

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

## Chapter 2 Mechanical Equilibrium

### Summary

**THE BIG IDEA** : An object in mechanical equilibrium is stable, without changes in motion.

#### 2.1 Force

- ✓ A force is needed to change an object's state of motion.
- A force is a push or a pull. A force is always required to change an object's state of motion.
- The combination of all forces acting on an object is called the **net force**. The net force on an object changes its motion.
- When you hold a rock at rest in your hand, you are pushing upward on it with as much force as Earth's gravity pulls down on it. The net force on the rock is zero.
- The scientific unit of force is the newton, abbreviated N.
- Tension is a "stretching force."
- Weight is the force of gravity acting downward on an object.
- A **vector** is an arrow that represents the magnitude and direction of a quantity. A **vector quantity** is a quantity that needs both magnitude and direction for a complete description. Force is an example of a vector quantity.
- A **scalar quantity** is a quantity that can be described by magnitude only and has no direction. Time, area, and volume are scalar quantities.

Chapter 2 Mechanical Equilibrium

**Exercises**

**2.1 Force (pages 13–14)**

1. A force is a \_\_\_\_\_ or a \_\_\_\_\_.
2. A force is needed to change the state of \_\_\_\_\_ 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. \_\_\_\_\_
4. Define net force.

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

Applied Forces	Net Force
_____ 5. 5 N to the right and 5 N to the left	a. 2 N to the left
_____ 6. 4 N to the right and 6 N to the left	b. 2 N to the right
_____ 7. 7 N to the right and 5 N to the left	c. 10 N to the right
_____ 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.

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10. Circle the letter that identifies the force acting upward on an object suspended from a spring scale.

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|------------|----------------|
| a. gravity | b. equilibrium |
| c. tension | d. weight      |

11. A \_\_\_\_\_ is an arrow that represents the magnitude and direction of a quantity.

12. Explain the difference between a vector quantity and a scalar quantity.

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13. Write *V* beside each vector quantity. Write *S* beside each scalar quantity.

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|----------------|-----------------|
| _____ a. time  | _____ b. area   |
| _____ c. force | _____ d. volume |