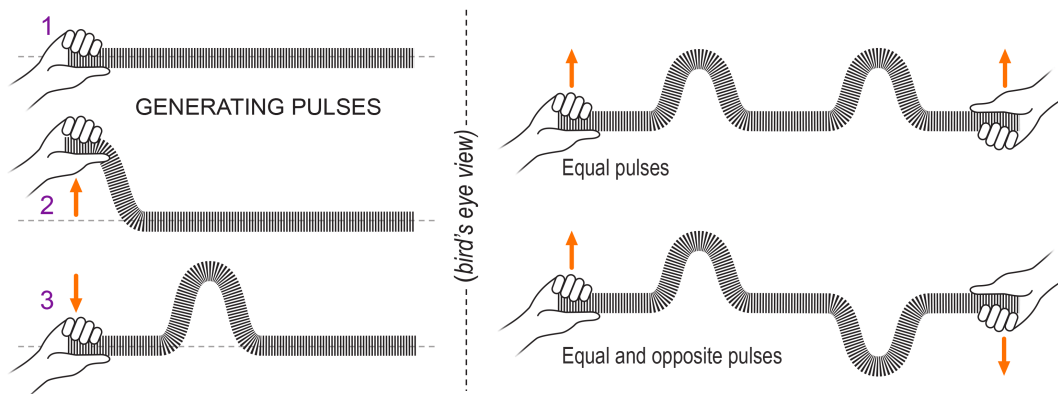


Investigation 15C: Interference

Essential Question: How does the amplitude of a wave change when it encounters another wave?

When multiple waves exist in the same place at the same time, interference occurs. Wave interference can be either constructive or destructive, causing the amplitude of the resultant wave to be different than the individual waves. In this investigation you will observe the interaction of wave pulses on a spring and draw a conclusion about when constructive and destructive interference occur in waves.



Constructive and destructive interference

- Stretch the slinky out flat on a table or the floor – one group member holding each end. Do NOT overstretch the slinky!
- Send pulses down the slinky from each end and observe how they interact when they meet in the middle. Use your observations to answer the questions.
- Test the following scenarios:
 - Equal pulses from each end
 - Big pulse from one end – small pulse from the other end
 - Equal and opposite pulses from each end
 - Big pulse from one end – opposite small pulse from the other end.

The pulses travel fast, making it difficult to observe the exact moment they interact. Try using slow motion video to make observations.

Questions

- When the equal pulses met in the middle, how was the amplitude of the combined wave different from the individual pulses?

- b. When the big and small pulses met in the middle, how was the amplitude of the combined wave different from the individual pulses?

- c. When the equal and opposite pulses met in the middle, how was the amplitude of the combined wave different from the individual pulses?

- d. Which scenarios experienced constructive interference? How do you know?

- e. Which scenarios experienced destructive interference? How do you know?

- f. For each scenario, describe what happened to the pulses after they met.