

# Density Of A Sinkers

## Task Information

**Grade:** 8th Grade

**Format:** Manipulative

**Purpose:** The student will find the density of a metal sinker

**Content:** Physical Science

**Skills:**

**Primary:** Measuring, Observing, Applying Math

**Secondary:** Recording Data

**Time:** 10 - 15 minutes

**Materials:**

- spring scale or balance
- 100 mL beaker with water
- modeling clay
- calculator
- graduated cylinder (at least 50 mL)
- 1 oz or 3/4 oz lead sinker
- string

**Preparation:**

- Put a small piece of modeling clay in the bottom of the graduated cylinder. This will pad the graduate in case the student drops the sinker into the graduate.
- Tie a string to the lead sinker so that the students can gently lower the sinker into the graduated cylinder. This will also help them to get the sinker out of the graduate.

**Safety:**

- Caution the students against dropping the sinker into the graduated cylinder.
- If any glassware should break, instruct the students **not** to attempt to clean it up themselves but to inform the instructor immediately.

**Extension/Modifications:**

- Grade 8 Task Collection - Unknown Liquids
- Earth Science Task Collection - Density of a mineral

## Density of a Sinkers

**Task:** At this station, you will be determining the density of a sinker.

**Materials**

- spring scale or balance
- graduated cylinder
- beaker with water
- sinker
- calculator

**Directions**

1. Find the mass of the sinker. Include units in your answer. \_\_\_\_\_
2. In the space below, describe the procedures you will use to find the **VOLUME** of the sinker.

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3. Find the volume of the sinker. Include units in your answer. \_\_\_\_\_
4. What is the density of the sinker? Round to the nearest tenth. Include units in your answer. \_\_\_\_\_

Show your work in the space below using the formula:

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

5. Suppose you cut the bottom half off the sinker. What would be the density of the upper half of the sinker? Explain your answer.

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**Density of a Sinker - Scoring Rubric****Maximum Score - 10 points****Question 1. Mass of the Sinker****2 points total**

Point Criteria:

- Teacher determined mass: \_\_\_\_\_ grams
- Allow 1 point for mass within the acceptable ranges.
  - triple beam or double pan balance = accuracy of +/- 1.0 grams
  - spring scale = accuracy of +/- 2.0 grams
- Allow 1 point for labeling the units as grams.

**Question 2. Procedure for Volume****2 points total**

Point Criteria:

- Response should include:
  - Put sinker into graduated cylinder.
  - Measure initial and final volumes.
  - Difference is the volume of the sinker.
- Allow 2 points if all three elements are included.
- Allow 1 point if two elements are included or if student writes "water displacement method."

\*\*\* Points should be based on the procedure not the actual value for the volume of the sinker. \*\*\*

**Question 3. Volume of the Sinker****2 points total**

Point Criteria:

- Teacher determined volume: \_\_\_\_\_ milliliters
- Allow 1 point for volume within the acceptable range.
  - accurate to +/- 1.0 milliliters
- Allow 1 point for labeling the units as milliliters.

**Question 4. Density of the Sinker.****3 points total**

Point Criteria:

- Density calculation should be based upon the student's values of mass and volume.
- Allow 1 point for density within the acceptable range.
  - accurate to +/- 0.5 g/mL
- Allow 1 point for labeling units as g/mL.
- Allow 1 point for correct substitution of the student's values into the density formula.

**Question 5 Density of 1/2 the sinker.****1 point total**

Point Criteria:

- Allow 1 point for a statement indicating that the density of 1/2 the sinker will be the same as the whole sinker because density is not directly related to volume.

**Highest possible score - 10 points**

Student ID \_\_\_\_\_ Scoring Form - Density of a Sinker  
Male or Female (circle one)

Circle the student's score for each question. Add the points for each question and write the total score at the bottom of the scoring form.

Question	Circle point breakdown	Points earned
1. Mass of sinker	0    1    2	_____
2. Procedure followed	0    1    2	_____
3. Volume of Sinker	0    1    2	_____
4. Density of Sinker Calculations Work Shown	0    1    2  0    1	_____
5. Density of 1/2 the sinker	0    1	_____

Total Score \_\_\_\_\_  
Total possible score - 10 points

Student ID 911334 Scoring Form - Density of a Sinker

Male or Female (circle one)

Circle the student's score for each question. Add the points for each question and write the total score at the bottom of the scoring form.

