SHOW ALL YOUR WORK! NO NAKED NUMBERS! **3** SIGNIFICANT FIGURES!

1. What is an independent variable and on what axis is it located?
2. What is a dependent variable and on what axis is it located?
3. What is the difference between a control and a constant?

Record the number of sig figs for the following:

1. 0.003
2. 1.003
3. 8000000
4. 6.13 E25
5. 3200400
6. 9005
7. 0.070000
8. 4.00 E12

Convert to scientific notation

1. 234500
2. 2
3. 560
4. 0.0000000837

A student finds the densities of silver, gold and nickel. Use the table below to find the accepted values and determine the student’s percent error for each.

PROPERTIES OF ELEMENTS

|  |  |  |  |
| --- | --- | --- | --- |
|  | Enthalpy of Fusion | Density (g/cm3) | Atomic Number |
| Gold | 12.4 | 19.32 | 79 |
| Silver | 11.65 | 10.49 | 47 |
| Nickel | 17.15 | 8.908 | 28 |

1. Silver: 11.0 g/mL
2. Gold: 19.5 g/mL

1. An object with a mass of 34.02 g raises the level of water in a graduated cylinder from 50 mL to 53 mL. What is the density of the object? Hint: D = m/v

Calculate the following and round the answers to 3 significant figures

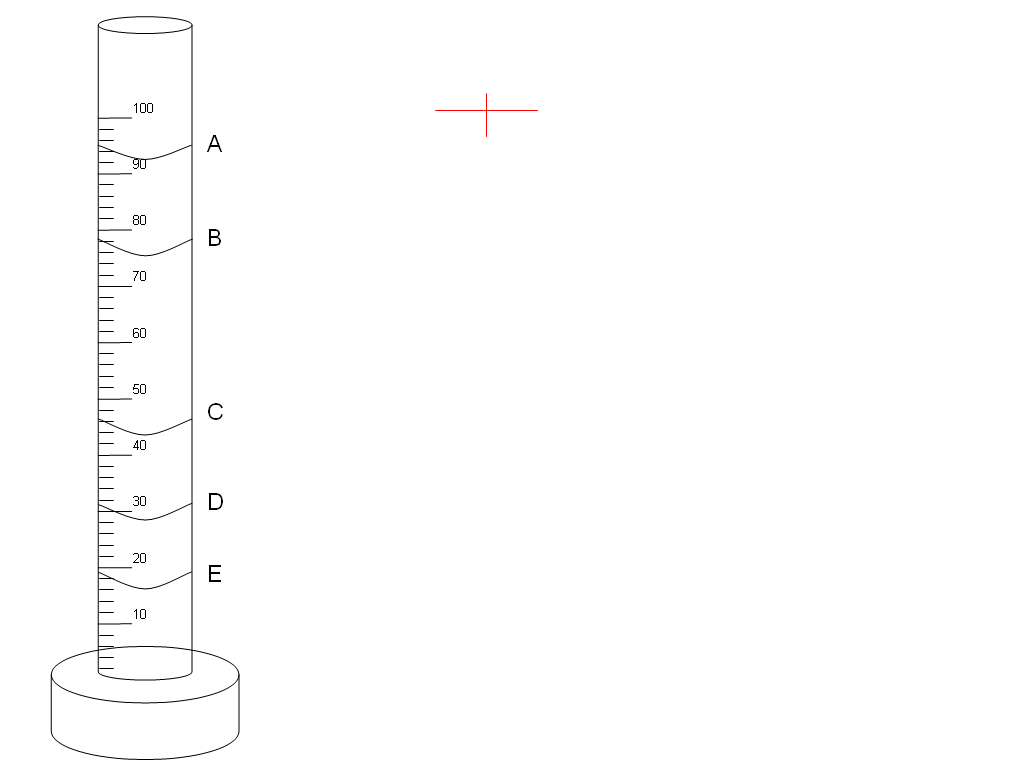
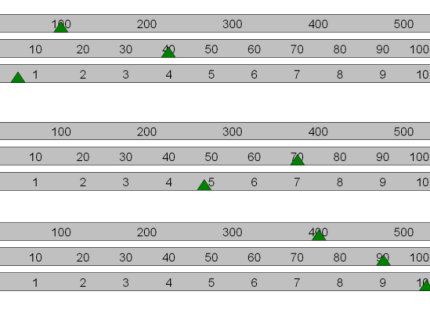
1. 4.0 x 10ˉ¹ kg + 6.2 x 10ˉ¹ kg
2. 4.0 x 103 kg - 6.2 x 104 kg­­­
3. (2.0 x 10² kg) x (4.0 x10³ kg)
4. (9.0 E² g) ÷ (3.0 E-³ g)

Three different students measured the volume of a golf ball by water displacement. Their results are shown in the table below. After recording their results, their teacher told them the ball had a volume of 18.6 ml.

|  |  |  |  |
| --- | --- | --- | --- |
|  | student 1 | student 2 | student 3 |
| Trial 1 | 18.7 ml | 18.0 ml | 18.9 ml |
| Trial 2 | 18.5 ml | 18.9 ml | 19.0 ml |
| Trial 3 | 18.7 ml | 19.1 ml | 19.0 ml |

1. Which student is most accurate? Why? Which is most precise? Why?

Convert the following:

