Sierra Nevada JOURNEYS

Solar System (Earth Science)

Students will work to discover the just how large our Earth is compared to the other planets and how far Earth is away from the sun compared to other planets.

Grade Level: 4-8

Objectives:

- Students understand the size of the solar system.
- Students learn about the size of objects in the solar system.
- Students understand why our stars rise and set just like our sun.

Materials Needed:

- Solar system fruit objects
- Planet Flags
- Pacing the solar system WKST
- Distances from the sun WKST
- Laminated planet information cards
- Four signs labeled: Sun, Moon, Inner Planets, Outer Planets

Prep Time:

10 minutes

Activity Time: 1 hour 30 minutes

Follow-up Activities:

- Weather

Nevada State Standards Addressed:

- E.5.B.1 Students know that there are more stars than anyone can count, but they are not scattered evenly, and they are not all the same in brightness or color.
- E.5.B.2 Students know the solar system includes the sun, planets, and moon.
- E.5.B.3 Students know stars are like the Sun, but they are so far away they look like points of light.
- E.5.B.4 Students know that there are cyclical patterns of observable objects in the solar system.
- E.5.B.5 Students know the patterns of stars in the sky stay the same although appear to move across the sky nightly, and different stars can be seen in different seasons.

NAAEE standards Addressed:

- **1.3 Openness to inquiry**
- **3.1 Critical / Creative thinking**
- **5.1 Learner-centered environment**
- **5.3 Connection to learners' everyday lives**

Key Vocabulary

Solar System: The sun together with all the planets and other bodies in the universe that creates its own light; star.

Planet: A body of mass in the universe that revolves around a star; sun.

Sun: A star located in our solar system.

Lead In Information

How many of you have looked up at night and seen the stars? What is a star? Are they always in the same place? What is a planet? What is the difference between our solar system and the universe? Does the Universe have an end?

Teacher background :

Each star is a possible sun for a another solar system. In fact, our sun is considered a weak star. The universe is expanding and all objects are moving further and further from the sun.

Activity 1:

What planets?

Step One: What is a planet? Ask students to list as many planets as possible. Write these on the board or tape up different cards with these written on them.

Step Two: Hand out the planet card clues and have the students place them in order from the sun based on the clues. Order and have students make each planet out of play-dough, then have them place the play-dough planets next to each info card based on the size. Students should work in groups to discover sizes and the order.

Step Three: have the students Go through the planets pointing out size comparisons and some important facts about each.

Activity 2:

How far away are our planets

Why can't we just look out and see all the other planets? (They are not that large compared to other stars...and they are very far away from Earth) Just how far?
Well, one way scientists measure the distance between planets is by the average distance from the Earth to the Sun (1 AU). An astronomical unit equals 93 million miles. Do you think that all the planets are the same distance from the Sun? Are they all evenly spaced in the Solar System?

Step 1: Have students break into original groups and use their play-dough planets. Hand out a roll of toilet paper to each student group and the "Pacing our Solar System" worksheet. Explain to your students that you are going to see the different distances using the chart given. Explain that this is scaled down to fit in the classroom, but the important thing is the distance to the next planet. Students measure each distance and place the planet along the toilet paper.

Students should write the name and try and trace their Solar System object onto the toilet paper. Discuss with students that there are very large distances between some planets compared to others. Also, explain that if they were to add the next closest star to their toilet paper it would have to be placed about 38 miles from the sun. Why can we see it and not the closer planets? (What we see are the planets reflecting the sun's rays). Students can hang toilet paper Solar Systems on the classroom wall.

Review Questions:

- Are all the planets in the solar system the same distance apart?
- Can you list all the planets in order starting with the closest to the sun?
- What are some differences between the inner planets and the outer planets?

Evaluation:

- Have students list the planets in order starting with closest to the sun.
- Have the students come up their own objects to represent the relative sizes of the different planets.
- Have students create different categories for a jeopardy game based on trivia with the planets.

Cross-Curricular Extentions

Reading:
A book that goes with theme:
A Wrinkle in Time

Math:
Link this lesson with other measuring lessons. Have the students do all the measurements in meters or centimeters. Have students do conversions.

Social Studies:
Read in the news (even local newspaper) about recent trips to space and what NASA has planned next.

Phys.-Ed.:
Have students convert all the numbers to meters and multiply each number by two. Students could pace out all of the planet distances and put a flag in the ground. This could be done as a relay.

G/T Connections:

Research a particular planet in more depth. What would it take for an organism to live on this planet? Could humans live there? Why or Why not? Have students report back to the class to resolve the issue.

Constructed Response

Prompt: Our lessons discussed the Solar System.

A). In two sentences describe two reasons people may not see other planets.

B). In two sentences, give at least two reasons why other planets do not have living things on them.

Place-Based Connection

Visiting a local planetarium or doing a stargazing night at the school. Teachers could also have students make their own planetarium in their classroom.

Resources

starryskies.com

www.planetfacts.net

kidzone.w/planets

sciencenet.com

sbau.org