

Find Your Centre (of Gravity) Grades 4 to 6

<b>Post Activity – Balance &amp; Motion</b>	Cross Curricular	Art
	Safety Notes	Heavy objects falling

<p><b>Big Ideas</b> Pulleys and gears change the speed, direction and motion of, and force exerted on, moving objects. (Grade 4)</p> <p>Structures and mechanisms throughout our environment have forces that act on and within them. (Grade 5)</p>	<p><b>Specific Expectations</b> Describe how one type of motion can be transformed into another type of motion using pulleys.</p> <p>Identify internal and external forces acting on a structure or mechanism.</p>
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**Description**  
Quickly find the centre of gravity for different objects, even if the weight is unevenly distributed.

<p><b>Materials</b> Metre sticks Dowels of various lengths Playdough String Weights with hooks Washers Irregularly shaped objects (cut-outs of heart, bird, bat, etc. or use the templates on the other page)</p>	<p><b>Accommodations/Modifications</b> This activity can be done with skewers, toothpicks and marshmallows. Use the marshmallows to change the weight distribution of weight along the skewer.</p> <p>Please be aware of food allergies.</p>
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## Introduction

Our school program, “Balance & Motion” looks at how pulleys can help change direction, speed or force. An important component of the program is finding the centre of gravity of an object. The centre of gravity of an object is where the total weight of an object is concentrated. In irregularly shaped objects, the centre of gravity is often not the same as its geometric centre. It may even occur somewhere external to the physical object. For example, the centre of gravity of a hula hoop is in the middle of the hoop.

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## Action

1. Take the metre stick and support it with your two index fingers.
2. Without dropping the metre stick, slowly slide your index fingers towards each other until they meet. The spot where your fingers meet is the stick’s centre of gravity.
3. Using a piece of playdough, or a piece of string tied to a weight or a washer, change the weight distribution of your stick.
4. You can attach the weight/playdough at one end of the stick and see how it changes the position of the centre of gravity.
5. Move the weight/playdough to different places along the stick, and notice how the centre of gravity also moves.
6. Change the amount of weight you add, and notice how the centre of gravity moves.

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## Consolidation/Extension

With objects that are irregularly shaped (not long and skinny), you can find the centre of gravity using plumb lines. A plumb line is the vertical line between the hanging point of an object and the centre of the earth. You can draw a plumb line by hanging a washer on the end of a piece of string and pinning the loose end of string to the edge of your shape. Allow the shape to swing freely. Draw the vertical line where the shape settles. You need to draw at least two plumb lines on the shape and the point of intersection is the centre of gravity.

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## Assessment

1. What do you notice about the centre of gravity as you move the weight along the metre stick? Where does it move?
2. Is the centre of gravity always at the geometric centre of the object? Why or why not?
3. What does it mean when your object is balanced?

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## Additional Resources

Irregular shape templates.

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