

## CBA #2 Study Guide

### Chemical Formulas, Equations, and Reactions

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

Color change, gas production (bubbles, foaming, fizzing, odor), Light or sound produced, temperature change, precipitate formation. NEW SUBSTANCE IS FORMED.

2. Which of the following chemical equations shows the total mass staying the same during a chemical reaction?

- a)  $2\text{Na} + 2\text{H}_2\text{O} \rightarrow \text{NaOH} + \text{H}_2$
- b)  $\text{NaOH} + \text{MgCl}_2 \rightarrow \text{NaCl} + \text{MgOH}$
- c)  $\text{H}_2 + \text{O}_2 \rightarrow \text{H}_2\text{O}$
- d)  $\text{Mg} + \text{Cl}_2 \rightarrow \text{MgCl}_2$

D.

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

Physical Change

4. The formula for iron oxide is **Fe<sub>3</sub>O<sub>4</sub>**.  
Draw a model compound for iron oxide.

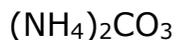
5. How many different types of elements are in iron oxide above?

2 elements

6. How many total atoms are in iron oxide?

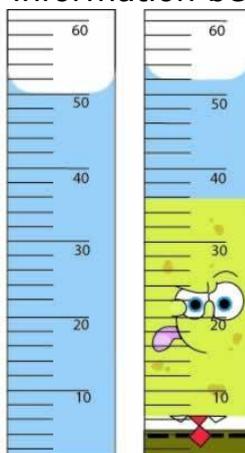
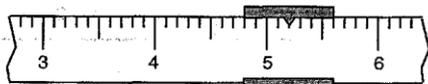
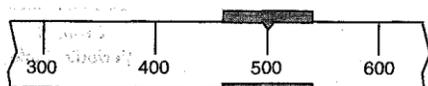
7 atoms

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



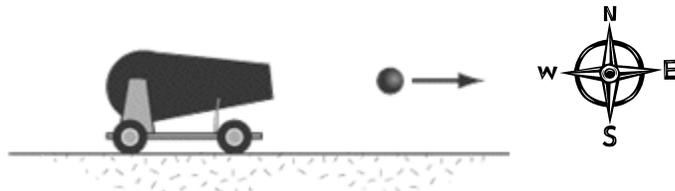
2

8. Calculate the density of the object using the information below.



272.6 g/ml

## Force and Motion



9. A canon is shot at 20 m/s above. What is its velocity?

20 m/s east

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

Sandpaper requires more applied force to move an object.

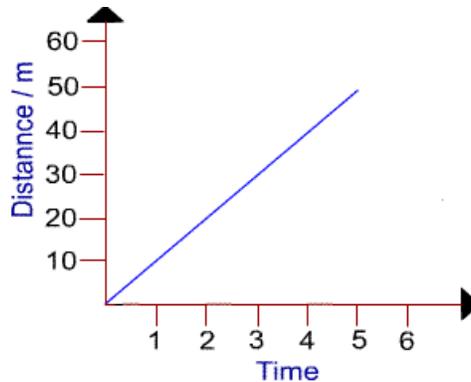
10. What effect does friction have on objects?

The force of friction works against the inertia of an object.

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

Balanced forces. Air resistance  $\uparrow$  = gravity  $\downarrow$

Use the following graph to answer questions 12 & 13 .

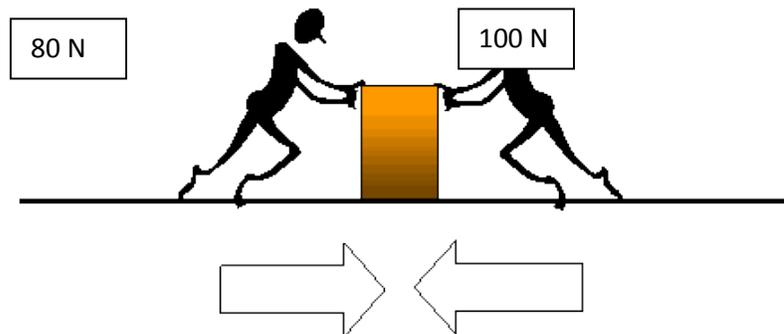


12. What does the slope of the graph above represent?

Speed

13. What is the speed of the object?

10 m/s



14. What is the overall net force from the example above?

20N left

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

Direction is constantly changing.

### Newton's Laws of Motion

16. 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?

The box will come to a stop.

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

An object at rest stays at rest, an object in motion stays in motion going the same speed and direction unless acted on by an unbalanced force.

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

The student exerts a force down to the ground, the ground exerts an equal and opposite force on the student.

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

The more mass an object has, the less acceleration will occur.

20. Using the following formula,  $F=ma$ , Calculate the acceleration for the following scenarios.

a. 50N force is applied to a 10 kg ball.

5 m/s<sup>2</sup>

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

10 m/s<sup>2</sup>

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

2.5 m/s<sup>2</sup>

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

5 m/s<sup>2</sup>

21. 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<sup>2</sup>

200N

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

500N

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

100N

22. 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.

Newton's law of inertia states an object in motion will continue to move in the same direction and speed unless acted on by an unbalanced force.