1. 0.75 mg to grams
2. 2.369 E-2 kg to g
3. 5555 km to m
4. 0.000000025 megameters to cm
5. 45.6 x 106 microliters to megaliters
6. Write the correct metric base unit AND the instrument we use to measure the following:
   1. length
   2. mass
   3. temperature
   4. volume
   5. Density
7. How many centimeters are in a meter?
8. How many meters are in a kilometer?
9. How many millimeters are in a meter?
10. What is mass?
11. What is volume?
12. List what the most appropriate units when measuring the following.
    1. Length of a pencil
    2. Volume of a barrel of oil
    3. Surface area of a piece of paper
    4. Distance to the sun
    5. Mass of a car
13. What unit does each of the smallest black lines on the meter stick represent?
14. What is a meniscus?
15. What unit does each of the small numbered lines on the meter stick represent?
16. Each line on a graduated cylinder shown to the left equals?
17. Unit for time
18. Unit for distance
19. Unit for velocity
20. Unit for acceleration
21. What acceleration do you use for falling objects?

For each of the following record the correct value the instrument is displaying. As always three sig figs and accuracy will be graded.

1. Record the correct volume for the lines to the left.
2. Record the correct mass for the balance to the right

Directions: For each of the following scenarios construct a distance/time graph and a velocity/time graph. Be sure to label your axis.

1. A person walking away from the sensor slowly.
2. A person walking toward the sensor slowly.
3. A person walking away from the sensor quickly for 5 seconds then stopping.
4. A person walking toward the sensor quickly for 5 seconds then stopping.
5. A person running away the from the sensor stopping for 2 seconds and then slowly walking away from the sensor.
6. A person stands still for 2 seconds, then they walk slowly away from the sensor, then quickly turns around and runs toward the sensor.

Calculate the following

1. A blue-footed booby travels 1250 meters South in 32400 seconds.

(a)What is its velocity in m/s?

(b)What is its velocity in km/hr?

1. (a)How many seconds will it take a cannonball traveling 350 m/s to travel 150 meters?

(b) What is its speed in km/hr?

1. (a) How far will a runner with a speed of 18000 m/hr travel in 0.35 hours?

(b) How far will he travel in 14400 seconds if he maintains this speed? Hint: make sure time units are the same.

1. A dik-dik (small antelope) traveling 40 m/s accelerates to 55m/s in 3 seconds as it passes a hungry lion. (a) What is the magnitude of the dik-dik’s acceleration?
2. If a rabid chicken goes from a dead stop to 25m/s in 5 seconds, what is its acceleration?
3. How far will a three legged dingo run in 6 seconds if it has an acceleration of 3m/s/s?
4. A rock is dropped off a tall building and hits the ground 5 seconds later.
   1. How tall is the building?
   2. How fast is the rock going when it hits the ground?
5. How fast will a rock be moving when it hits the ground if it is dropped off a building 50m tall? Hint: find time first

A car travels 4 km east in 5 minutes turns south and travels 5 km in 9 min. then turns back east for 10 min.

1. Find the velocity during first leg
2. Find velocity during the second leg
3. Use the velocity in 66 to find distance in third leg.
4. Find the total distance traveled.
5. Find the average velocity for the entire trip. Convert this to km/hr.
6. Draw diagram of route
7. Find the displacement.

You are standing at the edge of a cliff and you throw a baseball straight up in the air at a velocity of 40 m/s. Where will the ball be after 8 seconds? Prove with diagram.

1. List and define Newton’s 3 laws
2. Which object has more inertia – a bowling ball or a tennis ball? Explain.
3. How does inertia influence your ability to roll a bowling ball versus a tennis ball? Explain.
4. Use Newton’s First Law of Motion and the concept of inertia to explain what happens to a person in a head-on car accident who is not wearing a seat belt. How does wearing a seat belt help?
5. If your net force equals zero what does that mean?
6. In what situations will you not have a normal force?
7. In what situations will you have a tension force?
8. In what situation will you not have a force of weight?
9. Arnold Schwarzenegger is moving out of his California mansion. He pushes a box of books on the floor with a force of 50 N to the right. The frictional force of the floor opposes his push with a force of 30 N.
   1. Draw in the forces. Use the scale **1 cm = 10 N of force**
   2. Are the forces balanced or unbalanced? \_\_\_\_\_\_\_\_\_\_\_\_\_
   3. Will the box accelerate? \_\_\_\_\_\_\_\_\_\_ If so, in which direction? \_\_\_\_\_\_\_\_\_\_
10. Nemo is trying to swim up stream to be found… again. He pushes forward with a force of 2 N. The stream pushes back on him with a force of 2 N.
    1. Draw in the forces using the scale **1 cm = 1 N of force**.
    2. Are the forces balanced or unbalanced? \_\_\_\_\_\_\_\_\_\_\_\_
    3. Will he accelerate? \_\_\_\_\_\_\_\_\_\_\_\_\_\_ If so, in which direction? \_\_\_\_\_\_\_\_\_\_
11. James Bond has a weight of 1700 N. He skydives out of a plane to evade the nuclear bombs heading for his airplane. The air resistance pushes back on him with a force of 700 N.
    1. Draw a diagram of the situation using the scale **1 cm = 10 N of force**.
    2. Is there a net force on James? ­\_\_\_\_\_ If so, label it on your diagram.
    3. Will he accelerate? \_\_\_\_\_\_\_\_\_\_\_\_\_\_ If so, in which direction? \_\_\_\_\_\_\_\_\_\_