RECORD SHEET

Activity 7: Speed of Waves

Name Date Class

Key Question

Learning the Ideas

Does the Speed of Waves Depend on Amplitude, Frequency, or Something Else?

1. Does the larger amplitude transverse wave seem to move *much faster*, *much slower*, or *at about the same speed* as the smaller amplitude transverse wave?

2. Does the larger amplitude compression wave seem to move *much faster*, *much slower*, or *at about the same speed* as the smaller amplitude compression wave?

3. Does the larger amplitude sound wave seem to move *much faster*, *much slower*, or *at about the same speed* as the smaller amplitude sound wave?

4. Based on the three examples shown, does the speed of either a *transverse* or *compression* wave seem to depend on its amplitude?

5. Based on the three movie segments, do higher frequency waves (either transverse or compression) seem to move *much faster*, *much slower*, or *at about the same speed* as lower frequency waves?

6. Does the speed of the sound waves seem to depend on the medium (material) through which they move?

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7. Is the speed of sound in steel *greater than*, *less than*, or *the same* as it is in air?

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Calculating Speeds, Distances, and Times with Waves

Problem 1: The Coiled Spring Wave

Suppose two students stretch out the coiled spring so that it is 6 m long. One student generates a transverse pulse. It takes exactly 1.5 s to reach the student at the other end.

8. What is the speed of the transverse pulse? Show your work.

Problem 2: The Steel Beam

A steel beam is 20-m long. Someone strikes one end of the beam with a sledgehammer.

9. How long does it take for the sound of the hammer strike to travel from one end of the steel beam to the other? Show your work.

10. How long does it take for the sound of the hammer strike to travel the same distance through air (assume the temperature is 20°C)? Show your work.

What We Have Learned

Recall the key question for this activity:

What property or properties of a wave determine its speed?

Write the answer to the key question.