Name _____ Date _____ Class _____

SECTION 2-2 SECTION SUMMARY

Force, Mass, and Acceleration

Guide for Reading

- **How are force and mass related to acceleration?**

2

Newton's second law of motion explains how force, mass, and acceleration are related. **The net force on an object is equal to the product of its acceleration and its mass.** The relation among force, mass, and acceleration can be written in one equation.

$$\text{Force} = \text{Mass} \times \text{Acceleration}$$

People often refer to this equation itself as Newton's second law of motion.

When acceleration is measured in meters per second per second (m/s^2) and mass is measured in kilograms, force is measured in kilogram $\times$ meters per second per second ($kg \cdot m/s^2$). This unit is called the **newton** (N), in honor of Isaac Newton. One newton equals the force required to accelerate one kilogram of mass at 1 meter per second per second ($1\ m/s^2$).

$$1\ \text{N} = 1\ \text{kg} \times 1\ \frac{\text{m}}{\text{s}^2}$$

Sometimes you may want to write the same relationship among acceleration, force, and mass in a different form.

$$\text{Acceleration} = \frac{\text{Force}}{\text{Mass}}$$

In the above equation, you can see that the value for acceleration will increase if the value for force increases. Acceleration and force change in the same way—both get larger. The equation also means that the value for acceleration also will increase if the value for mass decreases. Acceleration and mass change in opposite ways.

© Prentice-Hall, Inc.

Name _____ Date _____ Class _____

SECTION 2-2 REVIEW AND REINFORCE

Force, Mass, and Acceleration

◆ Understanding Main Ideas

Answer the following question in the space provided.

1. Newton's second law of motion describes the relationship of force, mass, and acceleration. Write the equation.

_____

Write the letter of the correct answer on the line at the left.

_____ **2.** If you increase the force on an object, its acceleration
a. decreases. **b.** stays the same.
c. also increases. **d.** stops.

_____ **3.** If you increase the mass on an object, its acceleration
a. decreases. **b.** stays the same.
c. also increases. **d.** stops.

_____ **4.** How much force is needed to accelerate a 3 kg skateboard at 5 m/s^2?
a. 8 N **b.** 0.6 N
c. 1.6 N **d.** 15 N

_____ **5.** How much force is needed to accelerate a 25 kg bowling ball at 2 m/s^2?
a. 5 N **b.** 12.5 N
c. 50 N **d.** 100 N

_____ **6.** If a 2 kg bird is pushed by the wind with a force of 2 N, how fast does the bird accelerate?
a. 1 m/s^2 **b.** 2 m/s^2
c. 4 m/s^2 **d.** 1 m

◆ Building Vocabulary Skills

Answer the following question in the space provided.

7. What is the newton used for measuring?

_____

Fill in the blank with the correct units.

8. 1 N = 1 kg × 1 _____

© Prentice-Hall, Inc.