

**Activity 3: Mechanical Waves and Energy Transfer**

Name \_\_\_\_\_

Date \_\_\_\_\_

Class \_\_\_\_\_

**Key Question**

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**Explore Your Ideas**

1. What does the person at the other end *feel* when the pulse reaches that end? (Describe what is *felt*.)

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2. Do you think energy is being transferred from the hand generating the pulse to the hand at the other end? Explain your reasoning.

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3. Does a transverse pulse with larger amplitude seem to transfer *more*, *less*, or *the same amount* of energy as a pulse with smaller amplitude? How do you know?

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4. As the pulse moves along the coiled spring from one end to the other, do any of the individual coils actually travel along with the pulse from one end to the other?

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5. What does each of the individual coils do as the pulse passes by?

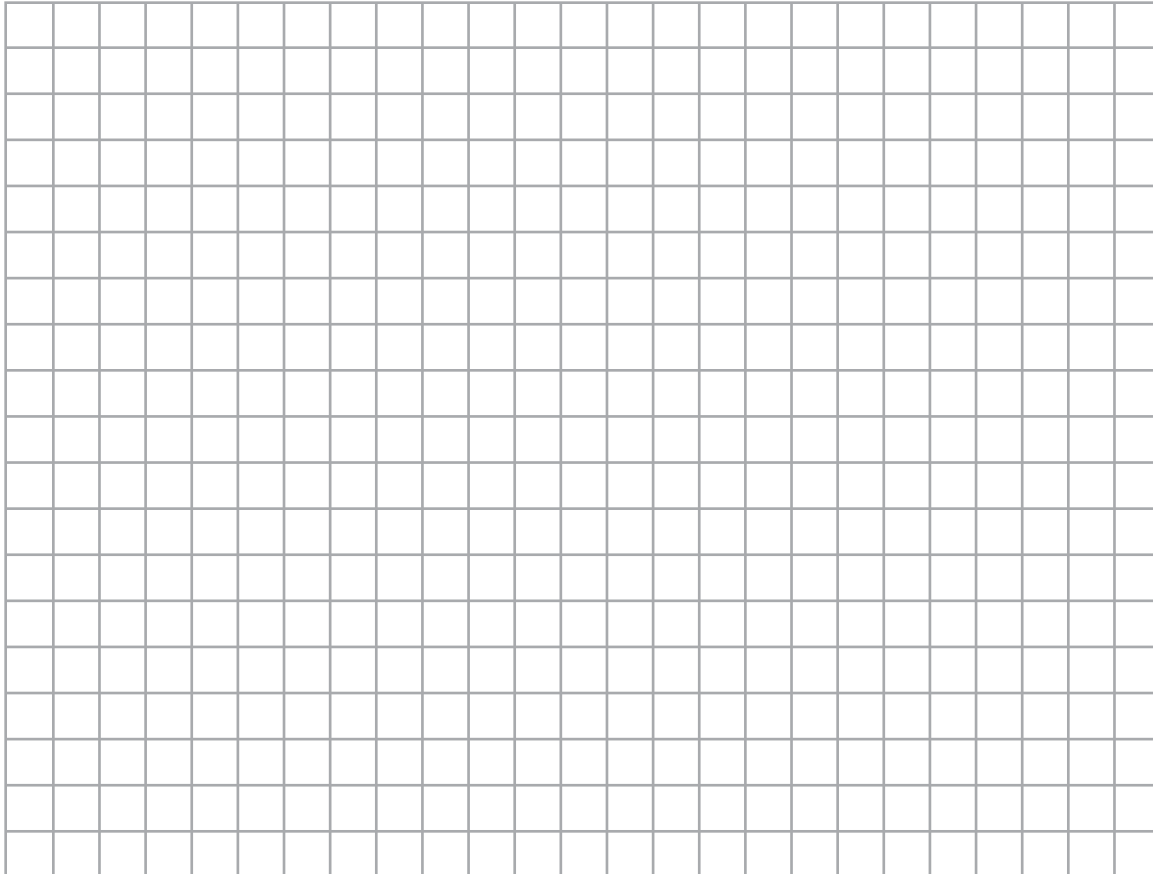
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6. Draw sketches of two transverse waves, one under the other. Each should have the same amplitude, but one was generated at a higher frequency and one at a lower frequency. Label which is the lower frequency and which is the higher frequency.



7. As the frequency of a transverse wave increases, what seems to happen to the wavelength? Does the wavelength *increase*, *decrease*, or *remain the same*?

