

Learning Target: I will be able to ask questions to compare and contrast the characteristics of electromagnetic and mechanical waves.

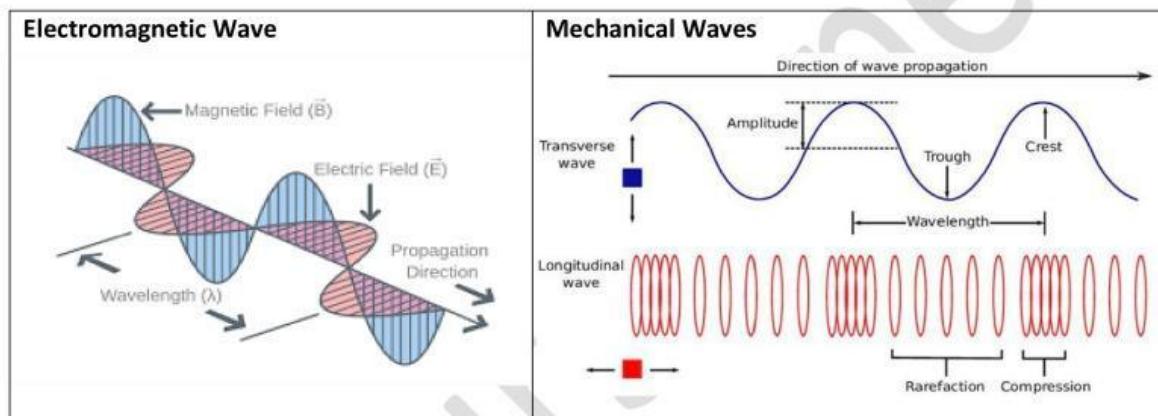
Electromagnetic vs. Mechanical Waves Interactive Activity



Part 1: Comparing Electromagnetic and Mechanical Waves

Instructions: Complete the table below by identifying the differences and similarities between electromagnetic waves and mechanical waves. Use the diagrams provided for reference.

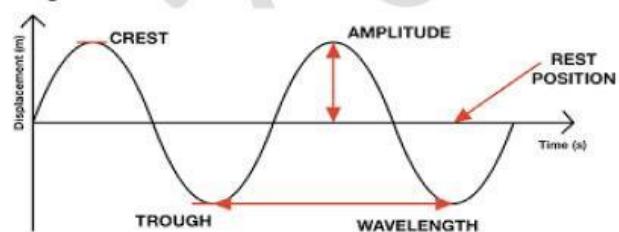
Characteristic	Electromagnetic Wave	Mechanical Wave
Requires a medium (Yes/No)		
Can travel through a vacuum		
Speed in a vacuum (fast/slow)		
Examples of wave types		



Part 2: Reading Wave Characteristics

Instructions: Examine the wave diagrams and answer the questions.

Diagram 3: Transverse Wave Characteristics

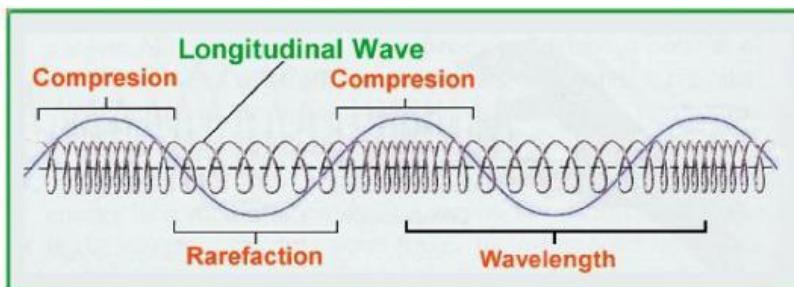


Questions:

1. How do you find the wavelength of the wave shown in Diagram 3? _____
2. How do you measure amplitude in a transverse wave? _____
3. Identify the crest and trough of the wave. _____

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Diagram 4: Longitudinal Wave Characteristics



Questions:

1. What parts of the wave represent compression? _____
rarefaction? _____
2. How is the wavelength measured in a longitudinal wave? _____
3. How would the wave change if the frequency increased? _____
4. How would the wave change if the frequency decreased? _____

Part 3: Real-World Applications

Instructions: Analyze the real-world applications below and categorize them as involving electromagnetic or mechanical waves. Justify your choice.

1. **Radio Broadcasting:** Signals are transmitted over long distances.
 - **Type of wave:** _____
 - **Reason:** _____
2. **Ocean Waves:** Waves move across the surface of the water.
 - **Type of wave:** _____
 - **Reason:** _____
3. **Ultrasound Imaging:** Used to view internal organs in medical settings.
 - **Type of wave:** _____
 - **Reason:** _____
4. **Microwave Ovens:** Heat food using electromagnetic radiation.
 - **Type of wave:** _____
 - **Reason:** _____

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Part 4: Chart Interpretation Instructions:

Study the chart comparing wave speeds in different mediums and answer the questions.

Medium	Mechanical Wave Speed (m/s)	Electromagnetic Wave Speed (m/s)
Vacuum	N/A	300,000,000
Air	340	300,000,000
Water	1,500	225,000,000
Steel	5,960	230,000,000

Questions:

1. Why can't mechanical waves travel through a vacuum? _____
2. Compare the speed of mechanical waves and electromagnetic waves in steel. Which is faster and why? _____
3. In which medium do electromagnetic waves slow down the most? _____

Part 5: Creating Your Own Waves Activity:

- Draw a diagram of a transverse wave and label its parts.
- Draw a diagram of a longitudinal wave and label its parts.
- Write two sentences explaining how these two wave types differ in the way they transfer energy.

Transverse Wave	Longitudinal Wave

How do transverse waves and longitudinal waves differ in the way they transfer energy?

Sentence 1: _____

Sentence 2: _____