The Sun is the biggest feature in our solar system. It is the largest object and contains approximately 98% of the total solar system mass. One hundred and nine Earths would be required to fit across the Sun, and its inside could hold over 1.3 million Earths. The Sun’s outer visible layer has a temperature of 11,000°F, much hotter than our temperature here on Earth!

Believe it or not, the Sun is just a star, just like those we see twinkling at night. The Sun, however, is so much closer to us on Earth that it looks much bigger, much brighter, and we can even feel heat coming from it on sunny days.

Scientists know a lot about the stars that shine at night. Compared to these other stars, the Sun is actually medium sized. Many of the stars that appear so small in the night sky are actually much bigger than our Sun. Others, however, are quite tiny in comparison. Some are much hotter, and some are so cool and dim that we can barely see them.

The Sun is made of hot gases, containing many of the same materials we find here on the Earth. These materials, called elements, include hydrogen, helium, calcium, sodium, magnesium, and iron.
How big is the Sun?

The Sun is HUGE! Even though it looks small in the sky, it is actually bigger than you might imagine. It only looks small because it is 93 million miles away. The Earth is very tiny compared to the Sun. In fact, if you think of the Sun as a basketball, the Earth would only be the size of the head of a pin!

Another way to understand the distance is to think of driving to the Sun in a car. If you actually could do this, and your drove 60 miles an hour, it would take you 176 years to get there! Light from the Sun takes about 8 minutes to reach the Earth. If you understand how fast light travels, you can recognize that the Sun must be very far away.

Why do we study the Sun?

Without the Sun, life on Earth would not exist. Our planet would be a frozen dark ball, drifting in space. We need the Sun for light, heat and energy. With the Sun, plants can grow, and animals can eat. The Sun’s output changes over time. These changes affect not only our daily lives and climate, but also our communications, such as by satellites. The more we know about the Sun, the better we can deal with these changes.

In the past, we know the Sun was a little different than it is now, and at those times the Earth experienced ice ages. During the most recent ice age, almost all of
Canada and the Northern United States were covered in a huge sheet of ice about a mile thick! Even as recently as the late 1600s, Europe and North America were a bit cooler than they are now, experiencing a little ice age, and changes in the Sun were most likely responsible.

**What is an eclipse?**

Once in a while, the Moon will move directly in front of the Sun. When it does, it blocks the light coming from the Sun. If it blocks out the Sun totally, we call this a total eclipse. If the Moon only blocks part of the Sun, it is a partial eclipse.

During a partial eclipse, you can still see part of the Sun behind the Moon, so you must not look at it. The Sun is very dangerous if you look directly at it. It is important that you never do this!

During a total eclipse, the bright Sun is completely blocked. At this time, only the outer atmosphere of the Sun is visible.

As you can see, the Moon is much smaller than the Earth, and it cannot block the Sun from the whole Earth at once. For this reason, eclipses only affect a small portion of the Earth’s surface when they occur.

Learning more about the Sun and the Moon helps us to understand the universe in which we live.
Using the model of the Sun, ask the girls to tell you what they know about the Sun and share what you have just learned.

Supplies (for a class of 30 students)

1. Large model of the Sun for classroom discussion (www.lakeshore.com)
2. Large easy to understand poster of the Solar System and its orbital path
3. Five flashlights
4. Five white softballs
5. Balloons (make sure the package includes a yellow balloon)
6. Index cards with the name of the planet in bold with easily visible letters or a planet mobile with the planets punched out for the girls to hold
7. Sidewalk chalk in different colors
8. Markers
9. Blank puzzles boards

Activity #1: The Phases of the Moon

In this exercise, we will observe and compare the phases of the Moon.
This activity will help the girls to recognize that the positions of the Sun, the Moon, and the Earth affect the phases of the Moon.

How do the positions of the Sun, the Moon, and Earth affect the phases of the Moon? The Moon phase we see on any given night depends on the positions of the Moon, the Sun, and Earth in space. The Moon receives light from the Sun, just as the Earth does. Just as half of Earth experiences day while the other half experiences night, one half of the Moon is lit by the Sun while the other half is dark. As the Moon revolves around the Earth, we see different parts of the side of the Moon that is facing the Sun. It takes the Moon about one month to go through its entire set of phases.

