

Drops on a Penny: Teacher Notes

Sunshine State Standards

MA.E.1.3.1

MA.E.1.3.2

MA.E.1.3.3

MA.E.3.3.1

Math Abilities

Conceptual Understanding

Data Collection

Graphing

Line of Best Fit

Interpret Data

Procedural Knowledge

Organize Data

Graph Data

Make Predictions



Process Standards

Problem Solving

Reasoning

Communication

Connections

Representation

Hook

Water has a tendency to act as if it has a very thin net stretched over its surface. This tendency is called surface tension. Surface tension is caused by the polar nature of the water molecule.

The polar charges are caused by electron sharing of the atoms of the molecule. This sharing causes areas of the molecules to become positively and negatively charged. The charged areas are called poles. Opposite charges attract causing the pole on one molecule to be attracted and "cling" to an oppositely charged pole of another molecule.

This cling, or adhesion, of molecules forms the "net" called surface tension. As water piles up on a penny, it creates a dome-like shape. It will even bulge over the edge of the penny. The "net" of surface tension keeps the water from spilling off. Surface tension will support this bulging dome until the water piles up so high that the force of gravity on the water becomes greater than the strength of the net and it is ripped open as the polar bonds are broken.

Group Arrangement

Students work in pairs

Tools

- Dixie cups
- Water
- Eye Dropper
- Paper towels
- Pennies



Procedure

A. COLLECT THE DATA

1. Guess how many drops of water a Heads-Up penny will hold.
2. Count how many drops it will actually hold.
3. Record your data.

B. GRAPH THE DATA

Create a Stem-and-Leaf plot of the class data.

C. ANALYZE THE DATA

1. Use the data to calculate the mean, median, mode and range.
2. Use this data to create a box and whiskers plot.



Math Connection

As a result of this activity, students will learn to model and graph stem-and-leaf plots and box and whiskers plots.



Assessment

- Predict how many drops of water a Tails-Up penny will hold and check your prediction.
- Draw a box and whiskers plot and compare to the plot for the Heads-Up penny.