1. Place an "enter" on the board. Then enclose the selected number all around.

2. When the alcohol is a result of can't fit or other variable listed in the experiment.

3. Where the alcohol was and whether the variable listed in the experiment.

4. Describe the variable that was listed in the experiment.

5. Describe the variable that was listed in the experiment.

6. Compare the results of the variable that was listed in the experiment.

7. Compare the results of the variable that was listed in the experiment.

8. Describe the variable that was listed in the experiment.

9. Compare the results of the variable that was listed in the experiment.

<table>
<thead>
<tr>
<th>Model</th>
<th>Alcohol Volume</th>
<th>Room Pressure</th>
<th>Room Temperature</th>
<th>Room Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>180</td>
<td>100</td>
<td>25°C</td>
<td>10°C</td>
</tr>
<tr>
<td>2</td>
<td>120</td>
<td>100</td>
<td>20°C</td>
<td>10°C</td>
</tr>
<tr>
<td>3</td>
<td>210</td>
<td>100</td>
<td>25°C</td>
<td>10°C</td>
</tr>
<tr>
<td>4</td>
<td>220</td>
<td>100</td>
<td>30°C</td>
<td>10°C</td>
</tr>
</tbody>
</table>

1. Identify the reaction listed in Model 1 as one of more complete reactions.

2. Identify the reaction listed in Model 2 as one of more complete reactions.

**Fundamentals of Experimental Design**
1. Describe the control group for this experiment.

2. What are some of the variables that might bias the control group in the experiment?

3. Indicate

<table>
<thead>
<tr>
<th>Condition</th>
<th>Independent Variable</th>
<th>Dependent Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
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<tr>
<td>Independent</td>
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<tr>
<td>Variable</td>
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</table>

4.秘书 may modify an experiment with a control group for which a set of conditions is specified and do not alter the experimental conditions or the control group.

5. The term "control group" refers to the group of subjects who are not exposed to the experimental treatment. This group serves as a basis for comparison to the experimental group.

6. Each group in the experiment has its own controls, which are necessary to ensure the validity of the results.

7. The control group is essential in measuring the effects of the experimental treatment.

8. Without a control group, it is impossible to determine whether the results are due to the experimental treatment or other factors.

9. In a controlled experiment, the control group must be identical to the experimental group except for the variable being tested.

10. The control group helps to rule out the possibility of external factors affecting the results.
Measuring with a Ruler/Scientific Notation

#1-5 Use a metric ruler to measure the length of the lines below.
#6-10 Use the metric rules to draw lines.

1) _____ cm
2) _____ cm
3) _____ cm
4) _____ mm
5) _____ mm
6) 5.0 cm
7) 1.7 cm
8) 13.2 mm
9) 8 mm
10) 121 mm

Convert #11-15 from scientific notation to standard notation. Convert #16-20 from standard notation to scientific numbers.

11) $6.683 \times 10^{-3}$
12) $1.956 \times 10$
13) $1.2113 \times 10^{-5}$
14) $3.200 \times 10^{-6}$
15) $9.008 \times 10^{-6}$
16) 0.0001762
17) 92,300
18) 78,000
19) 0.0004006
20) 0.00027600
# Measuring Equipment with Significant Figures

Read the instrument in the drawing and record the value. Identify the possible equipment it could be from the word bank below.

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Word bank: burette, pipette, thermometer, ruler, graduated cylinder
7. Find the volume when:

(a) volume = 2.50 cm³, and density = 0.62 g/cm³

(b) volume = 5.00 cm³, and density = 0.98 g/cm³

(c) volume = 0.50 cm³, and density = 2.2 g/cm³

8. Find the mass when:

(a) mass = 125 g, volume = 2.50 cm³, and density = 5.00 g/cm³

(b) mass = 75 g, volume = 2.50 cm³, and density = 3.00 g/cm³

(c) mass = 375 g, volume = 5.00 cm³, and density = 7.50 g/cm³

9. Show your work for each question:

(a) Which is the least dense material listed above?

(b) Which is the most dense material listed above?

10. How use arithmetic principles to predict which of the materials will sink in water. List them:

11. Use arithmetic principles to predict which of the materials in the chart above will float on water. List them:

12. Which is the least dense material listed above?

13. Which is the most dense material listed above?

14. Write the following calculations. Include the appropriate number of significant figures:

(a) 2.00000 x 9.0000 = 18.0000

(b) 1.00000 x 2.90000 = 2.90000

(c) 0.00009 x 2.00000 = 0.000018

15. Identify the number of significant figures in the following measurements:

(a) 10.00 x 1.0

(b) 2.00 x 1.0

(c) 3.00 x 1.0

(d) 4.00 x 1.0

(e) 5.00 x 1.0

(f) 6.00 x 1.0

(g) 7.00 x 1.0

(h) 8.00 x 1.0

(i) 9.00 x 1.0

(j) 10.00 x 1.0

16. Write the following calculations. Include the appropriate number of significant figures:

(a) 1.00000 x 2.90000 = 2.90000

(b) 0.00009 x 2.00000 = 0.000018

(c) 0.00009 x 2.00000 = 0.000018

17. Write the following calculations. Include the appropriate number of significant figures:

(a) 2.90000 x 1.00000 = 2.90000

(b) 1.00000 x 2.90000 = 2.90000

(c) 0.00009 x 2.00000 = 0.000018

18. Write the following calculations. Include the appropriate number of significant figures:

(a) 2.90000 x 1.00000 = 2.90000

(b) 1.00000 x 2.90000 = 2.90000

(c) 0.00009 x 2.00000 = 0.000018
Chapter 1 and 2

Honors Practice Problems

1. A cube has a side length of 4 cm. What is its surface area and volume?
   - Surface Area: $6 \times 4^2 = 96$ cm²
   - Volume: $4^3 = 64$ cm³

2. A rectangular prism has dimensions 5 cm x 3 cm x 2 cm. What is its volume?
   - Volume: $5 \times 3 \times 2 = 30$ cm³

3. A sphere has a radius of 3 cm. What is its surface area and volume?
   - Surface Area: $4\pi \times 3^2 = 36\pi$ cm²
   - Volume: $\frac{4}{3}\pi \times 3^3 = 36\pi$ cm³

4. A cylinder has a radius of 2 cm and a height of 5 cm. What is its volume?
   - Volume: $\pi \times 2^2 \times 5 = 20\pi$ cm³

5. A cone has a radius of 3 cm and a height of 4 cm. What is its volume?
   - Volume: $\frac{1}{3} \pi \times 3^2 \times 4 = 12\pi$ cm³

6. A pyramid has a base area of 10 cm² and a height of 5 cm. What is its volume?
   - Volume: $\frac{1}{3} \times 10 \times 5 = \frac{50}{3}$ cm³

7. A sphere has a diameter of 6 cm. What is its radius and surface area?
   - Radius: $3$ cm
   - Surface Area: $4\pi \times 3^2 = 36\pi$ cm²

8. A cube has a side length of 2 cm. What is its surface area and volume?
   - Surface Area: $6 \times 2^2 = 24$ cm²
   - Volume: $2^3 = 8$ cm³

9. A cylinder has a radius of 4 cm and a height of 3 cm. What is its volume?
   - Volume: $\pi \times 4^2 \times 3 = 48\pi$ cm³

10. A cone has a radius of 2 cm and a height of 6 cm. What is its volume?
    - Volume: $\frac{1}{3} \pi \times 2^2 \times 6 = 8\pi$ cm³

11. A pyramid has a base area of 15 cm² and a height of 5 cm. What is its volume?
    - Volume: $\frac{1}{3} \times 15 \times 5 = 25$ cm³

12. A sphere has a diameter of 8 cm. What is its radius and surface area?
    - Radius: $4$ cm
    - Surface Area: $4\pi \times 4^2 = 64\pi$ cm²

13. A cube has a side length of 3 cm. What is its surface area and volume?
    - Surface Area: $6 \times 3^2 = 54$ cm²
    - Volume: $3^3 = 27$ cm³

14. A cylinder has a radius of 3 cm and a height of 7 cm. What is its volume?
    - Volume: $\pi \times 3^2 \times 7 = 63\pi$ cm³

15. A cone has a radius of 4 cm and a height of 9 cm. What is its volume?
    - Volume: $\frac{1}{3} \pi \times 4^2 \times 9 = 48\pi$ cm³

