


Balance the Pencil

Simple Science Activity

Purpose:	The purpose of this activity is to use balanced and unbalanced forces to balance a pencil vertically on a craft stick.
Standard(s):	<p>S4P3. Obtain, evaluate, and communicate information about the relationship between balanced and unbalanced forces.</p> <p>a. Plan and carry out an investigation on the effects of balanced and unbalanced forces on an object and communicate the results.</p>
Materials:	a craft stick, an address label or piece of tape, two clothespins, one pipe cleaner, two #2 pencils (one sharpened and one unsharpened)
Procedures:	<ol style="list-style-type: none"> 1. Begin by having the students attach their craft stick to a flat surface using the label/tape so that it is half on and half off. 2. Ask the students to try to balance the unsharpened pencil on the craft stick (vertically) and observe what happens. 3. Next ask the students to try to balance the sharpened pencil on the craft stick (vertically) and observe what happens. 4. Ask the students why they think the pencils both fell off the craft stick. 5. Ask the students if they think we can make the pencil balance on the craft stick. 6. To make this happen, attach the center of the pipe cleaner around the pencil and attach a clothespin to each loose end of the pipe cleaner. The balanced weight will hold the pencil up, both sharpened and unsharpened. <div style="text-align: center; margin-top: 20px;">  </div>

<p>Science Behind It:</p>	<p>Every object with mass has a center of gravity. The center of gravity is the point on an object where the mass is perfectly balanced. The ease with which an object can be balanced depends greatly on the location of its center of gravity. In a pencil, the center of gravity is right in the middle.</p> <p>Of course, it is much easier to balance an object with a broader base of support and a lower center of gravity. In our activity, the base of our object is the tip of the pencil – not very big. Since we cannot make the tip of the pencil bigger, we have to move its center of gravity. To do this, we attached the pipe cleaner with the clothespins and added mass to move its center of gravity and increase its stability.</p> <p>A real-world example of this would be a tight rope walker. Tight rope walkers carry a heavy, downward curving pole to lower their center of gravity to stay balanced.</p>
<p>Questions to Ask:</p>	<ul style="list-style-type: none"> • What happened when you tried to balance the pencils without the assistance of the pipe cleaner and clothespins? • How did the pipe cleaner and clothespins help to balance the pencil? • What other materials could we use that would have a similar effect?