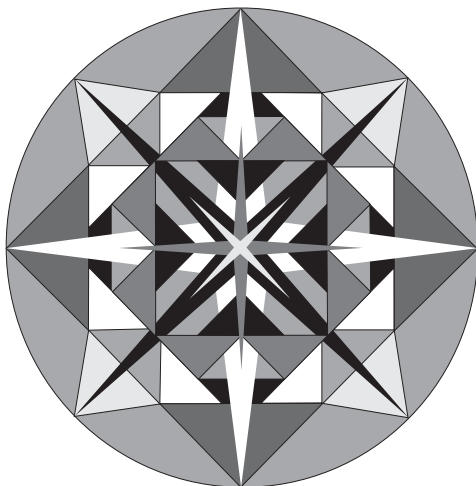


I. Student Activities/Investigations



Investigation M1: Measuring Mass and Volume and Calculating Density

Activity M1.1: Will it sink or float? (Laboratory Activity)

Equipment: Rubbing alcohol, water, saltwater, beakers or other calibrated containers, diet soft drinks in aluminum cans, regular soft drinks in aluminum cans, metal sphere, metal cylinder, metal cube, graduated cylinder, and safety goggles.

Safety Precautions

**Wear safety goggles.
Do not taste the liquids.
(All liquids used are safe to touch.)**

1. **WHAT'S YOUR IDEA?** Make both quantitative and qualitative predictions about what will happen when you place diet and regular soft drinks (unopened aluminum cans full of soft drinks) into rubbing alcohol, water, and saltwater in calibrated containers.

?

2. **WHAT ARE THE GROUP'S IDEAS?** List all the predictions made by your classmates. Do any of the predictions contradict each other?

??

M1.1(1)

3. **MAKING OBSERVATIONS:** Place the soft drink can systems (unopened aluminum cans full of soft drinks) into the liquids. What qualitative and quantitative observations can you make?



4. **MAKING SENSE:** Organize what you have observed in a chart. Make more observations if necessary to complete your chart. What is the same about the soft drink can systems? What is different about the soft drink can systems? What is the same about rubbing alcohol, water, and saltwater? What is different about rubbing alcohol, water, and saltwater?



M1.1(2)

Activity M1.4: How is density related to floating and sinking? (Laboratory Activity)

Equipment: Rubbing alcohol, water, saltwater, beakers or other calibrated containers, diet soft drinks in aluminum cans, regular soft drinks in aluminum cans, balances and standard masses, overflow cans and catch buckets, rulers, string or tape measures, tape for labeling containers, and safety goggles.

Safety Precautions ■■■▶

**Wear safety goggles.
Do not taste the liquids.
(All liquids used are safe to touch.)**

1. **WHAT'S YOUR IDEA?** Devise an activity to determine the density of the diet and regular soft drink can systems.

?

2. **WHAT ARE THE GROUP'S IDEAS?** How did your classmates plan to find the density of the diet and regular soft drink can systems? Do you think any particular method is more accurate than the other methods?

??

M1.4(1)

3. **MAKING OBSERVATIONS:** Your small group may choose or your instructor may assign a method for finding the density of the diet and regular soft drink can systems. Collect the necessary data and calculate the densities.



4. **MAKING SENSE:** For each of the diet and regular soft drink can systems, find the mean (average) of all your class' density values, excluding any outliers (extreme values). How can you use your mean densities to predict in which liquids (rubbing alcohol, water, and saltwater) each soft drink can system will float?



M1.4(2)