Name: __Answer Key_____   Date: _____   Period: _____
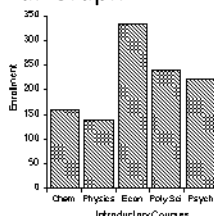
Physical Science 1st semester Final Exam Review
Unit 1 (Science Skills) and Unit 2 (Motion and Forces)

1. Sketch an example of each of the following graphs:
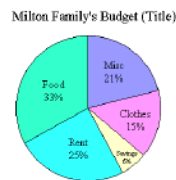   a. Bar Graph   b. Line Graph   c. Circle Graph

2. What are the basic steps of the scientific method?
   Ask a question, Make an observation, Develop a hypothesis, Test Hypothesis, Record Data, Analyze Results, and Draw Conclusion

3. What happens when the data in an experiment does not support the hypothesis?
   The researcher must go back, revise the hypothesis, and test the hypothesis with an experiment again.

4. Define scientific law: **a statement that summarizes a pattern found in nature**

5. Define scientific theory: **a well-tested explanation for a set of observations or experimental results**

6. Define model: **a representation of an object or event**

7. Scientific Notation Practice:
   a. Write the following in scientific notation
      A. 0.00567 **5.67 x 10^{-3}**   B. 520000 **5.2 x 10^5**   C. 0.0008976 **8.976 x 10^{-4}**
      D. 98700 **9.87 x 10^4**   E. 0.04681 **4.681 x 10^{-2}**
   b. Write the following in standard notation
      A. 6.5 x 10^{-4} **.00065**   B. 7.23 x 10^4 **72300**   C. 6.42 x 10^{-6} **.00000642**
      D. 1.2300 x 10^4 **12300**   E. 4.58 x 10^{-8} **.0000000458**

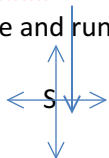8. Metric Practice: *Convert the following items.*   K H Da <u>B</u> D C M
   a. 4.2 cm = _____**42**_____ mm   d. 725 mm = __**.725**_____m
   b. 520 L = _____**5.20**_____ hL   e. 25 cm = ____**.0025**_____hm
   c. 0.000523 Kg = _**52.3**_____ ___cg   f. 0.0045 dag = __**0.045**_____ g

9. Displacement
   a. Define displacement: **the straight-line distance from the start point to the end point.**
   b. A toy car is rolled uphill 2 meters before it slows, stops, and begins to roll back down the hill. It rolls for 6 meters before stopping. What is the car's displacement?   **2 m uphill**   **6 m downhill**
      6m – 2m = 4 m downhill
   c. You leave your house and run 5 km north, 3 km west, 8 km south, and 3 km east. What is your total displacement? W   E   8 km south – 5 km north = 3 km South
      S   3 km east – 3 km west = 0 km   So the total displacement is **3 km South**.

10. What does the slope of the line on a distance time graph show? **speed**

11. What does the slope of the line on a speed time graph show? **acceleration**

12. A horizontal line on a distance-time graph shows an object is **not moving**.

13. An upward sloping line on a distance-time graph shows an object is **speeding up**.

14. A downward sloping line on a distance-time graph shows an object is **slowing down**.

15. Speed and acceleration: *Show your work for all calculations.*
    a. What is the speed of a runner who travels 75 m in 5 s? v = d/t → 75m/5s = **15 m/s**
    b. How long does it take a car going 14 m/s to travel 125 m? t = d/v → 125m/14m/s = **8.93s**
    c. What is the acceleration if it takes 4 seconds to increase your speed from 2 m/s to 6 m/s?
       a = (vf – vi)/t → (6m/s-2m/s)/4s = **1m/s^2**
       An object traveling at 80 m/s takes 15 s to come to a stop, what is its acceleration?
       a = (vf – vi)/t → (0m/s-80m/s)/15s = **-5.33m/s^2**
    d. What are the three ways that an object can accelerate?
       By increasing speed, decreasing speed, and/or changing direction

16. What happens when an unbalanced force acts on an object? **The object moves or changes position**
17. What is the SI unit of force? **Newton (N)**
18. Friction (define and give an example of each):
    a. Static- **a friction force that acts on objects that are not moving (i.e. a book sitting on a desk).**
    b. Sliding – **a friction force that opposes the motion of an object as it slides over a surface (i.e. a lunch tray sliding across a table).**
    c. Rolling – **a friction force that acts on rolling objects, caused by the change in shape at the point of rolling contact (i.e. a skate board's wheels while traveling on the sidewalk).**
    d. Fluid – **a friction force that opposes the motion of an object through a fluid (i.e. a skydiver falling through the air).**
19. What forces act on falling objects? **Gravity/Air resistance**
20. What forces act on objects that are NOT moving? **Balanced forces**
21. Newtons Laws
    a. Describe Newton's 1st law- **AKA "the Law of Inertia"; an object at rest tends to remain at rest and an object in motion remains in motion unless acted upon by a net force.**
    b. Describe Newton's 2nd law - **The relationship between an object's mass (m), its acceleration (a), and the applied force (F) is $F = ma$.**
    c. Describe Newton's 3rd law - **For every action there is an equal and opposite reaction.**
22. Compare the weight of the same object on the earth, moon, and Jupiter.
    Weight on the moon   less than   Weight on earth   >   Weight on Jupiter
    This is due to the fact that gravity on the moon is less than gravity on earth because earth is bigger than the moon, and gravity on earth is less than gravity on Jupiter because Jupiter is bigger than earth.
23. What is the acceleration of an object with a 14 kg mass and a 14 N force acting on it? (Show work)
    F= m*a → so a = F/m → 14N/ 14kg = **1m/s^2**