**Twang**

**Purpose**
To examine how a string vibrates.

**Materials**
About 36 inches (1 m) of white string  
2 chairs with straight legs  
Ruler  
Marking pen  
Metal paper clips

**Procedure**
1. Tie one end of the string to a chair leg and the other end to the leg of a second chair. The string should be at least 6 inches above the floor.
2. Move the chairs apart so that the string is as taut as possible.
3. Use the pen to make a mark on the string about 6 inches (15 cm) from one end.
4. Clip the paper clips to the string so that they hang freely and are able to spin around the string.
5. Position the paper clips at the end opposite the mark and about 1 inch (2.5 cm) apart.
6. Pluck the string where it is marked and observe the motion of the paper clips. Repeat this step two or more times.
7. Move the paper clips to different places along the string. Then repeat step 6.

**Results**
Some of the paper clips vibrate so much that they spin around the string. Some paper clips spin at greater speeds than others, and some vibrate a small amount and continue to hang without spinning.

**Why?** When the string is plucked, a standing wave with nodes and antinodes is produced in the string. The position of a paper clip in relation to the nodes and antinodes determines how much the paper clip vibrates. At the nodes, the paper clip vibrates the least and remains relatively stationary. At the peak of an antinode, it vibrates the most and spins around the string. The faster the string itself vibrates, the shorter the waves and the closer the nodes.