Name _____ Class _____ Date _____

Exercises

2.1 Force (pages 13–14)

1. A force is a push or a pull.
2. A force is needed to change the state of motion of an object.
3. Is the following sentence true or false? If an object is sliding on ice, it will continue sliding until a force slows it down. true
4. Define net force.
   the combination of all forces acting on an object

Match the applied forces on an object with the letter of the corresponding net force on the object.

	Applied Forces	Net Force
d	5. 5 N to the right and 5 N to the left	a. 2 N to the left
a	6. 4 N to the right and 6 N to the left	b. 2 N to the right
b	7. 7 N to the right and 5 N to the left	c. 10 N to the right
c	8. 6 N to the right and 4 N to the right	d. 0 N (no change in motion)

9. Describe the forces that act on a rock at rest in your hand.
   Your hand pushes upward on the rock with as much force as Earth's gravity pulls down on it.
10. Circle the letter that identifies the force acting upward on an object suspended from a spring scale.
    a. gravity b. equilibrium
    (c.) tension d. weight
11. A vector is an arrow that represents the magnitude and direction of a quantity.
12. Explain the difference between a vector quantity and a scalar quantity.
    A vector quantity is a quantity that describes both magnitude and direction. A scalar quantity can be described by magnitude only and has no direction.
13. Write *V* beside each vector quantity. Write *S* beside each scalar quantity.
    S a. time S b. area
    V c. force S d. volume

2.2 Mechanical Equilibrium (page 16)

14. Express the equilibrium rule in words.

Whenever the net force on an object is zero, the object is said to be in mechanical equilibrium.

15. Express the equilibrium rule mathematically, and explain what the symbol in the rule means.

$\Sigma F = 0$; the symbol Σ means "the sum of."

16. Circle the letter that describes the forces acting on a suspended object at rest.

a. The forces acting upward on the object are greater than the forces acting downward on the object.

b. The forces acting upward on the object are less than the forces acting downward on the object.

(c.) The forces acting upward and downward on the object are balanced.

d. No forces are acting on the object.

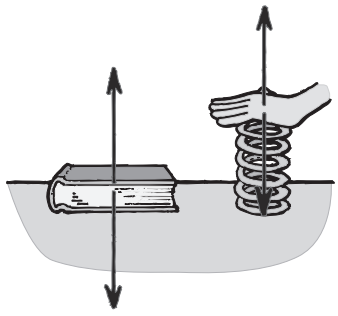
2.3 Support Force (page 17)

17. Identify the two forces acting on a book at rest on a table. State the direction of each force.

a. The weight of the book due to gravity acts downward.

b. The support force provided by the table acts upward on the book.

18. The _____support_____ force is the upward force that balances the weight of an object on a surface. Another name for this force is the _____normal_____ force.



19. Look at the drawing above. Explain how the force of the table pushing up on the book is similar to what happens when the spring is compressed.

When the spring is compressed, it pushes upward on your hand. Similarly, the book sitting on the table compresses the atoms of the table. The atoms then push upward on the book.

20. Circle the letter that describes an object at rest on a horizontal surface.

a. The support force is equal to the object's weight.
b. The support force is greater than the object's weight.
c. The support force is less than the object's weight.

2.4 Equilibrium for Moving Objects (pages 18–19)

21. If an object is moving at a ___constant___ speed in a ___straight-line___ path, it is in a state of equilibrium.

22. Is the following sentence true or false? If a desk is pushed at a constant speed across a horizontal floor, the force of friction must be equal in magnitude and opposite in direction to the pushing force on the desk. ___True___

23. Objects at rest are said to be in ___static___ equilibrium.

24. Objects moving at constant speed in a straight-line path are said to be in ___dynamic___ equilibrium.

2.5 Vectors (pages 19–22)

25. Suppose a gymnast with a weight of 300 N is suspended by a single vertical rope. What is the tension in the rope? ___300 N___

26. Now suppose the same gymnast hangs from two vertical ropes. What are the tensions in the ropes? ___150 N in each rope___

27. Define resultant. ___the sum of two or more vectors___

28. State the parallelogram rule.

___To find the resultant of two vectors, construct a parallelogram wherein the two vectors are adjacent sides. The diagonal of the parallelogram shows the resultant.___

29. The gymnast shown below is suspended from two non-vertical ropes. The solid vector represents the gymnast's weight. What does the dashed vector represent? ___the resultant of the tensions in both ropes___