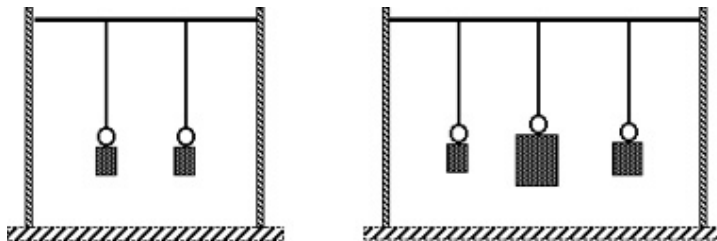


## Lab: Coupled Pendula, Conservation of Energy and Resonance

Name \_\_\_\_\_ Period \_\_\_\_\_

Two or more pendula attached to the same support are said to be coupled. If the pendula are the same length and therefore have the same period they are *in tune*. Energy from one pendulum will be transferred to the other pendulum and back. Energy is conserved and they are in *resonance*.



**PURPOSE:** To set up coupled pendula and observe how the energy is conserved in each case.

### PROCEDURE:

1. a. Set up two pendula with 20 g masses whose lengths are about 60 cm. b. Tune them so that their periods are equal. c. Stop one in dead center. d. Displace the other to about  $45^\circ$  and release it. e. Write your observations of what happens over about two minutes.

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2. a. Replace the masses with a 10 g mass and a 100 g mass. b. Adjust the lengths to their center of masses such that their periods are *in tune*. c. Set the 100 g mass at dead center. d. Displace the 10 g mass to about  $45^\circ$  and release it. e. Write your observations of what happens over about two minutes.

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f. Set the 10 g mass at dead center. g. Displace the 100 g mass to about  $45^\circ$  and release it. h. Write your observations of what happens over about two minutes. **Look out! WOW! Energy is conserved!**

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3. Set up three pendula: a 20 g mass, a 50 g mass, and a 100 g mass whose lengths are about 60 cm. b. Tune them so that their periods are equal. c. Stop two in dead center. d. Displace another to about  $45^\circ$  and release it. e. Write your observations of what happens over about two minutes.

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4. Try your own adjustments but **do not** use big fat masses. They'll break the string and get busted on the deck. Observations:

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### THE GRANDE CRITIQUE: