

In this project, you can make your own Pendulum Wave starting with a rigid crossbar.

### **MATERIALS**

1. Weights (machine nuts)
2. String
3. A crossbar (3-foot length of 1x2" wood or a frame assembled from PVC pipe)
4. Tape measure
5. Tape

### **DIRECTIONS**

1. Mark a line that runs the length of the crossbar. This reference line will define the place from which the pendulums will be hung.
2. Refer to the table that lists the lengths of the pendulums. For each pendulum, cut a length of string that is 2 times the length of the pendulum plus 10 centimeters.
3. Starting with the longest pendulum in the series, tape one end the piece of the string to the crossbar at the reference line. Pass the free end of the string through a machine nut, and then carefully tape the string to the crossbar at the reference line about 5 centimeters away from the first end. It is important to adjust the length of the pendulum to the nearest tenth of a centimeter (or to the nearest millimeter).
4. Hang the next pendulum (the second longest pendulum) at least one centimeter away from the first. Continue this procedure until you have at least 8 pendulums carefully attached to the reference line on the crossbar. Each weight (machine nut) should be hanging like a pendant on a necklace.
5. Here is a list of possible lengths, given in centimeters:

Pendulum #	Pendulum Length	String Length
<b>1</b>	30cm	70cm
<b>2</b>	27.9cm	66cm
<b>3</b>	26.0 cm	62cm
<b>4</b>	24.3cm	59cm
<b>5</b>	22.8cm	56cm
<b>6</b>	21.7cm	53cm
<b>7</b>	20.1cm	50cm
<b>8</b>	18.9cm	48cm
<b>9</b>	17.9cm	46cm
<b>10</b>	16.9cm	44cm
<b>11</b>	16.0cm	42cm
<b>12</b>	15.2cm	40m
<b>13</b>	14.4cm	39cm
<b>14</b>	13.7cm	37cm
<b>15</b>	13.0cm	36cm
<b>16</b>	12.4cm	35cm