

Name: \_\_\_\_\_ Date: \_\_\_\_\_

$m_r^\beta$  **Physics Practice: Modes, nodes, and standing waves**

We have been studying sound waves that can move freely through space. Now we will consider waves that travel in one dimension on a string with fixed ends. We will use the wave simulator at <http://www.mrbenson.org/wave-modes/>.

1. The red and green waves are *standing waves*. What is a standing wave?

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2. What is *interference*?

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3. What is *constructive interference*?

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4. What is *destructive interference*?

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5. What is *reflection*?

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6. Discuss in class why vibrating strings have standing waves. Explain in your own words.

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7. Change the number of modes on the red wave. What do you suppose mode represents? It may be helpful to increase simulation speed.

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8. What is the relationship between mode and frequency of the waves?

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9. A *displacement node* is a position on the standing wave that does not move (i.e. it has no displacement over time). How is the number of displacement nodes related to the mode of the wave?

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10. What do you think an *antinode* is?

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11. Give the red wave 9 modes, the green wave 10 modes, and set the sim speed to about 5. What do you notice about the superposed purple wave? Explain why this happens.

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12. Give the red wave 8 modes, the green wave 10 modes. What do you notice about the superposed purple wave?

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