Planetary Order

Grade: 6

Curriculum Outcome: 104-8, 300-23 describe the physical characteristics of components of the solar system

INDEX:

Teacher's Guide……2

Activity Sheet……4

Worksheet……6

Answer Keys

Activity Sheet……10

Worksheet……11

Teacher's Guide
Planetary Order

Grade Level: 6

Unit: Space

Specific Curriculum Outcome (SCO): 104-8 and 300-23 describe the physical characteristics of components of the solar system

Objective: inform students about the new planetary order, including the minor planets Pluto, Ceres and Eris. They could use this to investigate the definition of a planet

Materials:

Pencil and Paper
Scissors
Colouring Pencils
Glue
Laminator

Introduction:

This lesson is to have students investigate the new planetary order, the planet categories and the definition of a planet. This will be accomplished through the teacher's lecture. In this lecture, the teacher will provide students with a definition of what a planet is and the terminology astronomers use to discuss planets.

To begin this lesson, the teacher will define what planets are and present terminology with the student that's used to discuss planets. This information will include mass, diameter, average distance from the sun, rotation period, mean surface temperature, and surface material. The teacher can explain these terms using Earth as the example and getting the students to answer the questions based on what they already know about Earth.

During the teacher's presentation, mass, average distance from the sun, rotation period, mean surface temperature and surface materials must be defined. If the students don't understand these terms they will not be able to do the activity. The following table contains the definitions of each term that the teacher must discuss with the class in order to move on to the activity.

Term	Definition
Mass	How much matter is in the planet? It can be measured in Kilograms.
Average distance from the sun	How far away is the planet from the sun? It can be measured in Kilometres
Diameter	What is the distance from one side of the planet straight through to the opposite side? It can be measure in Kilometres.
Mean Surface Temperature	What is the average temperature of the planet? It can be measured Calvin.
Surface Materials	What can be found on the planet?

When the teacher and students are finished with the lecture portion of the lesson, the students can then start the activity which is creating the Planetary Playing Cards. The Planetary Playing Cards are a handout that the teacher must pass out to students. Students will be creating 11 cards, one for each planet.

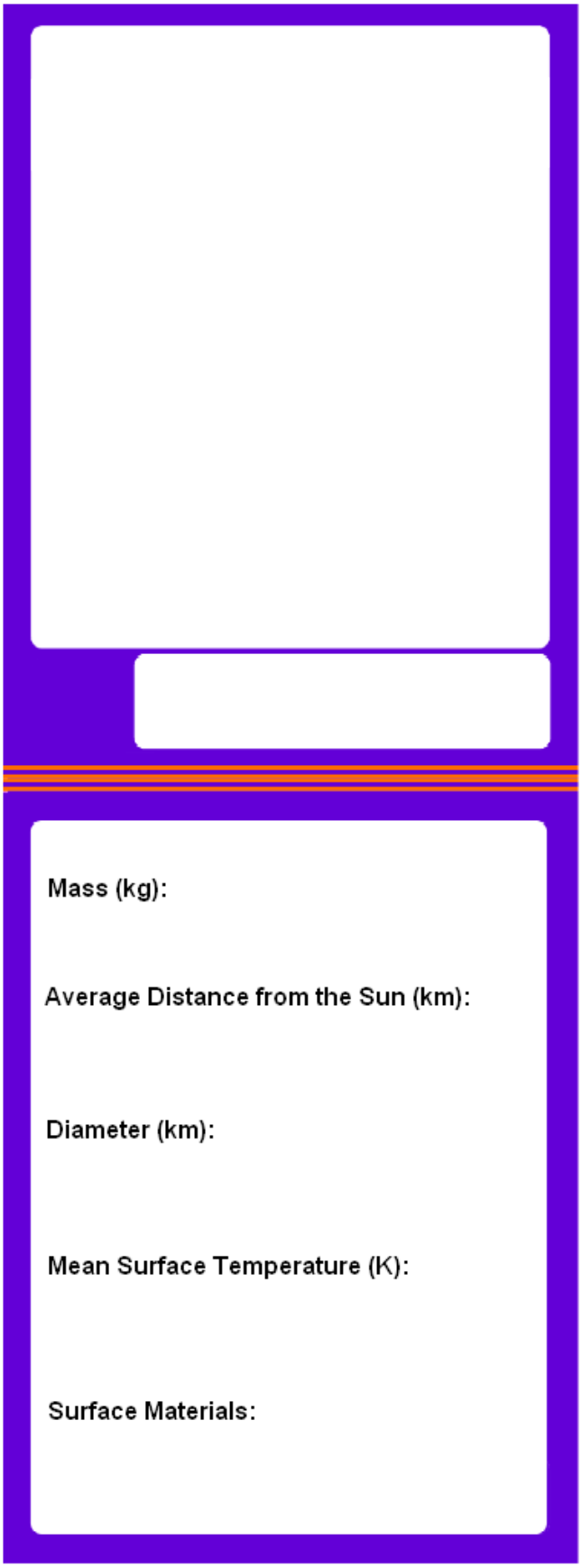
The teacher must prepare copies of the student's activity sheet found in the next section. Each student should receive 11 copies of the same sheet. One sheet is for one planet. The activity sheet will provide the students with a template to make the Planetary Playing Cards. The students will follow its directions. The students will write the name of the planet in the space provided. Then, students will research the planet either using their books or the internet to find information. For each card students are going to find the same list of information. They will find the planet's mass, average distance from the sun, rotation period, mean surface temperature, and surface materials which are the terms that the teacher went over in the lecture. The students will write this information in the designated area of the card. Then students will find a picture of the planet and draw it on its designated area.

