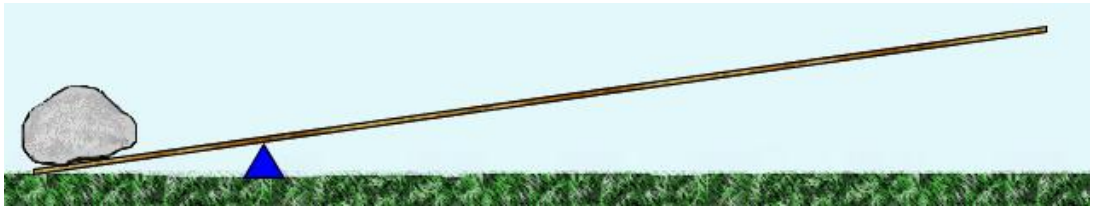
Name: _____ Date: _____

Student Exploration: Triple Beam Balance

Vocabulary: fulcrum, lever, mass, rider, triple beam balance

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

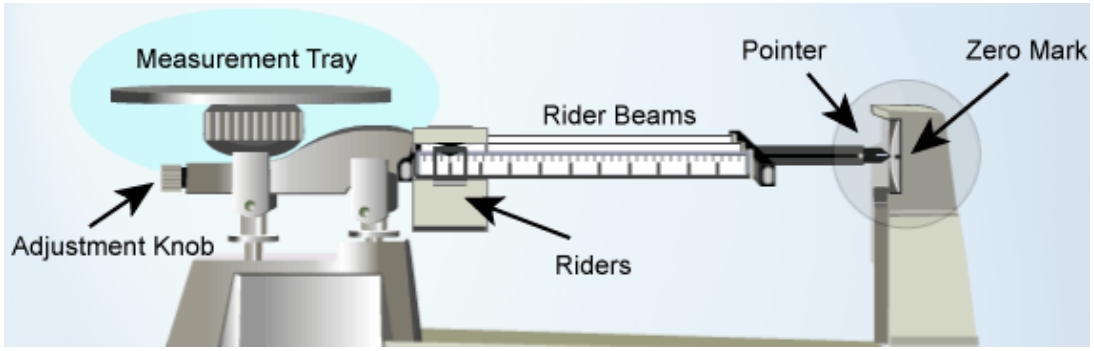
1. A **lever** is a long beam that is set on a pointed **fulcrum**. A heavy rock is placed on a lever, as shown. Draw an arrow where you should push down to lift the rock most easily.



2. Suppose you wanted to balance the rock with a smaller rock. Where would you put the smaller rock? Draw a smaller rock on the diagram above so that it balances the big rock.

Gizmo Warm-up

A **triple beam balance** is a type of lever that is used to measure **mass**, or the amount of matter in an object. An object with an unknown mass is placed on the measurement tray. On the other side of a fulcrum, a set of sliding weights, called **riders**, slide on beams to balance the object.

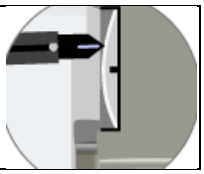


Practice using the balance in the *Triple Beam Balance* Gizmo™.

1. Where is the fulcrum of this lever? Circle and label its location on the diagram above.

2. How do you balance the weight of the object on the measurement tray?_____

_____

Activity: **Measuring mass**	Get the Gizmo ready: • Set all the **Riders** to 0. 

Question: How is a triple beam balance used to find mass?

1. Observe: The riders have masses of 10 grams (top), 100 grams (middle), and 1 gram (bottom). Drag the **10-gram rider** to **100**. At this position it balances a 100 gram mass.

What happens to the **pointer**? _____

2. Compare: Place each object on the measurement tray, one at a time. Which objects have a mass greater than 100 grams? How do you know?

_____

_____

3. Compare: Move the **10-gram rider** back to **0**, and move the **100-gram rider** to **200**.

A. Which objects have a mass greater than 200 grams? _____

B. Which objects have a mass greater than 300 grams? _____

4. Measure: Move the **100-gram rider** back to **0**. Place the **light bulb** on the tray.

Move the **100-gram rider to the right**, one notch at a time, until the pointer sinks. Now move the 100 gram rider back to the left one notch. (The pointer should lift up.)

Move the **10-gram rider** to the right, one notch at a time, until the pointer sinks below the **zero mark**. Now move the rider back to the left one notch.

Slowly move the **1-gram rider** until the pointer lines up with the **zero mark**.

5. Calculate: The mass of the light bulb is the sum of the values on each rider. To get a magnified view of the **1-gram rider**, place the cursor over that rider. (Each tick mark represents 0.1 g.) Write your answer to the nearest 0.1 gram.

100-g rider: _____ 10-g rider: _____ 1-g rider: _____

Mass of the light bulb: _____

6. Practice: Use the Gizmo to find the mass of the other objects. Write their masses below.

Paper clips: _____ Cone: _____ Cube: _____