Name/#_____

Date_____

Gravity Unit Test

Definitions: Match the definition to its vocabulary word.

1. Mass _____ 2. Weight _____ 3. Gravity _____ 4. Gravity Factor _____ 5. Radius _____ 6. Diameter _____	**A. A comparison of each planet's gravity to the gravity on Earth** **B. A force that attracts two objects toward each other** **C. A straight line passing through the center of a circle or sphere** **D. Amount of matter in an object** **E. How heavy an object is; strength of gravitational force on an object** **F. The distance from the center to the edge of a circle or sphere**

Brainpop Questions: Circle the correct answer.

7. How does the Sun's gravity compare to the Earth's gravity?
   a. The Sun's gravity is stronger
   b. The Earth's gravity is stronger
   c. The gravitational pull is the same
   d. Scientists are not able to measure the Sun's gravity

8. Why is earth's gravity stronger than the moon's gravity?
   a. The earth is more massive than the moon
   b. The moon is so far away from the earth
   c. The moon has no mass
   d. The earth has a larger volume than the moon

9. According to Newton's laws, what might happen to the earth if its orbit moved farther away from the sun?
   a. The sun's gravitational pull on the earth would increase
   b. The earth's gravitational pull on the moon would increase
   c. The sun's gravitational pull on the earth would stay the same
   d. The sun's gravitational pull on the earth would decrease

10. Which of these would have the strongest gravitational pull?
    a. A large, dense star
    b. A medium-sized planet
    c. A small moon
    d. A comet

Experiments: Answer the following questions using complete sentences and citing evidence from our classroom experiments.

11. What is the difference between mass and weight?

_____
_____
_____
_____

12. On Earth, or any planet, which direction does gravity pull? Explain using one example that proves your answer.

_____
_____
_____
_____
_____

13. Planet Meigs has more mass than Earth, but has the same radius and diameter. How will a 4-square ball's weight change on the new planet?

_____
_____
_____
_____
_____

14. Planet H.-F. has a larger radius and diameter than Earth, but the same mass. How will an iPad's weight change on the new planet?

_____
_____
_____
_____
_____

15. Why did the astronaut jump higher on the moon, than on Earth?

_____
_____
_____
_____
_____

16. Where will you weigh less: at sea-level or on a mountaintop? Why?

_____
_____
_____
_____

Use the table to answer the following questions. Use specific data to prove your answers.

17. Why did the soda can weigh the most on Jupiter?

_____

_____

_____

_____

18. Why did the soda can weigh the least on Pluto?

_____

_____

_____

_____

19. What is the weight of a 5 pound Base-10 Block if it is transported to another planet?

Mercury_____

Jupiter_____

Please show your work in this box.

What Would You Weigh on Jupiter?

Jupiter has 318 times more mass than Earth, so you might assume that you would weigh 318 times more on Jupiter than you weigh on Earth. This would be true if Jupiter were the same size as Earth, but the diameter of Jupiter is more than 10 times the diameter of Earth. This means that if you stood on Jupiter, you would actually be farther from the planet's center than you would be if you stood on Earth. This reduces Jupiter's gravitational pull on you to only about 2.36 times (and not 318 times) your weight on Earth.

The number 2.36 is referred to as Jupiter's "gravity factor." The gravity factor is the ratio of each planet's gravity to that on Earth. Earth's gravity factor is 1 and Jupiter's gravity factor is 2.36. By multiplying your Earth weight by a planet's gravity factor, you can determine your weight on that planet. Use the table to find out how much you would weigh on each of the nine planets.

Table 1 Mass, Radius, and Surface Gravity of Each Planet

Planet	Mass (10^{22} kg)	Radius (km)	Surface Gravity Factor (Earth = 1)
Mercury	33	2439	0.38
Venus	487	6051	0.91
Earth	597	6378	1.00
Mars	64	3396	0.38
Jupiter	189,900	71,492	2.36
Saturn	56,850	60,268	0.92
Uranus	8683	25,559	0.89
Neptune	10,240	24,764	1.12
Pluto	1	1170	0.06