Question	Circle point breakdown	Points earned
1. Mass of sinker	0 <u>1</u> 2	<u>1</u>
2. Procedure followed	0 <u>1</u> 2	<u>1</u>
3. Volume of Sinker	0 <u>1</u> 2	<u>1</u>
4. Density of Sinker Calculations Work Shown	<u>0</u> 1 2 <u>0</u> 1	<u>0</u>
5. Density of 1/2 the sinker	<u>0</u> 1	<u>0</u>

Total Score 3  
Total possible score - 10 points

## Density of a Sinker

**Task:** At this station, you will be determining the density of a sinker.

### MATERIALS:

spring scale or balance  
 graduated cylinder  
 beaker with water  
 sinker  
 calculator

### DIRECTIONS:

1. Find the mass of the sinker. Include units in your answer.

30.1

2. In the space below, describe the procedures you will use to find the **VOLUME** of the sinker.

I will put in 30.1 grams of water  
then put the sinker in the  
water

3. Find the volume of the sinker. Include units in your answer.

4

4. What is the density of the sinker? Round to the nearest tenth. Include units in your answer.

60

Show your work in the space below using the formula:

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

$$\frac{30.1}{34.0}$$

5. Suppose you cut the bottom half off the sinker. What would be the density of the upper half of the sinker?

If I cut off the bottom  
half I will get 20.1.

Circle the student's score for each question. Add the points for each question and write the total score at the bottom of the scoring form.

Question	Circle point breakdown	Points earned
1. Mass of sinker	0    1 <u>2</u>	<u>2</u>
2. Procedure followed	0    1 <u>2</u>	<u>2</u>
3. Volume of Sinker	0 <u>1</u> 2	<u>1</u>
4. Density of Sinker Calculations Work Shown	<u>0</u> 1    2 0 <u>1</u>	<u>1</u>
5. Density of 1/2 the sinker	<u>0</u> 1	<u>0</u>

Total Score 6  
 Total possible score - 10 points

GMS-36

# Density of a Sinkers

Task: At this station, you will be determining the density of a sinker.

**MATERIALS:**

- spring scale or balance
- graduated cylinder
- beaker with water
- sinker
- calculator

**DIRECTIONS:**

1. Find the mass of the sinker. Include units in your answer. 32g
2. In the space below, describe the procedures you will use to find the **VOLUME** of the sinker.

I will fill the graduated cylinder  
half way with water and then slide the sinker  
in it and see how much the water rises

3. Find the volume of the sinker. Include units in your answer. 8
4. What is the density of the sinker? Round to the nearest tenth. Include units in your answer. 4.0

Show your work in the space below using the formula:

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

$$\begin{array}{r} \text{mass} \\ 7 \overline{) 32} \\ \underline{28} \\ 4 \end{array}$$

5. Suppose you cut the bottom half off the sinker. What would be the density of the upper half of the sinker?

2.2

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Male or Female (circle one)

Circle the student's score for each question. Add the points for each question and write the total score at the bottom of the scoring form.

Question	Circle point breakdown	Points earned
1. Mass of sinker	0    1 <u>2</u>	<u>2</u>
2. Procedure followed	0    1 <u>2</u>	<u>2</u>
3. Volume of Sinker	0    1 <u>2</u>	<u>2</u>
4. Density of Sinker Calculations Work Shown	0    1 <u>2</u> 0 <u>1</u>	<u>3</u>
5. Density of 1/2 the sinker	<u>0</u> 1	<u>0</u>

Total Score 9  
Total possible score - 10 points

# Density of a Sinker

**Task:** At this station, you will be determining the density of a sinker.

**MATERIALS:**

- spring scale or balance
- graduated cylinder
- beaker with water
- sinker
- calculator

2

**DIRECTIONS:**

1. Find the mass of the sinker. Include units in your answer.

28g

2. In the space below, describe the procedures you will use to find the **VOLUME** of the sinker.

I placed water in volume tube  
put sinker in watched where  
in was and where it ended  
up at.

3. Find the volume of the sinker. Include units in your answer.

3ml<sup>3</sup>

4. What is the density of the sinker? Round to the nearest tenth. Include units in your answer.

9.3g/ml<sup>3</sup>

Show your work in the space below using the formula:

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

5. Suppose you cut the bottom half off the sinker. What would be the density of the upper half of the sinker?

Dont know

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