Activity: Planning a Planet

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Let's Design a Planet!

This module is designed to help synthesize your knowledge and understanding of Earth Science. It incorporates all aspects of Earth Science in otder to explain the details of your created and designed planet.

Instructions:
Using your knowledge of Earth Science, create a planet that maintains realistic possibilities. Think about the following questions and respond to them in your science notebook. Be sure to explain each aspect of your planet using as much vocabulary, knowledge and details as possible.

1. What three factors need to be present in order to be considered a planet? Explain how your planet has each of these.

2. Does your planet have a moon(s)?

   Does your moon show phases? Can we see more than one side at a time? Are there tides or other phenomena associated with the moon(s)?

3. Are other planets visible from your planet? If so, explain how you observe other planets.

4. Are there patterns to the day and year? Explain what creates a day and a year on your planet. Explain how sunlight might impact the day and the year. Consider the angle of the sun in both situations for a day and a year.

5. Is your planet filled with water, land, both? Is it molten, solid, a mixture? Does it have an atmosphere?

6. Does your planet have tectonic plates? Explain these or their absence.

7. Where is your planet in terms of age? What evidence is there to show age?

8. Explain some prominent features such as craters, mountains, plateaus, islands, underwater volcanoes, etc.

9. Is there life on your planet? Explain the life forms and where they are located.

10. Explain the climate and weather on your planet. Include in these descriptions ideas about seasons at various locations on the planet.

11. What does the night sky look like and how does it change over a season?

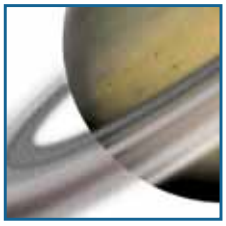
Using materials provided by your instructor create your planet. Be sure to explain the scale of your planet.

Create one of the following three ideas for your planet:

a) Contour map of one of the continents or underwater terrains found on your planet.

b) Star map as viewed from your planet at a designated latitude and longitude.

c) Water budget for a certain climatic location on your planet.



MoST*

RESOURCES NEEDED

Article:
Why is Pluto not a Planet?

Earth Science textbook or online sources for reference

MATERIALS NEEDED

Various sized balls, modeling clay, paper mache, paper, colored markers, paints, balloons, newspapers, drop cloths and items to add texture to the planet

Students should be able to:

Design a planet using their depth of knowledge and understanding of our planetary system

Explain the unique characteristics of their planets

Design a planet using a scale measurement system

Inside This Packet

Notes for the Teacher

With your class read "Why is Pluto not a Planet?" from *Universe Today*.

Organize a debate for those supporting Pluto as a planet versus those supporting Pluto as a dwarf planet.

Discuss the conclusion of the paper. What three elements must be present to be classified as a planet?

Prior to the Activity

In a class discussion summarize the understanding of our planet by topics. Write the topics down and encourage the students to add as many of these as possible. Take a topic, such as season, and investigate how it impacts Earth. Seasons are created on Earth from the revolution of Earth around the sun, the tilt of Earth's axis, and the shape of the planet. These factors alter the amount of sunlight and its angle of impact at the surface.

Ideas for topics can include plate tectonics, contour maps, meteorological data, soil science, seasons, climate, planetary formation, moon study (phases, sides of the moon, eclipse, tides, gravitational pull, shape of the moon), eclipses (lunar, solar, partial, full), convection cells, rock cycle, evolution, creation, layers of the earth, earthquakes, volcanoes, etc.

If you would like to provide a model or guide to the students, the following student example is designed to assist the students with understanding how detailed to create their responses.

