Unit 8: Waves  
**6 – Interference**

Two waves with the same frequency and opposite phase.

**Destructive Interference:**

Two waves with the same frequency and phase. **Constructive Interference:**

When two waves travel in the same medium they affect the medium independently. To determine their **overall** effect we use the principle of superposition.

**Principle of Superposition:**

The total amplitude of the waves is equal to…

**Standing Waves**

* Standing waves are caused by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Areas of complete destructive interference have \_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and are called \_\_\_\_\_\_\_\_\_\_
* Areas of complete constructive interference have \_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and are called \_\_\_\_\_\_\_\_\_\_
* When a wave hits a fixed boundary it will \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_ its amplitude.
* If a series of waves are sent along a string the reflected pulse will…
* If the waves are sent at just the right frequency we will create a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1) The Sun is 1.50x108 km from Earth. How long does it take for the light from the Sun to reach us?

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| Type:  Pattern: | Type:    Pattern: |
| Type:  Pattern: | Type:    Pattern: |
| Type:  Pattern: | Type:    Pattern: |

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|  | **Sample Problems: Interference of Waves**  Draw the interference pattern for the combinations of waves shown below. Show your calculations for the amplitude at each marked () location . | | |
| **1.** | | | |
| 1st dot: Amplitude = 0 + 0 = 0  2nd dot: Amplitude = 4 + \_\_\_\_ = 6  3rd dot: Amplitude = \_\_\_\_ + \_\_\_\_ = 0  4th dot: Amplitude = -4 + \_\_\_\_ = \_\_\_\_\_  5th dot: Amplitude = \_\_\_\_ + \_\_\_\_ = \_\_\_\_\_ | | *Check that the amplitudes drawn in the interference pattern match the values that you calculated for each ‘dot’.* |  |
| **2.** | | | |
| 1st dot: Amplitude = 0 + 2 = \_\_\_\_  2nd dot: Amplitude = \_\_\_\_ + -2 = \_\_\_\_\_  3rd dot: Amplitude = \_\_\_\_ + \_\_\_\_ = \_\_\_\_\_  4th dot: Amplitude = \_\_\_\_ + \_\_\_\_ = \_\_\_\_\_ | | *Draw the interference pattern...* |  |