

3rd GRADE

PENNY LIFT

CLASS SCIENCE FAIR PROJECT

Summary: Students work together as a class to generate a science fair project. The students use the steps of the scientific method to ask a question, form a hypothesis, design a test, collect data, and draw conclusions. Their findings are presented to the class and placed on a science fair project board for the school science fair. The topic of this project is to find out the best position for a fulcrum needed to lift a load most easily.

Intended Learning Outcomes for 3rd Grade:

- 1c. Make simple predictions and inferences based upon observations.
- 1f. Conduct a simple investigation when given directions.
- 1h. Use observations to construct a reasonable explanation.
- 3a. Know science information specified for their grade level.
- 4a. Record data accurately when given the appropriate form and format.
- 4b. Report observation with pictures, sentences, and models.
- 4c. Use scientific language appropriate to grade level in oral and written communication.

Utah State Core Curriculum Tie:

Standard 3 Objective 1:

- c. Investigate how forces applied through simple machines affect the direction and/or amount of resulting force.

Preparation time: 30 min

Lesson time: 50 min

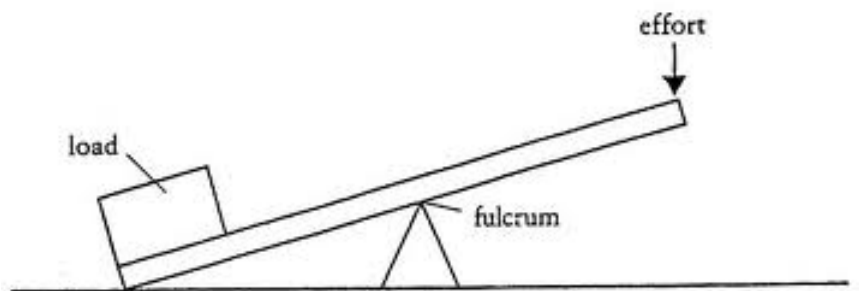
Small group size: works best with one adult for every 5 children

Materials:

- 1. one ruler per group
- 2. one pencil per group
- 3. 10 pennies per group
- 4. about 40 washers the size of a quarter per group, if these are not available then you can substitute this with another equivalent mass. You can also check other objects with different groups: nickels, quarters or pennies along with washers.
- 5. several half sheets of paper per group
- 6. one science fair presentation board
- 7. headings made for the presentation board: introduction, hypothesis, procedure, data, conclusion, teacher's name and class

Background information:

A lever is a simple machine used to lift or move objects. A lever makes our work easier. It has two parts. The arm is the part that moves. The fulcrum supports the arm. The load is the object being lifted. The closer the load is to the fulcrum the easier it is to lift.



In this experiment, we want to determine where a fulcrum should be placed so that the least amount of force will be needed to lift the pennies.



Pre-lab discussion: Show the students a picture of a lever and label the parts. Construct a lever out of a board, a rock for a fulcrum and find a load to lift. Place the fulcrum far from the load and close to the load without lifting it. Have the students predict which position would make lifting the load the easiest. Tell them they are going to test their hypothesis with a pencil and ruler lever. Discuss with the students what a science fair is and explain that today they are going to complete a class science fair project.

Instructional procedure:

I. Experiment: Complete the experiment first and then work on writing the assigned sections for the project board.

1. Make a lever by placing a pencil on the desk and then place the ruler over the pencil. Place the ruler at the 4-inch mark over the pencil. Stack 10 pennies on the ruler at the 1-inch mark. Add washers to the 11-inch mark until the 10 pennies are lifted off the table. On the table provided, write how many washers it took to lift the pennies.

2. Repeat the experiment with the ruler placed at the 5-inch mark over the pencil. Add your results to the table.
3. Repeat the experiment with the ruler at the 6, 7, and 8-inch mark over the pencil. Record your results.
4. Graph your data with the fulcrum setting on the x-axis and the washers needed to lift the load on the y-axis.
5. Questions to ask the students: Which experiment needed the most washers? Which needed the least? Which experiment required the greatest force to lift the pennies? Which needed the least force?

II. Science fair display board: Assign each group a different section of the class science fair display board. Each group can decide what to write and then help the students take turns writing the different words on a half sheet of paper. Students will write up their section and then place it in the appropriate area on the display board. If you take pictures of the students working on the project you can put them on the board as well.

Introduction: In about 3 sentences, explain why we are doing the experiment – what do we want to learn. For example, we want to learn if it is easier to lift a load when the load is placed close to or far from the fulcrum.

Hypothesis: We will do this as a class before the experiment starts. For example, we think that when the fulcrum is placed close to the load, fewer washers are needed to lift the load. If they predict a different outcome then use their hypothesis.

Procedure: Write down the steps we used to perform the experiment. Use a number format and simplify the procedure if needed.

Title: Make a title for our class project. The name should be catchy but also relevant to the experiment.

Data: Every lab group will complete a data table and bar graph for the experiment. Students can also draw some pictures to add to the board.

Conclusion: In about 3 sentences, explain what we learned. Be sure and explain whether our hypothesis was supported or not. Explain what this tells them about where a fulcrum should be placed in a lever for the easiest lift of the load.

Display board sections:

left panel

introduction

hypothesis

procedure

center panel

title

tables, pictures,

drawings

right panel

conclusion

name of teacher