

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

Period: \_\_\_\_\_

# Bess Beetles

## *Science Skill 1: The Scientific Method*

### **BACKGROUND**

Bess beetles look menacing, but are surprisingly gentle. Bess beetles get their name from the French word *baiser*, which means “to kiss,” based on the smooching sound they make with their legs. Bess beetles can range in size from 21-44 mm in length. They live in groups and eat rotting wood, moss and adult beetle feces after it has been partially digested by bacteria. If you've seen one, you already know why some people call them patent leather beetles--they're quite shiny and black, just like a pair of patent leather shoes. Watch them in action:

<https://www.youtube.com/watch?v=zljwLSLOETo>.

### **MATERIALS**

- Bess beetles
- Dental floss
- Electronic balance
- Paper clips
- Scotch tape
- Petri dishes

### **SAFETY & ETHICS**

It is important to treat all living organisms with care and respect when working with live organisms. Limit your interaction with the living organisms only to what is required of the experiment. Beetle noises and excrement is normal. Be sure to wash your hands thoroughly after working with living organisms.

### **PROBLEM**

Does beetle mass affect pulling strength?

### **HYPOTHESIS**

Predict the relationship between the variables listed above by writing a hypothesis.

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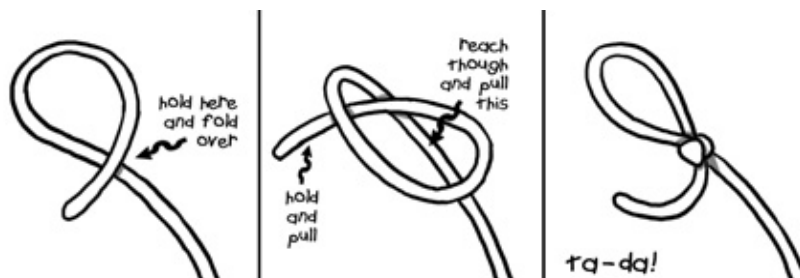
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## PROCEDURE

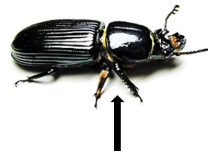
1. Measure the mass of a beetle to the nearest one hundredth gram using an electronic balance. Take the mass of an empty Petri dish, then collect your beetle to take its mass with the dish (place the beetle on his backside) and subtract the Petri dish mass. Record this information in your data table.

$$\text{Mass}_{\text{Petri dish + beetle}} - \text{Mass}_{\text{Petri dish}} = \text{Mass}_{\text{beetle}}$$

2. Cut a piece of dental floss approximately 30 cm long (about 1 foot). Make a slip knot on one end of the floss.



3. Place the slip knot around the beetle, positioning it between the front and middle legs (as indicated by the arrow in the diagram below) before tugging gently to tighten. Be careful not to pull too fast or snug as to cause harm to the beetle.



4. Tape the opposite end of the dental floss to a Petri dish. This will serve as the "sled" for the beetle to pull.
5. Place the beetle on one end of your lab table, flanked by textbooks creating a "lane" for the beetle and Petri dish sled. Once the beetle begins to move forward, slowly add paper clips one at a time until the beetle is unable to pull the sled further. Note: You may need to reposition the beetle if it nears the edge of the table or moves towards the sides of the lane. Do not poke, prod, or push the beetle.
6. Remove the slip knot from the beetle and return the beetle to its container.
7. Take the mass of the Petri dish sled, dental floss, and paper clips.

**DATA & APPLICATION**

	<i>Mass (g)</i>	<i>Method</i>
Empty Petri dish		Measure
Petri dish + Beetle		Measure
Beetle ( <i>do not place beetle directly on scale</i> )		Calculate
Petri dish + floss + tape + paper clips		Measure

For this lab, we will calculate the pulling power using a ratio of the pulled mass to beetle mass.

$$\text{Pulling Power} = \text{Total Mass} \div \text{Beetle Mass}$$

Record your beetle mass and final pulling power on the class data table.

According to your data, the total pulling power of the Bess Beetle is \_\_\_\_\_ times its own mass! If your pulling power was equivalent to that of the beetle, how many grams could you pull?

$$\text{Your Weight (lb)} \times 2.2 \text{ (lb)} = \text{Your Mass (Kg)}$$

$$\text{Pulling Power} \times \text{Your Mass (Kg)} = \text{Mass (Kg)}$$