**The Density of Crayons**

**Objective: Students will review how to find the mass, volume and density of irregularly shaped objects using crayons and upload the data of the density and crayon color to the iSENSE project.**

Curriculum Standard: MS-PS1-7(MA): Use a particulate model of matter to explain that density is the amount of matter (mass) in a given volume. Measure the mass and volume of regular and irregular shaped objects and calculate their density.

Materials: Triple beam balances, 20 mL graduated cylinders, assorted crayons, chromebooks for data entry

Directions:

1. As an activator, take a large clear beaker or fishbowl and fill it with water. Drop in several different color crayons. Some of the crayons will sink, some will float.
2. Hand out the student directions. Ask the students why they think some of the crayons sank and why some are floating. (Question 1 on worksheet.) Ask for volunteer answers.
3. Ask them if they remember what property they can measure to determine whether something can sink or float. (Question 2 on worksheet) – the answer is density.
4. Ask what tools and processes you need to calculate density. ( Question 3 on worksheet.) Students should say they have to calculate mass using a triple beam balance. They also should be able to say they need to calculate volume. Because the crayon is an irregular shaped object, they would need to do this using water displacement. Finally, they would need the formula D=M/V to calculate the density of the crayon.
5. Each lab group will have five crayons. Tell students to record the color of the crayon exactly as it is written on the paper, then remove the paper.
6. While the crayon is still dry, students should find the mass of the crayon. Then, using the graduated cylinder, students should find the volume of the crayon. These should be recorded on the student worksheet.
7. Students will then calculate the density of each crayon using the data from the table.
8. Students will go to <https://isenseproject.org/projects/1419> and click “contribute data”. Students will enter the color of the crayon, the density of the crayon, and whether it will sink or float.
9. Students will go to the visualizations and experiment with the different types of graphs until they find the one view that best expresses their findings.
10. Students will save and print a copy of the visualization and attach it to the student worksheet.

Assessment: The assessment is based on the four questions on the student worksheet and the correct calculations in the data table.