawing paper
StarChild worksheet (see note at end of lesson)

Vincent van Gogh's "Olive Trees"
Me and My Place in Space by Joan Sweeney

Procedure

Inform students that many, many years ago people worshipped the sun believing it was a god/goddess. Brainstorm ideas about why people might think the sun was important enough to be thought of as a god/goddess.

If ideas regarding light and heat do not surface, discuss with students about the heat generated by the sun in van Gogh's "Olive Trees" (which should be hung in the classroom). Assure the discussion includes the fact that if sunlight was absent, all plants would die. Grass and trees would die. Without these things, plant-eating animals would die and, in turn, animals that eat the plant-eating animals could not survive. If necessary, remind students that the sun provides heat and without it, the Earth would be too cold to sustain life. In fact, life on Earth would be impossible without that great, golden ball we call the sun.

Solicit ideas about just how far students believe the sun to be from the Earth. Explain that the sun is 93 million miles from the Earth. Have students venture a guess as to how long they think it might take to drive to the sun. The answer is roughly about a million hours but using this question should help put the distance in perspective. The sun is really far away.

Distribute drawing paper with two identical circles placed next to one another (having the circles drawn will remind children that the Earth is shaped like a ball). Have students illustrate how the Earth looks with the benefit of the sun in circle one and how it might look if the sun did not shine on the Earth in circle two. Student pictures for circle two might include an empty circle, a black circle, etc. Discuss illustrations.

While students are drawing, hang a mobile of the Solar System. Solicit input from the students about what the mobile depicts. Teach that the sun plays another important role; it is the center of the Solar System. Using the mobile, explain that the Solar System is made up of the sun, nine planets, and their moons. Have students find each planet on the mobile as you read the following poem:

Children of the Sun
by Brod Bagert
Mercury's small
Almost nothing at all.
Venus is bright and near.
Earth is a place with deep blue seas
And a sky that is blue and clear.
Mars is red and angry
Jupiter has an eye
Saturn has rings of ice and stone
That circle round its sky.

Uranus, Neptune and Pluto
Are far away and cold.
So now I know my planets
And I'm only six (seven) years old.

Stress ideas such as near, far, close to, etc. in describing where the planets are in relation to the sun. Spend some time examining and talking about the mobile.

Read the book *Me and My Place in Space* by Joan Sweeney. This book provides students with an introduction to space, has wonderful illustrations, and fascinating facts about the planets.

Finally, spin a top several times across a table and tell students that tomorrow's lesson will bring a surprise about something which spins.

Note: If desired, a worksheet from "StarChild" available on the internet at <http://starchild.gsfc.nasa.gov> or on a free CDROM from StarChild may be used at this time. It is a very simple solar system matching game called "Pair Me Up, Scottie." No written instructions are given. Children simply pair up pictures of planets. They can use the mobile to assist them in identifying the planet. A fun activity.

Lesson Three

Does the Earth Really Spin Like a Top?

Objectives

The student will:

participate in an experiment to ascertain that night and day are caused by the spinning of the Earth

Materials

a spinning top
a large globe
a flashlight
a paper doll
mobile of the solar system

Procedure

Initiate the lesson with the spinning of the top. Ask the following question in an appropriately incredulous voice:

Do you believe that the Earth spins around and around just like this top?
Allow time for discussion. Explain that the Earth spins continuously.

Using a globe to represent the Earth, show the students how the Earth spins. Tape a paper doll to North America explaining that this is the place (or continent) on which we live. Shine a flashlight on the globe (represents the sun) and when it is shining on us do we experience daylight or night time. Turn the globe around slowly. Ask the children what they think is happening to the part of the Earth facing away from the sun. If necessary, explain that while one side of the Earth faces the sun, that side has daylight and the other side has night. Then as the Earth keeps turning, the other side has day and we have night. AMAZING! Allow students the opportunity to turn the globe and continue to reinforce the concept of day and night.

Ascertain that a day equals 24 hours and that is exactly how long it takes for the Earth to spin around once. In that 24 hours, each side of the Earth has daytime and nighttime.

It is probably inevitable that the question of why we don't feel the movement of the Earth will come up. A simple explanation is that the Earth moves slowly and continuously. It never stops or jolts us around. In addition, things around you are all moving at the same rate so it is impossible to detect motion.

Lesson Four

The Sun and the Earth

Objectives

The student will:

participate in an activity to determine Earth's relationship to the Sun

Materials

hand-held signs reading "Earth, " and "Sun"

large open area such as playground or gymnasium

Procedure

To assess and review yesterday's lesson on the spinning of the Earth do the following activity:

Gather students in an open area. Select one child to hold the "Sun" sign and one child to hold the "Earth" sign. Ask students where you should position the Sun (center of our solar system). Position the Earth about two yards away from the Sun. Ask someone to explain what the child representing the Earth should do to cause day and night. Have the child slowly spin. Stop the child several times and check with the students observing the action, to ascertain whether they can correctly identify day and night.

Once this concept has been acquired you can set the Earth in motion to rotate around the Sun and add this new dimension to learning. Have the child slowly begin to walk around the Sun while spinning. As soon as the earth has completed one revolution (or orbit)

around the sun, solicit student ideas as to what might be happening. Why is the Earth spinning and rotating at the same time?

Explain that the Earth not only spins to create day and night in a 24 hour period but it also orbits or rotates around the Sun at the same time. Each orbit takes approximately 365 days which equals one year. Allow children the time to take a turn as either the Sun or the Earth.

The moon has purposefully been left out of this solar scenario as it has not yet been introduced. This activity will be repeated in second grade and will include the movement of the moon at that time.

Lesson Five

A Final Project

Objectives:

The student will:

- visualize the size of the Sun in comparison to the Earth by using pennies
- create a personal "Sunbook"

Materials:

100 pennies
string
chalk
index cards, pencils
hole punch

Procedure:

In an outside area, have students line up 100 pennies side by side. Measure a piece of string the length of 50 pennies in the line. Tell students to imagine one penny as the size of the Earth. Have one student stand at the center of the line (at penny #50) and hold one end of the string. Take the other end of the string and with a piece of chalk, trace a circle on the playground around the line of pennies. This circle shows the relative size of the Earth in relation to the sun. One hundred earths would fit into the sun! (adapted from the Mailbox Theme Series, Solar System).

Give each child eleven index cards. Have them create their personal "Sunbooks" stating ten true facts about the sun. Facts can be illustrated. The first card should be the cover for the set. Example facts might include:

The sun is a medium-sized star.

Without the sun there would be no life on Earth.

The sun shines on different parts of the Earth at different times which causes day and

night.

The sun is so large that 100 Earths would fit into it.

The sun is the center of the solar system.

Without the sun, plants would not grow.

The sun looks like the biggest star but that it because it is closest to the Earth.

The sun is very hot.

It can hurt your eyes if you look directly at the sun.

The sun is made up of hot gases.

Hole punch each card and tie with yarn. "Sunbooks" can serve as an assessment tool and should be shared with classmates allowing repetition of important facts. "Sunbooks" can be displayed on a bulletin board entitled "A Fiery Star," "Facts About Our Sensational Sun," etc.