Name: _____

Date: _____

Critical Reading

Read this passage from the text and answer the questions that follow.

Acceleration and Weight

Newton's second law of motion explains the weight of objects. Weight is a measure of the force of gravity pulling on an object of a given mass. It's the force (F) in the acceleration equation that was introduced above:

$$a = Fm$$

This equation can also be written as:

$$F = m \times a$$

The acceleration due to gravity of an object equals 9.8 m/s^2, so if you know the mass of an object, you can calculate its weight as:

$$F = m \times 9.8 \ m/s^2$$

As this equation shows, weight is directly related to mass. As an object's mass increases, so does its weight. For example, if mass doubles, weight doubles as well.

Questions

1. Define weight.

2. How is the weight of an object related to its mass?

3. If an object has a mass of 50 kg, what is its weight?

Multiple Choice

Circle the letter of the correct choice.

1. An object is accelerating when it
    1. speeds up.
    2. slows down.
    3. changes direction.
    4. any of the above

2. Newton's second law of motion relates an object's acceleration to
    1. its mass.
    2. its velocity.
    3. the net force acting on it.
    4. two of the above

3. Doubling the net force acting on an object
    1. doubles its acceleration.
    2. decreases it acceleration.
    3. cuts its acceleration in half.
    4. does not affect its acceleration.

4. If you push a 20-kilogram mass with a force of 40 N, what will be the object's acceleration?
    1. 40 m/s$_2$
    2. 20 m/s$_2$
    3. 10 m/s$_2$
    4. 2 m/s$_2$

5. Which units can be used to express force?
    1. N
    2. kg/s$_2$
    3. kg • m/s$_2$
    4. two of the above

6. If you know the mass of an object, you can calculate its weight with the formula
    1. $F = m \times 9.8$ m
    2. $F = m \times 9.8$ m/s
    3. $F = m \times 9.8$ m/s$_2$
    4. $F = m \times 0.98$ m/s$_2$

Newtons 2nd Law of Motion Review

Name: _____

Date: _____

Matching

Match each definition with the correct term.

Definitions

_____ 1. acceleration due to gravity

_____ 2. formula for weight

_____ 3. formula for acceleration

_____ 4. measure of the force of gravity pulling on an object

_____ 5. type of relationship between acceleration and mass

_____ 6. measure of the change in velocity of a moving object

_____ 7. type of relationship between acceleration and force

Terms

a. acceleration

b. weight

c. direct relationship

d. a=Fm

e. inverse relationship

f. F=m×a

g. 9.8 m/s$_2$

Fill in the Blank

Fill in the blank with the appropriate term.

1._____ occurs whenever an object is acted upon by an unbalanced force.

2.The acceleration of an object is determined by the net force acting on the object and the object's _____.

3.Newton's second law of motion shows that there is a direct relationship between acceleration and _____.

4.One newton is the force needed to cause a 1-kilogram mass to accelerate at _____.

5.There is a(n) _____ relationship between an object's weight and its mass.

6.To calculate weight from acceleration and mass, mass must be expressed in _____.

7.An object's acceleration is zero when the net force acting on the object is _____.