13. Which of the following does **NOT** change the direction of a force?
   A. inclined plane
   B. pulley
   C. wedge
   D. wheel-and-axle

14. **MAIN IDEA AND DETAILS** Which detail about an ax lets you know that it is a wedge?
   F. It has just one inclined plane.
   G. It changes the way work is done.
   H. It has two inclined planes.
   J. It changes the direction of the force applied.

15. Which simple machine could you use to hold two objects together?
   A. lever
   B. pulley
   C. screw
   D. wheel-and-axle

16. Which kind of simple machine is the wheelchair resting on?
   F. inclined plane
   G. lever
   H. pulley
   J. screw



Inquiry Skills

17. Think about a spiral staircase. Which simple machine can you **compare** it to? Explain.

18. This table shows the force needed to lift a heavy box 1 meter by using four different methods. What conclusions can you draw about the distance the box traveled by **interpreting the data**?

Method Used	Force Needed
Lever	200 newtons
Inclined plane	300 newtons
Pulley	500 newtons
Lifting straight up	500 newtons

Critical Thinking

19. Tamyra and Marv are loading boxes onto identical trucks. Tamyra slides the boxes up a ramp that is 1 meter long. Marv uses a ramp that is 2 meters long. Who uses more force? Explain.

The Big Idea

20. You have to put a 20-kilogram box on a shelf. You can lift it 1 meter, or you can push it up a ramp. The ramp is 2 meters long. If you use the ramp, you'll feel as if you're moving 10 kilograms. Which method for putting the box on the shelf would you choose? Why? Which method might make you feel more tired? Explain.

Inquiry Skills (5 pts. each)

17. It resembles a screw. The stairs follow the same spiral pattern as screw threads.

18. The box traveled the largest distance for the lever, second largest for the inclined plan, and about the same distance for the pulley and straight lift.

Critical Thinking (5 pts. each)

19. Tamyra; she is using a shorter ramp, so she must use more force to do the same amount of work.

20. Possible answers: The ramp; it will take less force. The direct lift; it will be quicker. Possible answers: The direct lift will make me more tired; it requires more force.

Chapter Test

See ***Assessment Guide*** pages AG 122–127 for a Chapter Test and Performance Task, with Long Option rubric. Assessment options appear on page 690H.

Short Option Performance Assessment

Task

Build 'Em

Have students make models of two different simple machines covered in this chapter—lever, pulley, wheel-and-axle, inclined plane, screw, or wedge—using classroom objects, art supplies, or other materials. Then have students use each model to explain how the machine changes the way work is done.

Rubric

Preparation Provide students access to a variety of classroom materials and art supplies. Allow time for them to collect materials they need for their models.

Scoring Rubric—Performance Indicators

_____ Builds an accurate model of a simple machine.

_____ Uses the model to explain how the simple machine changes the direction and/or amount of force applied to it.

_____ Builds an accurate model of a different simple machine.

_____ Uses the model to explain how the simple machine changes the direction and/or amount of force applied to it.

Observations and Rubric Scores

3 2 1 0