

# Springs & Swings

## Setup Instructions

### Parts Checklist

The following items are provided with Springs & Swings:

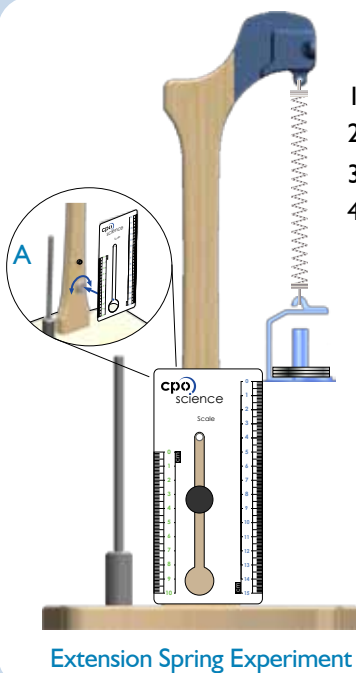
- Stand
- Mass Hanger
- Mass Holder
- 1 Compression Spring
- 2 Extension Springs
- Beam Breaker
- Scale Card
- Cord Lock
- String
- Flag
- 2 Hex Nuts
- 1 HEx Bolt
- 1 Hex Wrench
- Thumbscrew



In addition, you will need these items:

- Washer Masses
- DataCollector or Timer
- Photogate

### Setup for Hooke's Law

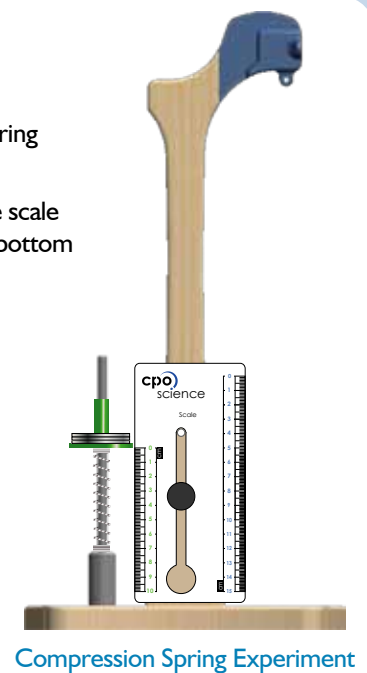


#### Extension Spring Experiment (left)

1. Place an extension spring in the hole at the top of the stand
2. Attach the mass hanger to the other end of the extension spring
3. Place 3 washers on the mass hanger
4. Place the scale over the knob. Loosen the knob to adjust the scale up or down. Align the zero mark on the scale card with the bottom of the hanger and secure by tightening the thumbscrew (A).

#### Compression Spring Experiment (right)

1. Place a compression spring on the spindle on the stand
2. Place the mass holder on top of the compression spring
3. Place 3 washers on the mass holder
4. Loosen the knob to adjust the scale up and down. Align the zero mark on the scale card with the bottom of the holder and secure by tightening the thumbscrew.

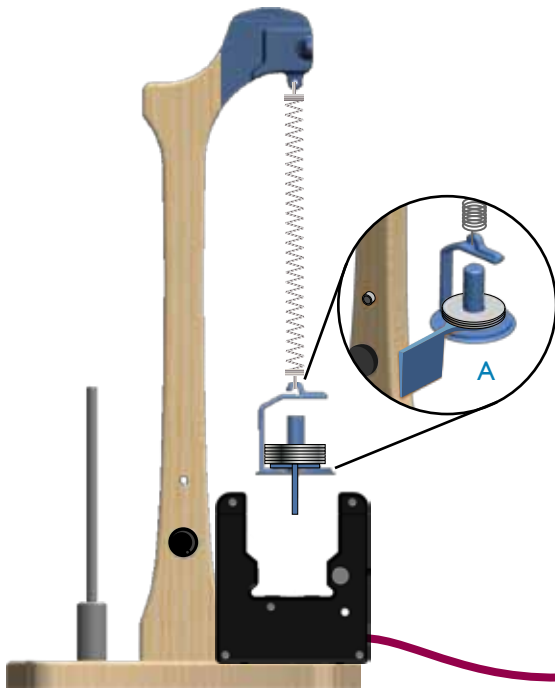


Compression Spring Experiment

# Springs & Swings

## Setup Instructions

### Setup for Oscillation and Natural Frequency



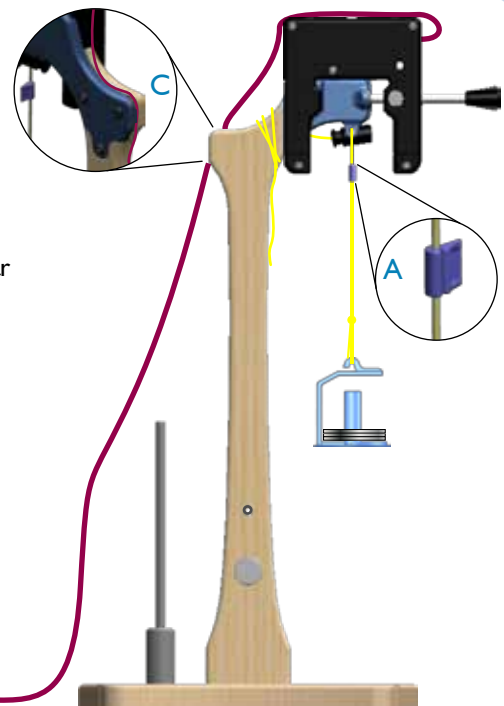
1. Place an extension spring in the hole at the bottom of the hanger mount.
2. Attach the mass hanger to the bottom of the spring.
3. Add the flag to the mass hanger and place washer masses on top of the flag (A). Face the flag perpendicular to the Photogate.
4. Place a photogate at the bottom of the stand.
5. Plug the Photogate into the DataCollector or Timer and turn on.

\*Note: As more weight is added, you may need to lower the photogate by placing it on the table surface to the right of the stand. The flag can be rotated to break the beam.

Attached to the DataCollector or Timer

### Setup for Pendulum and Harmonic Motion

1. Tie a loop at one end of the yellow string.
2. Slide the string into the hole at the bottom of the hanger mount.
3. Place the cord lock on the string end without the loop and place it behind hanger mount.
4. Fasten the mass hanger onto the loop.
5. Attach the beam breaker to the string. Have the flat tab pointing perpendicular to the Photogate (A).
6. Place three washers on the mass hanger.
7. Attach a Photogate to the top of the stand.
8. Wrap the excess string around the neck of the stand.
9. Have the excess telephone cord wrap around and fit into the slot (C).
10. Plug the Photogate into the DataCollector or Timer and turn on.



Attached to the DataCollector or Timer

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## Assembly Instructions

Step 1: Line up the base and stand using the wooden locating pin for proper orientation. Slide the screw studs through the holes and attach tee nuts with the wrench.

Step 2: Attach the Spindle to the base with a screw and tighten with the wrench.