New York State Standards

Physical Setting Earth Science
High School Level

Standard 1: Math
Key ideas 1, 2 and 3

Standard 1: Science
Key idea 1

Standard 1: Engineering
Key idea 1

Standard 4:
Key Ideas 1 and 2

Standard 6:
Key Ideas 2, 3, and 5

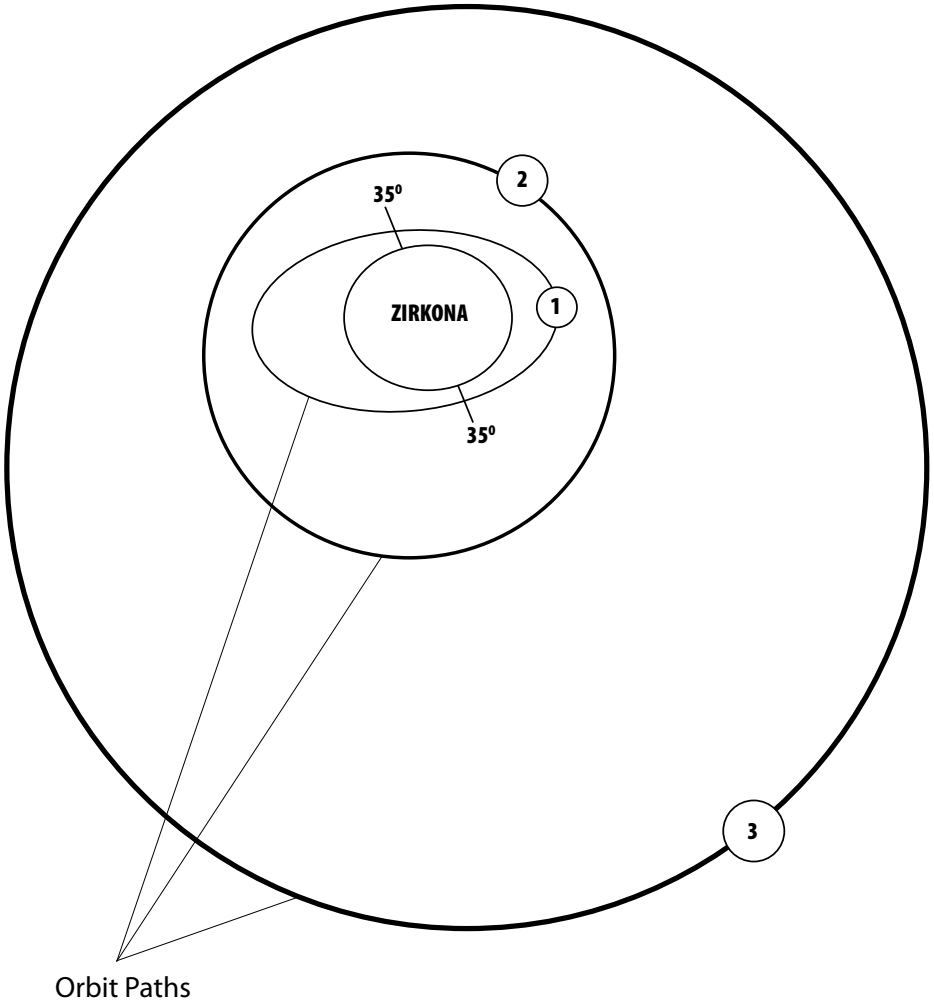
Student Example

Student Example: Moons
Planet Name: Zirkona
Topic Title: Question 2: Moons
Note: All mention of time is in earth hours.

Zirkona has three major moons: Obido, Hazmar, and Fredona. The moons all rotate at different rates. Fredona is similar to Earth's moon in that it rotates and revolves at the same rate therefore only one side is visible from planet Zirkona's surface. The moon Obido rotates once every 12 hours while Hazmar rotates once every 36 hours. The planet of Zirkona rotates once every 72 hours. Due to the rotation rates the complete surface of two moons, Obido and Hazmar, are visible at some point from the surface of Zirkona.

The distance from the surface of Zirkona to the moons is in the following order: Obido is closest followed by Hazmar then Fredona. The moons' revolution rates around Zirkona follow Kepler's Laws of Planetary Motion. Therefore, the fastest revolution is Obido with 72 Earth hours, followed by Hasmar at 28 Earth days, and finally Fredona with two Earth years.

The moons act like shepherding moons creating three major rings around Zirkona. The ellipses of the three moons vary greatly. Obido's eccentricity is .234, Hazmar is .007, and Fredona's is .0012. The pull of the moons on the water systems of Zircona are complex. Clearly when all three moons are in a pattern closest together the tides rise to a maximum height and when they are in opposition the tides are at the lowest levels. This however, happens infrequently due to the differences in revolution rates.



Orbit Paths

Zirkona's Moons

1. Obido
2. Hazmar
3. Fredona

	Rotation Rate	Revolution Rate
Obido	12 hours	72 hours
Hazmar	36 hours	28 days
Fredona	72 hours	2 years

(Earth time)