

Worksheet Significant Figures

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Part 1: Building a Foundation

What is the definition of significant figures?

Hint: Consider what contributes to the precision of a number.

- A) Digits that are placeholders in a number
- B) Digits that contribute to the precision of a number
- C) Only the non-zero digits in a number
- D) Only the zeros in a number

Which of the following numbers have three significant figures?

Hint: Look for numbers that contain three meaningful digits.

- A) 0.00456
- B) 123
- C) 4500
- D) 7.00

Explain why leading zeros are not considered significant figures.

Hint: Think about the role of leading zeros in a number.

Identify the number of significant figures in each of the following:

Hint: Count the meaningful digits in each number.

1. 0.078

2. 506

3. 3.400

Which rule applies when rounding the number 2.356 to two significant figures?

Hint: Consider how rounding affects the digits.

- A) Round up to 2.4
- B) Round down to 2.3
- C) Round to 2.35
- D) Keep as 2.356

Part 2: Comprehension and Application

How many significant figures are in the number 0.05060?

Hint: Count the meaningful digits, including trailing zeros.

- A) Two
- B) Three
- C) Four
- D) Five

Which of the following statements are true about significant figures?

Hint: Evaluate the statements based on the rules of significant figures.

- A) Trailing zeros in a decimal number are significant.
- B) Leading zeros are always significant.
- C) Zeros between non-zero digits are significant.
- D) All zeros in a whole number are significant.

Describe the significance of using significant figures in scientific calculations.

Hint: Think about how precision affects results.

If you multiply 3.2 (two significant figures) by 4.56 (three significant figures), how many significant figures should the result have?

Hint: The result should have the same number of significant figures as the factor with the least significant figures.

- A) Two
- B) Three
- C) Four
- D) Five

You are given the numbers 5.00 and 0.0032. Which of the following operations will result in a number with three significant figures?

Hint: Consider how each operation affects significant figures.

- A) Addition
- B) Subtraction
- C) Multiplication
- D) Division

Calculate the result of $12.345 + 0.06$ and express it with the correct number of significant figures.

Hint: Consider the least precise measurement when adding.

Part 3: Analysis, Evaluation, and Creation

Which of the following best describes the impact of significant figures on precision and accuracy?

Hint: Think about how significant figures relate to measurement quality.

- A) They increase accuracy but not precision.
- B) They increase precision but not accuracy.
- C) They affect both precision and accuracy.
- D) They have no impact on precision or accuracy.

Analyze the following numbers and select those that have four significant figures:

Hint: Look for numbers that contain four meaningful digits.

- A) 0.004500
- B) 450.0
- C) 4500
- D) 0.04560

Explain how significant figures can affect the outcome of a scientific experiment.

Hint: Consider the role of precision in experimental results.

In a lab experiment, you measure a length as 12.0 cm and a width as 0.045 cm. What is the area, and how many significant figures should it have?

Hint: Calculate the area and consider the least precise measurement.

- A) 0.54 cm² with two significant figures
- B) 0.54 cm² with three significant figures
- C) 0.540 cm² with three significant figures
- D) 0.540 cm² with four significant figures

Evaluate the following statements and select those that reflect the importance of significant figures in real-world applications:

Hint: Consider how significant figures impact various fields.

- A) They ensure consistency in scientific communication.
- B) They are only important in theoretical calculations.
- C) They help in maintaining precision in engineering designs.
- D) They are irrelevant in everyday measurements.

Propose a real-world scenario where significant figures play a crucial role, and explain the potential consequences of ignoring them.

Hint: Think about fields where precision is critical.