

Oscillating Mass

Assembly Instructions

The Oscillating Mass on a Spring works with the Sound & Waves Machine to demonstrate resonance. Students can change variables, like mass and stiffness, to explore how they affect a system's resonant frequency.

Parts Checklist

The following items are provided with the Oscillating Mass on a String:

- Spring Mounts (2)
- black knobs (2)
- springs (3)
- nuts (4)
- threaded nylon rod

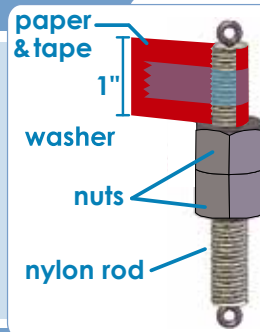
In addition, you will need the following items:

- Physics Stand
- Sound & Waves console
- Wiggler (with black knob)
- black stereo cable (phono cable)
- CPO Timer or DataCollector
- Photogate
- phone cord
- 1" x 2" strip of opaque paper
- tape

Assembling the Wiggler Mass

Screw one of the large nuts onto the threaded nylon rod. The mass can be changed by adding or removing nuts.

Cut a 1" x 2" piece of opaque paper. Secure it to the top of the nylon rod by a 3" piece of tape that wraps over the paper and around the nylon rod. This serves as the beam break for the Photogate.



Resonance and the Mass on a Spring

Note: The following directions suggest spacing that is a good place to start your wiggler investigation, but adjustments might need to be made.

Wiggler: Mount the wiggler on the Physics Stand by inserting its threaded rod into hole #13 or 14; secure with a black knob. Rotate the wiggler so that the wiggler arm points towards the pole, as shown at right.

Spring Mounts: Attach the spring mounts to the Physics Stand and secure with black knobs. Locate the upper spring mount using hole #19 of the Physics Stand. Locate the lower spring mount using the bottom two holes of the Physics Stand.

Springs & Mass: Hang one spring from the wiggler arm. Hook the wiggler mass onto the bottom of this spring. Next, hook the second spring to the bottom of the wiggler mass and then hook the other end of the spring to the lower spring mount. Use the third spring to connect the upper spring mount to the first spring, near the wiggler arm (see detail at right). Adjust the tensioners so that the wiggler arm is perpendicular to the Physics Stand pole. If it is pulled too far out of balance (strained up or down too much) it will not wobble properly.

Connect the wiggler to the Sound & Waves console with the black stereo cable (not shown). Connect the Sound & Waves console to the CPO Timer using the phone cord.

