NATURE OF SCIENCE & MEASUREMENT REVIEW - Ch. 1 & 2

\*\*\*\*ALL ANSWERS MUST INCLUDE THE PROPER UNITS.\*\*\*\*

IDENTIFY EACH AS PURE OR APPLIED SCIENCE:

1. Invention of glow sticks. \_\_\_\_\_\_\_\_
2. Study of optics (the behavior of light). \_\_\_\_\_\_\_\_
3. Investigation of chemiluminescence (light-producing reactions). \_\_\_\_\_\_\_\_
4. Telescope design. \_\_\_\_\_\_\_\_

ANSWER THE FOLLOWING QUESTIONS ABOUT THE EXPERIMENT BELOW:

Have you seen the video of the coke that explodes when Mentos is placed inside it? Dequan saw the video on line and thought that he could make the explosion larger by adding more Mentos. Dequan set up 3 bottles of Coca-Cola, all at the same temperature, and placed one mentos in the first, two in the second, and three in the third.

What is Dequan’s hypothesis? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is Dequan’s independent variable? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is Dequan’s dependent variable? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What are some constants in this experiment? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What do you think will be the results of this experiment?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

ANSWER THE FOLLOWING QUESTIONS ABOUT THE EXPERIMENT BELOW:

You are studying the effect of different drinks on tooth enamel. In your experiment, you place pieces of chalk in different drinks are record the time it takes for the chalk to completely dissolve.

1. Identify the dependent variable. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Identify the independent variable. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. List at least two constants that should be included in the design of this experiment.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

SOLVE THE FOLLOWING DENSITY PROBLEMS:

1. Limestone has a density of 2.72 g/cm3. What is the mass of 24.9 cm3 of limestone?
2. What is the volume of a tank that holds 595 g of methanol if the density of methanol is 0.788 g/cm3?
3. A sample of platinum has a mass of 16.1 g and a volume of 0.75 cm3. What is the density of platinum?
4. Helium has a density of 0.017 g/L. What is the volume of a weather balloon that contains 37.4 g of helium?

PERFORM THE FOLLOWING SI PREFIX CONVERSIONS:

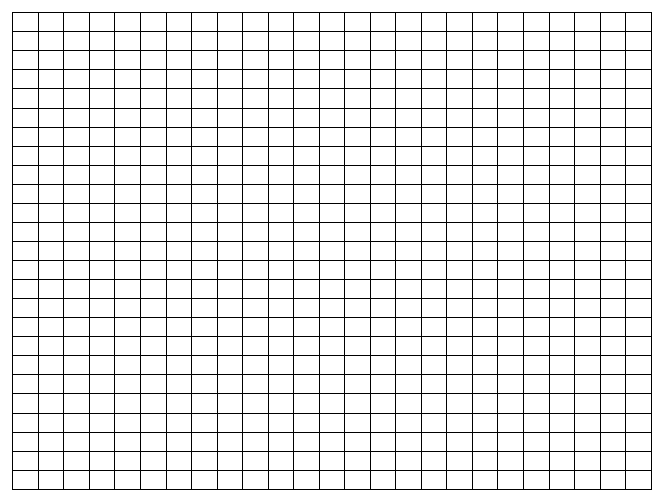
|  |  |
| --- | --- |
| 1. 84 g = mg 2. 177 mL = L 3. 56 m = cm 4. 0.093 kg = mg | 1. 75 mm = dm 2. 56,000 μm = cm 3. 4.5 mg = ng 4. 87.5 cm = mm |

Create a graph of the following data. Be sure to correctly label the axes.

In 2000, a law was passed against the use of cell phones while driving in Anytown, N.Y. The number of people who use cell phones while driving in Anytown has changed each year since then as shown in the table below. Construct a line graph to visually display this data.

Cell phone use while driving in Anytown, NY

|  |  |
| --- | --- |
| Year | Number of people |
| 2000 | 309 |
| 2001 | 274 |
| 2002 | 256 |
| 2003 | 238 |
| 2004 | 197 |
| 2005 | 203 |
| 2006 | 195 |
| 2007 | 192 |

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ANSWER SHEET

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|  |  |
| --- | --- |
| 1. applied 2. pure 3. pure 4. applied   If more Mentos were added, then the explosion would be larger.  independent: # of Mentos  dependent: height of explosion  Constants: type of coke, volume of coke, temperature, pressure  Your thoughts…   1. time it takes to dissolve chalk 2. type of drink 3. brand/color of chalk (same box) amount of chalk amount of drink temperature and other environmental factors (perform in same place at the same time) 4. 67.7 g 5. 755 cm3 6. 21.5 g/cm3 | 1. 2,200 L 2. 84,000 mg 3. 0.177 L 4. 5,600 cm 5. 93,000 mg 6. 0.75 dm 7. 5.6 cm 8. 4,500,000 ng 9. 875 mm   Graph:  Year on x axis (with divisions of 1 year)  Number of people on y axis (with divisions of 20, 25, or 50) |

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| --- | --- |
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