

Sci-Map Site

Westside Park

Name of Activity

Playground Physics Before You Go - Swing Pendulum

Materials

Coat hanger

Masking tape

String

2-3 paper clips

2 tall (> 7") containers with wide lids

Water to fill containers if they are empty (just to give them some weight)

2-3 metal nuts of different size (washers work, too)

Procedure

Set the two containers 12" apart (If the containers are empty, first fill with water).

Place the hanger on the table and without rotating it, lift to the top of the containers so that the hanger corners are on the lids. Tape the hanger corners to the lids (see pictures). Cut about 12" of string and tie to the narrow end of the paper clip. Slightly open the wide end of the paper clip. (see pictures)

Tie the other end of the string to the hanger so that the paper clip is about 1" above the table. Make the knot slightly loose so the string can rotate on the hanger.

Slip a nut onto the open end of the paper clip. Pull the paper clip (with the nut) away from the resting position and let it go. Measure how long it oscillates. Experiment with different size nuts. Does one nut swing longer than another? Does the frequency of oscillation change? What happens if the length of the string is changed?

The Science Behind It

A pendulum is a moving mass suspended from a pivot point. When it is moved from its resting position it will gain potential energy and oscillate (rotate back and forth). When a person first sits on a swing and does not move they are in the resting position. When the person is lifted away from the resting position they gain energy and swing back and forth (oscillate) until frictional forces slow the swing to its resting position. A person on the swing will have the greatest potential energy (the energy of position) when they are at the highest points of the swing. The greatest kinetic energy (the energy of motion) is when the person swings through the resting point.

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