

**GROUP Density Dilemma Activity Sheet:
The Case of the Missing Crown**

Group member names: _____

The Problem: In this activity, imagine that you are living in Europe in the Middle Ages. You have been summoned by the king of your land to help in a very important matter. Someone has stolen the king's solid gold crown. The king has issued a proclamation offering a reward of 500 gold coins for the safe return of his crown. The problem is that the king has received 5 crowns that appear to be made of pure gold and are identical to the missing crown. Your job is to correctly identify the gold crown, and persuade the King why your identification is scientifically accurate.

Please fill in your group responses in the spaces provided below.

Part 1 – What do You Know?

Task 1 – Getting into your groups

- 1. Group Leader - _____
- 2. Recorder - _____
- 3. Letter Writer - _____
- 4. Presenter - _____

Task 2 – What do you know?

- 1. What is mass and what are its units? _____

- 2. What is volume and what are its units? _____

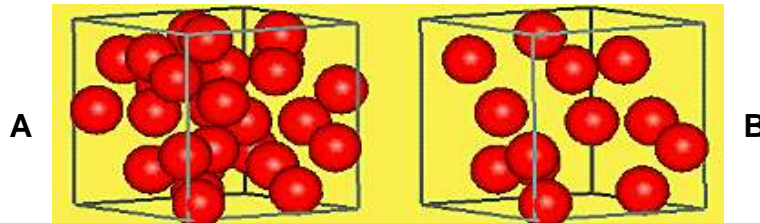
- 3. How do you measure volume indirectly? _____

- 4. What is density? What is the formula for density? _____

Task 3 – What do you want to know?

Part 2 – Introducing Density

Task 1 – Discovering Density



1. If each ball has the same mass, which box would weigh more, A or B? Why?

2. What is your groups' definition of density? _____

3. What is the formula for density?

4. Which of the substances found in the *Density of Common Substances* would float in water? How do you know?

Task 2 – Group Discussion about Density

1. Are there any revisions or additions your group would like to make from your answers in Task 1? Please write any changes in the space provided below.

Part 3 – Density Dilemma Problem

Task 3 – Predicting the King's Gold Crown

1. Which crown did each of your group members predict would be the one made of pure gold?

Group Member Name	1	2	3	4
Crown #				
Why did you choose that crown?				

Task 4 – Which is the Correct Crown?

Please show any work or information that your group uses to figure out which crown is made of pure gold in the space provided below.

Our group thinks that the gold crown is:

Task 5 – Write a Letter to the King

Using the space provided below write a formal letter to the King, persuading him that you have identified the real gold crown. Be certain to use scientifically accurate information and supporting evidence that your group came up with to explain why you have chosen a certain crown.