

Name: \_\_\_\_\_

Date: 11/7/18

Science 7

Motion

Aim: I can explain the behavior of falling objects.

Do Now:

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\_\_\_\_\_

Notes:

Gravity:

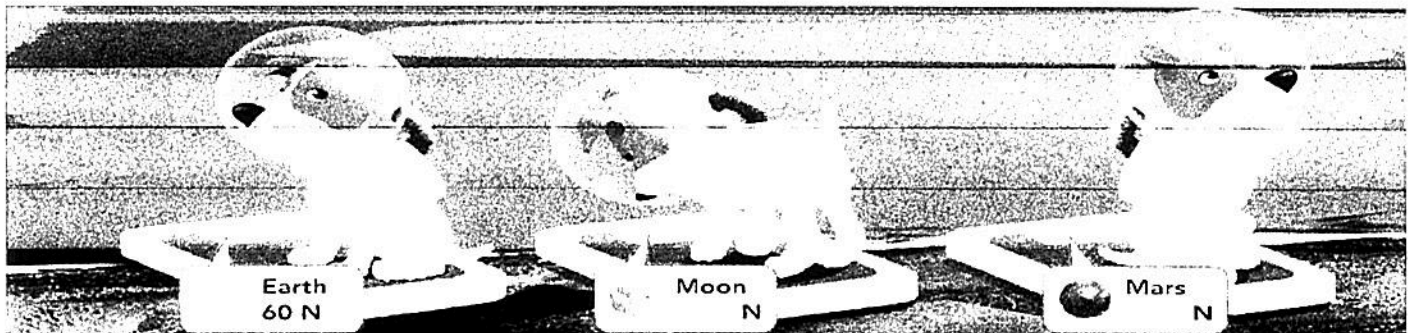
- Force of attraction between two objects
- All objects exert gravitational force
- Factors that affect the gravitational attraction between objects are mass and distance.

How do mass and distance effect gravity?

IF mass increases, gravity increases  
IF the space between the object increases gravity decreases.

Mass vs. Weight

- Weight - The measure of the force of gravity on an object.
- Mass - A measurement of the amount of matter in an object.



**Weight and Mass** Mass is sometimes confused with weight. Mass is a measure of the amount of matter in an object. Weight is a measure of the force of gravity on an object. When you stand on a bathroom scale, it displays the gravitational force Earth is exerting on you.

At any given time, your mass is the same on Earth as it would be on any other planet. But weight varies with the strength of the gravitational force. The dog in Figure 4 has a different weight at different places in the solar system. On the moon, he would weigh about one sixth of what he does on Earth. On Mars, he would weigh just over a third of what he does on Earth.

FIGURE 4

**Weight and Mass**

The Mars Phoenix Lander weighs about 3,400 N on Earth. It weighs about 1,300 N on Mars.

The first scale shows the dog's weight on Earth. Predict its weight on the moon and on Mars. Enter those weights in the boxes on the other two scales.

**Predict:** If dropped off of the empire state building at the same time, which object will hit the ground first, a bowling ball or a golf ball? Explain your answer.

The bowling ball and golf ball will hit the ground at the same time

### Falling Objects

- Near Earth's surface, gravity causes all falling objects to accelerate at  $9.8 \text{ m/s}^2$ .
- This only applies to objects that are dropped. Objects that are thrown have a greater acceleration.

### How fast is gravity?

What will fall to the ground first... A cannon ball with a mass of 100kg OR a cannon ball with a mass of 50kg? Why?

Both will hit the ground at the same time. They both fall at  $9.8 \text{ m/s}^2$

### Air Resistance

- The force air exerts on a moving object.
- Force acts in the opposite direction of that of the objects motion.
- Air resistance pushes up as gravity pulls down.

Does a leaf accelerate as fast as an acorn? Explain.

No, because the leaf is going to be more affected by air resistance. The leaf has a greater surface area.

### Terminal Velocity

- As an object falls through the air, air resistance gradually increases until it balances the pull of gravity.
- The highest velocity that will be reached by a falling object.

### Falling Objects

Use what you have learned about falling objects, air resistance, and terminal velocity to explain why a person can parachute safely to Earth from a high flying air plane.

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