# CBA #2 Study Guide

Chemical Formulas, Equations, and Reactions

1. List the 5 signs a chemical reaction has occurred.

2. Which of the following chemical equations shows the total mass staying the same during a chemical reaction?
   a) $2Na + 2H_2O \rightarrow NaOH + H_2$
   b) $NaOH + MgCl_2 \rightarrow NaCl + MgOH$
   c) $H_2 + O_2 \rightarrow H_2O$
   d) $Mg + Cl_2 \rightarrow MgCl_2$

3. What type of change occurs when water boils into steam?

4. The formula for iron oxide is **Fe_3O_4**.
   Draw a model compound for iron oxide.

5. How many different types of elements are in iron oxide above?

6. How many total atoms are in iron oxide?

7. How many Nitrogen (N) atoms are found in the following substance?
$$(NH_4)_2CO_3$$

8. Calculate the density of the object using the information below.
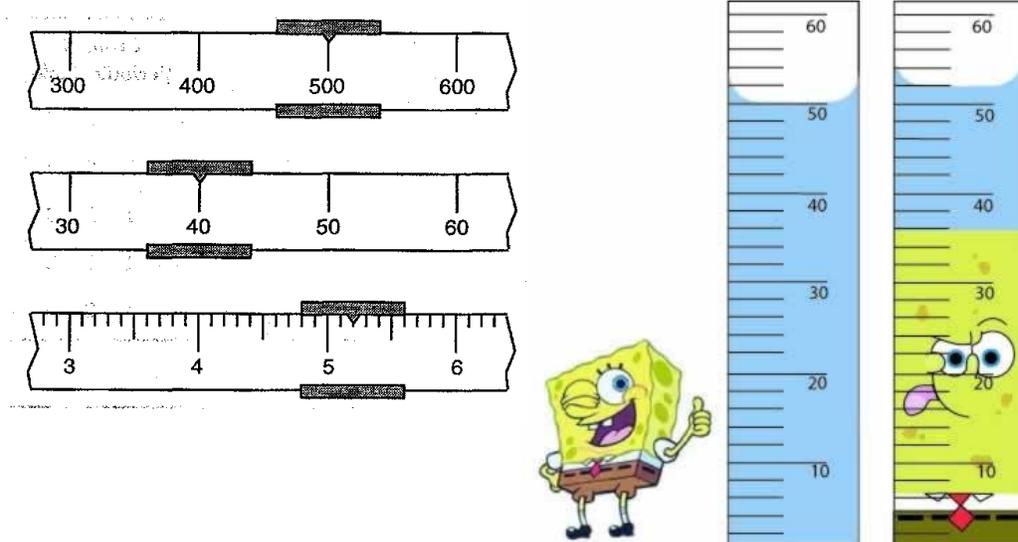
Force and Motion
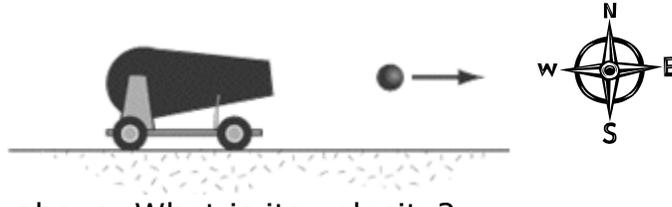
9. A canon is shot at 20 m/s above. What is its velocity?

10.   A marble rolls across tile on to sandpaper. Which surface would require you to apply more force to accelerate the marble?

11. What effect does friction have on objects?

12. When an object falling from an airplane is moving at a constant speed, what kind of forces are acting on the object?

Use the following graph to answer questions 13 & 14 .
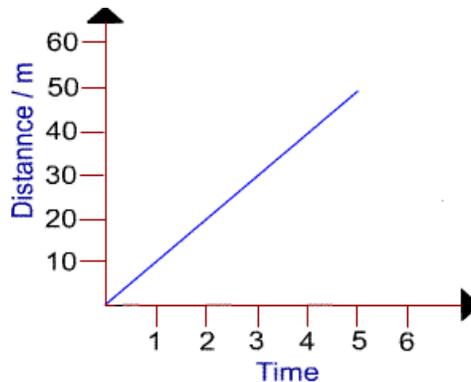
13. What does the slope of the graph above represent?

14. What is the speed of the object?
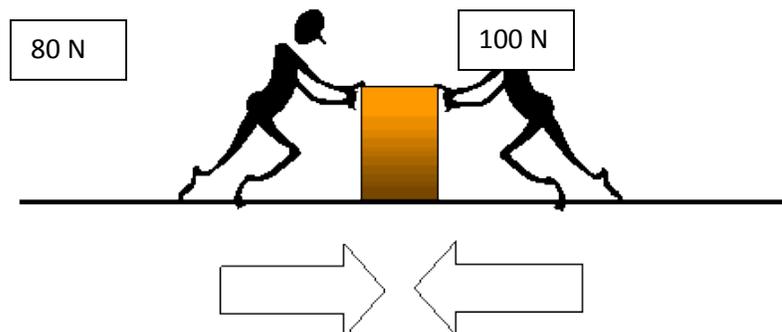
15. What is the overall net force from the example above?

16. An ice-skater travels at a constant speed of 8 km/ hr around the ice rink. Does her velocity change? Explain.

Newton's Laws of Motion

17. If a person is pushing a box 50 N to the right and a friend starts pushing with a force of 50 N in the opposite direction, what happens to the box?

18. What does Newton's law of inertia state?

19. Describe the forces occurring when a student does a push-up.

20. What is the relationship between the rate of acceleration and the mass of the object?

21. Using the following formula, F=ma, Calculate the acceleration for the following scenarios.
   a. 50N force is applied to a 10 kg ball.

   b. 50N force is applied to a 5kg ball.

   c. 25N force is applied to a 10 kg ball.

   d. 25N force is applied to a 5 kg ball.

22. Calculate the force for the following situations using the formula, F=ma.
   a. An object with a mass of 10 kg accelerates at 20 m/s^2

   b. An object with a mass of 5kg accelerates at 100 m/s^2

   c. An object with a mass of 2 kg accelerates at 50 m/s^2

23. When you are in a car and the car brakes quickly, you continue move forward. Which law does this describe? Explain why you move forward.