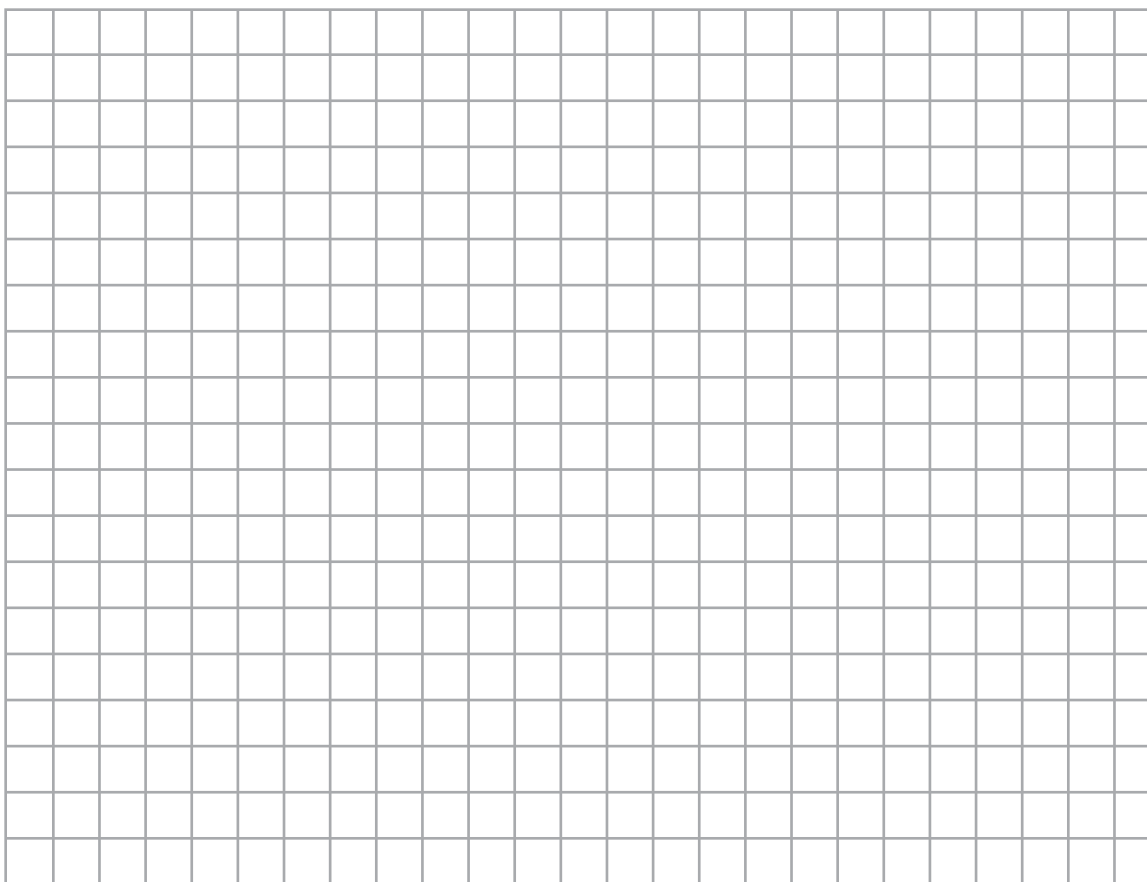
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8. Draw sketches of two transverse waves, one under the other. Assume each was generated at the same frequency, but one has larger amplitude and one has smaller amplitude. Label which has the larger amplitude and which has the smaller amplitude.



9. Based on your classmates' experiences with generating and receiving pulses, do you think a wave with larger amplitude transfers *more energy*, *less energy*, or *the same amount of energy* as a wave with smaller amplitude? Why do you think so?

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10. Is energy transferred by the pulse from one end of the coiled spring to the other?  
How do you know?

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11. Does a compression pulse with larger amplitude seem to transfer *more, less, or the same amount of energy* as a pulse with smaller amplitude? How do you know?

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12. What does each individual coil do as the compression pulse passes by?