Please read *The Moon Seems to Change* before beginning this activity.

Have the girls work in teams of six. Pick a girl from each team to hold the flashlight. This person will be the Sun. Pick another girl from each team to hold up the softball. This person will be the Moon in this activity. The remaining girls in each team will be the Earth and should sit between the Sun and the Moon. Turn on the flashlight so that the light shines directly on the ball and darken other lights in the room.

Have the girls observe how light shines on the Moon. The girl who is holding the Moon should begin to walk in a slow circle around the Earth, stopping at least seven times at different spots. Each time the Moon stops, ask the girls to observe any changes. The girl with the flashlight (the Sun) and the team that is the Earth must remain stationary while the Moon is rotating around the Earth.
Questions to ask:

How many different Moon shapes have you seen? Round shapes? Half-circle shapes? Crescent shapes? Why do you think this happens? Compare what you have seen with what you learned in the book that was just read.

Activity #2: Bringing the Sun and the Solar System to Life

This exercise uses role-playing to demonstrate the universe and its connection to the Sun.

This activity is designed to show the girls the concepts of revolution and rotation. The girls will use balloons or mobile pieces to represent the planets and will use them to demonstrate revolution and rotation of the planets around the Sun.

The definition of revolution is the action by a celestial body of going round in an orbit or elliptical course.

The definition of rotation is one complete turn.

Please read The Planets in Our Solar System before beginning this activity as it will provide useful background information for the girls.

Before class begins, blow up a yellow balloon to its fullest and balloons of nine different colors to sizes representing the nine planets. If using the planet mobile, punch out each planet. Take the girls outside. Have nine orbital paths marked on the ground with colored chalk, trying to vary each path so that it is distinct,
perhaps using a solid line or dashed line in varying colors. Pick nine girls to hold each planet balloon or mobile piece. Pick another girl to hold the big yellow balloon, which represents the Sun, or the Sun mobile piece. The girl holding the Sun balloon stands in the middle of a circle. The other girls take their places on the marked paths. You will need to give each girl the name of her planet on an index card, if you are using balloons and direct her to the correct place. Use the large poster of the Solar System for guidance. Now, have the girls walk in their path or orbit around the Sun. Stress that the planets never leave their own orbits. This travel around the Sun is called revolution. This term should now be introduced. After the girls have orbited the Sun once, bring in the added concept of rotation. While moving around the Sun, the girls should also start to spin around like very slow tops. (Caution them against becoming dizzy.) Remind the girl who is Venus that this planet spins the opposite way from the other planets. This demonstrates rotation. Tell girls that it takes one year for the Earth to revolve around the Sun, and it takes one day for the Earth to rotate on its own axis. Point out that rotation or spinning on one’s own axis takes much less time than going all the way around the Sun, which is a revolution. Give all girls in the class a chance to try this activity.

Tying it all Together

After returning to the classroom, demonstrate the principle just learned with the globe. Let one girl spin the globe and walk around a girl holding the Sun balloon to show rotation and revolution.

Questions to ask:

What does revolution mean? Give an example. What does rotation mean? Give an example. What planets rotate around the Sun?
Activity #3: Drawing our Solar System

This exercise will help the girls put to paper what they have just learned in the previous activity- the location of the planets in our Solar System in relation to the Sun.

This activity is designed to allow the girls to draw what they have just learned so that what they have just experienced through role-playing now becomes a concrete concept.

Have the girls work independently. Give each girl a blank puzzle board and a set of markers and ask her to draw the planets of the Solar System, using what she has learned in the previous activities, as well as the poster of the Solar System at the front of the room. Once the girls have completed their puzzles, ask them to take them apart and put them back together.

Questions to ask:

What planet is the farthest from the Sun? What planet is the closest to the Sun?
What is your favorite planet? Why?

Related Reading


Finding Out About Sun, Moon and Planets. Usborne Explainers,