When the students are finished making the Planetary Playing Cards, they will give them to their teacher. The teacher will check the playing cards and make sure the information for each planet is correct. Once the teacher and students are satisfied with the playing cards, the student can fold the card in half and tape the sides together.

When the students have finished making their Planetary Playing Cards, they will be given the worksheet. The students can use the cards to complete the worksheet. The worksheets will be a good assessment of how well the students understood the outcome.

The purpose of this assignment is to have students practice their research skills and learn about the planetary order. It is also a fun activity for students and an excellent opportunity for students to be creative. When the students are finished their assignment, they can keep their playing cards.

Activity Sheet



Instructions

1. Fill in the descriptive details about the planet in the lower half of the card.
2. Draw the planet on the front of the card.
3. Write the name of the planet under its picture in the space provided.
4. Fold the card in half on the fold line, and tape or glue the card together.
5. Cut the card out along the edges.
6. Repeat the process for all 11 planets.

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Activity Sheet

Name: _____ **Date:** _____

Directions: Complete the following table. Use your textbook, reference books, or the internet to find the missing information.

Planets	Mass (kg)	Average Distance from sun (km)	Diameter (km)	Mean Surface Temp. (K)	Surface Materials
Mercury		57,909,175			basaltic and anorthositic rocks and regolith
Venus	4.87×10^{24}		12,103.6		
Earth		149,597,890		281	
Mars			6,794		
Ceres	$9.43 \pm 0.07 \times 10^{20}$			167	icy
Jupiter		778,412,020	142,984		
Saturn	5.69×10^{26}				rings (smooth)
Uranus			51,118	59	
Neptune					
Pluto		5,906,376,200			perhaps methane ice
Eris	$(1.67 \pm 0.02) \times 10^{22}$		2450		

Planetary Order Questions

Name: _____ **Date:** _____

1. In your own words, what is the definition of a planet?

_____

_____

_____

2. Calculate relative size of each planet to the sun. To find the relative sizes divide the planet's diameter into the sun's diameter and multiple everything by the model's dimensions. The Sun's Diameter and Model Dimension are constants.

Example: Earth's Diameter (12756.3 km) x Model Dimension = 1.3 cm
Sun's Diameter (1,391,940km) 138.2 cm

3. Using the relative sizes you find in question 2, draw the planets in their relative size in order from the sun.

4. List the order of the planets in our solar system:

_____

_____

_____

_____

5. Complete the following table, classifying the planets by size:

Dwarf	**Small**	**Giant**
1.	1.	1.
2.	2.	2.
3.	3.	3.
	4.	4.

6. List the planets that have rings:

_____

_____

7. Complete the following table, classifying the planets by their surface composition:

Rocky	**Gaseous**	**Icy**
1.	1.	1.
2.	2.	2.
3.	3.	3.
4.	4.	

8. Choose a planet of your choice, excluding Earth, and describe what you think life would be like on that planet. Example: What is the temperature of the planet? What would you need to survive in this climate?

_____

_____

_____

_____

_____

_____

_____

Answer Key
Activity Sheet

Planets	Mass (kg)	Average Distance from sun (km)	Diameter (km)	Mean Surface Temp. (K)	Surface Materials
Mercury	3.3×10^{23}	57,909,175	4,880	452	basaltic and anorthositic rocks and regolith
Venus	4.87×10^{24}	108,208,930	12,103.6	726	basaltic rock and altered materials
Earth	5.98×10^{24}	149,597,890	12,756.3	281	basaltic, granitic rock and altered materials
Mars	6.42×10^{23}	227,936,640	6,794	310	basaltic rock and altered materials
Ceres	$9.43 \pm 0.07 \times 10^{20}$	37350	950	167	icy
Jupiter	1.90×10^{27}	778,412,020	142,984	120 (cloud tops)	rings (smooth)
Saturn	5.69×10^{26}	1,426,725,400	120,536	88 K (1 bar level)	rings (smooth)
Uranus	8.68×10^{25}	2,870,972,200	51,118	59	rings (smooth)
Neptune	1.02×10^{26}	4,498,252,900	49,532	48	rings (smooth)
Pluto	1.29×10^{22}	5,906,376,200	2274	37	perhaps methane ice
Eris	$(1.67 \pm 0.02) \times 10^{22}$	3X the distance of Pluto from the Sun	2450	42.5	Icy