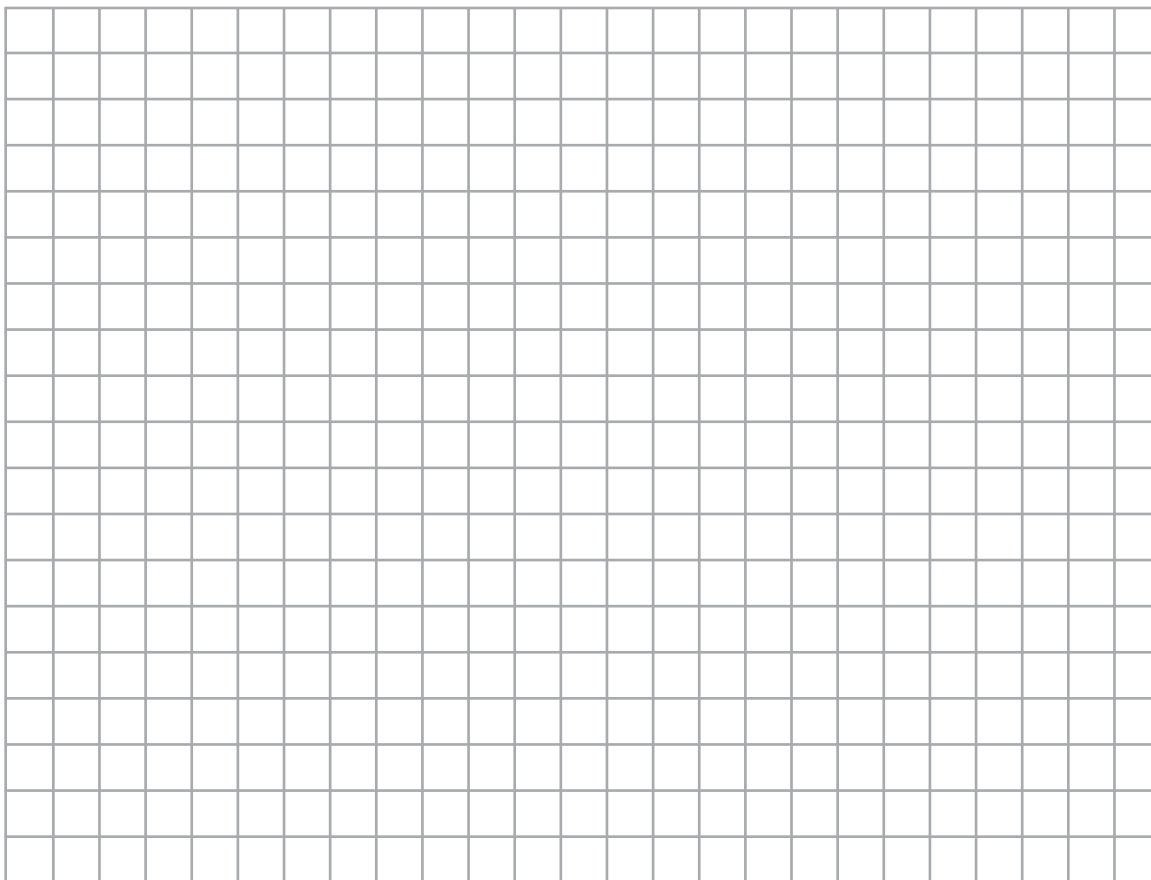
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13. Draw sketches of two compression waves, one under the other. One was generated at a higher frequency and one at a lower frequency. Label which is the higher frequency wave and which is the lower frequency wave.



14. As the frequency of a compression wave increases, what seems to happen to the wavelength? Does the wavelength *increase, decrease, or remain the same*?

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15. Do you think a compression wave with larger amplitude transfers *more energy, less energy, or the same amount of energy* as a wave with smaller amplitude? Why do you think so?

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### **Make Sense of Your Ideas**

1. What is the difference between transverse and compression waves?

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2. When a wave travels along a coiled spring, does each individual coil travel from one end of the spring to the other? If not, what does each coil do?

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3. Which of the following statements about the relationship between frequency and wavelength is best supported by your evidence?

- a) As the frequency increases, the wavelength increases.
- b) As the frequency increases, the wavelength decreases.
- c) There is no relationship between frequency and wavelength.

4. What is your evidence that a wave transfers energy?

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5. Which of the following statements about the relationship between the amplitude of a wave and the energy transferred seems best supported by your evidence?

- a) As the amplitude increases, the energy transferred increases.
- b) As the amplitude increases, the energy transferred decreases.
- c) There is no relationship between amplitude and energy transferred.

### **Our Consensus Ideas**

The key question for this activity is:



**What are some types and properties of waves?**

1. Write your best answer to the key question by summarizing your answers to the Make Sense of Your Ideas questions.

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2. Write the class consensus answer.

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