16. A pyramid has a base area of 20 cm² and a height of 4 cm. What is its volume?
    - Volume: $\frac{1}{3} \times 20 \times 4 = \frac{80}{3}$ cm³

17. A sphere has a diameter of 10 cm. What is its radius and surface area?
    - Radius: $5$ cm
    - Surface Area: $4\pi \times 5^2 = 100\pi$ cm²

18. A cube has a side length of 1 cm. What is its surface area and volume?
    - Surface Area: $6 \times 1^2 = 6$ cm²
    - Volume: $1^3 = 1$ cm³

19. A cylinder has a radius of 5 cm and a height of 2 cm. What is its volume?
    - Volume: $\pi \times 5^2 \times 2 = 50\pi$ cm³

20. A cone has a radius of 3 cm and a height of 8 cm. What is its volume?
    - Volume: $\frac{1}{3} \pi \times 3^2 \times 8 = 24\pi$ cm³

21. A pyramid has a base area of 30 cm² and a height of 6 cm. What is its volume?
    - Volume: $\frac{1}{3} \times 30 \times 6 = 60$ cm³

22. A sphere has a diameter of 20 cm. What is its radius and surface area?
    - Radius: $10$ cm
    - Surface Area: $4\pi \times 10^2 = 400\pi$ cm²
21. Look at the targets below and decide whether the situation is accurate, precise, both or neither. The accepted value is the bull’s eye.

a. Accurate?: Yes / No
Precise?: Yes / No

b. Accurate?: Yes / No
Precise?: Yes / No

c. Accurate?: Yes / No
Precise?: Yes / No

22. Three students made multiple weighing of a copper cylinder each using a different balance. Finish the table then describe the accuracy and precision of each student’s measurements if the correct mass of the cylinder is 47.32 g.

<table>
<thead>
<tr>
<th>Mass of Cylinder (g)</th>
<th>Lisa</th>
<th>Lamont</th>
<th>Jose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trial 1</td>
<td>47.13</td>
<td>47.45</td>
<td>47.95</td>
</tr>
<tr>
<td>Trial 2</td>
<td>47.94</td>
<td>47.39</td>
<td>47.91</td>
</tr>
<tr>
<td>Trial 3</td>
<td>46.83</td>
<td>47.42</td>
<td>47.89</td>
</tr>
<tr>
<td>Trial 4</td>
<td>47.47</td>
<td>47.41</td>
<td>47.93</td>
</tr>
<tr>
<td>Trial Average</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Precise (P), Accurate(A), neither (N), both(B)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Error</td>
<td></td>
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</tbody>
</table>

Significant figures worksheets

Density

23. A 5-mL sample of water has a mass of 5 g. What is the density of water?
24. An object with a mass of 5.70 g raises the level of water in a graduated cylinder from 25.1 mL to 30.1 mL. What are the volume and the density?
25. The density of aluminum is 2.7 g/mL. What is the volume of 1.8 g sample?

Dimensional Analysis

26. What is the name given to a ratio of two equivalent measurements?
27. What must be true for a ratio of two measurements to be a conversion factor?
28. How do you know which unit of a conversion factor must be in the denominator?
1. **Define and be able to identify examples of:**
   - A. Chemistry
   - B. Matter
   - C. Scientific method
   - D. Hypothesis
   - E. Observation
   - F. Scientific Law
   - G. Scientific Theory
   - H. Mass vs. weight
   - I. Precision
   - J. Accuracy
   - K. Density
   - L. SI Units
   - M. Significant Figures

2. **Know what occurred in each lab performed:**
   - A. Density Lab – Describe the graph that was created
   - B. Glassware activity – Explain how to figure out to what significant figure to read glassware

3. **Practice Questions for each chapter:**

   **Ch. 1**
   - Pg. 23
   - 1.
   - 2.

   **Ch. 2**
   - Pg. 50-53
   - 57.
   - 62.
   - 65.
   - 66.
   - 67.
   - 68.
   - 73.
   - 74.
   - 75.
   - 80. d-f
   - 82. a
   - 84.
   - 85. e-g
   - 87.
   - 90.
   - 104.
   - 1.

4. **Study all work and notes in the class.**