

**Grade Level/Course:**  
**Grades 3-5**

**Lesson/Unit Plan Name:**  
**Drops on a Penny**

**Rationale/Lesson Abstract**  
Students will learn about properties of water and will create their own data charts. Students will predict how many drops of three liquids will fit on the surface of a penny and then graph their results.

**Timeframe:**  
**1 day**

**Common Core Standard(s):**

3.MD.2 Measure and estimate liquid volumes and masses of objects using standards units of grams.

4.MD.1 Know relative sizes of measurement units within one system of units.

4.MD.4 Make a line plot to display a data set of measurements in fractions of a unit.

5.MD.2 Make a line plot to display a data set of measurements in fractions of a unit.

**Next General Science Standards**

5-PS1.A Structures and Properties of Matter.

**Prior Knowledge:**

Students will have some basic understanding of properties of water and that matter is comprised of liquids, solids and gases (plasma is a more advanced concept).

**Instructional Resources/Materials:****Materials for each pair of students:**

1 penny  
3 plastic cups  
1 eye dropper  
cooking oil, water, salt,  
1 plastic spoon  
paper towels, newspaper (to protect desks)  
1 milliliter measuring cylinder  
pencils and science notebooks

**Activity/Lesson:**

Students will have prior knowledge about properties of water. They will know that water is a liquid comprised of molecules. Students will be asked a simple question. How many drops of water will fill a penny? Teacher will model how to methodically put water on a penny with an eyedropper. Students will work in pairs. Students will work with 100 milliliters of water. They will measure that amount into their cup. Before the activity begins, students will make a prediction about how many drops of water can fit on a penny without spillage. Then students will complete the activity, taking turns putting drops on the penny and then observing. Students will record how many drops they put on the penny before water overflowed. Students will also estimate how many milliliters fit on their penny for each activity. Students will wipe the water off the penny and do the same activity two more times -- adjusting their prediction after the first try if necessary.

Students will then debrief full class -- sharing their results. Now that students know how to conduct this experiment, they will do the same with two other liquids - salt water next and then oil. Students will begin

each time with 100 milliliters of their liquid. For salt water, students will add teaspoons of salt to their water until salt no longer dissolves.

### Which liquid can hold the most drops on a penny?

As they conduct their experiments, the inquiry question will be which liquid can hold the most drops on a penny -- water, salt water, or oil.

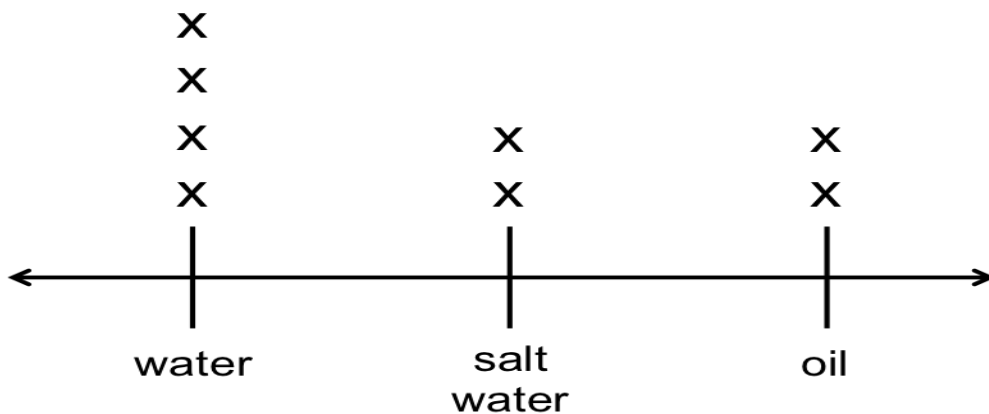
Students will next mix salt into their cup of water (add water to cups so that liquid level is 100 mL.) Students will repeat their scientific procedure. They will predict, do the activity, adjust their predictions, and then do the activity two more times. Students will record both their predictions and their results in a table provided by the teacher. Each pair will have the responsibility of carefully recording their results.



Repeat activity now with a cup filled with 100 mL of cooking oil. Make sure that students are making predictions, recording them, and also recording concrete results of experiments.

Debrief full class. Teacher will record findings on a line plot. Students will record their individual findings on a line plot.

Examples of Line Plot:



x = 5 drops

# Drops on a Penny

Liquid	Prediction	Number of Drops	How much was left in cup? (mL)	Were you right?
Water				
Salt Water				
Oil				

# Drops on a Penny

Liquid	Prediction	Number of Drops	How much was left in cup? (mL)	Were you right?
Water				
Salt Water				
Oil				

**Assessment:**

Teacher will use student work, including student data sheets and line plots for assessment.