Answer Key

Planetary Order Questions

Name: _____ **Date:** _____

1. In your own words, what is the definition of a planet?

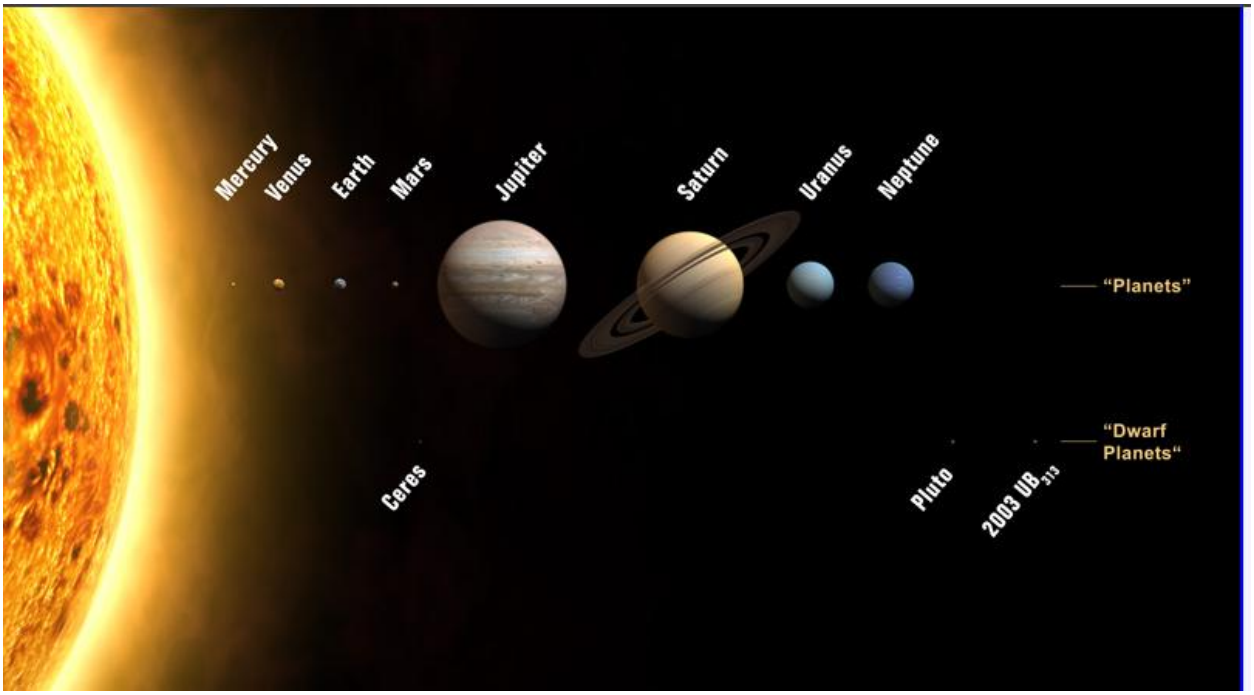
   A planet is a spherical ball of rock and/or gas that orbits a star. The Earth is a planet. Our solar system has eight planets.

2. Calculate relative size of each planet to the sun. To find the relative sizes divide the planet's diameter into the sun's diameter and multiple everything by the model's dimensions. The Sun's Diameter and Model Dimension are constants.

   Example: Earth's Diameter (12756.3 km) x Model Dimension = 1.3 cm
   Sun's Diameter (1,391,940km) 138.2 cm

Size of Planets	
Planet	**Scaled Diameter**
Mercury	0.5 cm
Venus	1.2 cm
Earth	1.3 cm
Mars	0.7 cm
Ceres	0.01 cm
Jupiter	14.2 cm
Saturn	12.0 cm
Uranus	5.1 cm
Neptune	4.9 cm
Pluto	0.2 cm
Eris	0.2 cm

3. Using the ratios that you find in question 2, draw the planets in their relative size in order from the sun.



4. List the order of the planets in our solar system:

Sun, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto

5. Complete the following table, classifying the planets by size:

Dwarf	**Small**	**Giant**
1. Pluto	1. Mars	1. Jupiter
2. Eris	2. Earth	2. Saturn
3. Ceres	3. Mercury	3. Uranus
	4. Venus	4. Neptune

6. List the planets that have rings:

   Neptune, Saturn, Jupiter and Uranus have rings.

7. Complete the following table, classifying the planets by their surface composition:

Rocky	**Gaseous**	**Icy**
1. Mars	1. Jupiter	1. Pluto
2. Earth	2. Saturn	2. Eris
3. Mercury	3. Uranus	3. Ceres
4. Venus	4. Neptune	

8. Choose a planet of your choice, excluding Earth, and describe what you think life would be like on that planet. Example: What is the temperature of the planet? What would you need to survive in this climate?

   Students are encouraged to be creative, but they must provide rationale for anything they put down.