

**Title**

# Balancing Robot

**Activity Overview**

**Description**

In this activity campers will place two pennies in various locations on a paper robot until they discover how to balance the robot.

**Topic Area(s)**

Center of Gravity, Physics

**Grade Level** K-5

**Duration** 30 minutes

**Learning Outcomes:**

- Campers will learn about gravity
- Campers will develop a sense of gravity's role in balance
- Center of gravity - and how this is used in everyday life

**Hook**

Do you think you can make a sheet of paper and a couple of pennies balance on anything??

**Background Information**

Gravity is the force with which the earth, moon, or other massively large object attracts another object towards itself. All objects upon earth experience a force of gravity that is directed equally "downward" towards the center of the earth. Sometimes gravity can make things turn and topple over, especially if they are high up and unbalanced. All objects behave as though their **mass** (the stuff they're made from) is concentrated at a point called their **center of gravity**. A simple object like a ball has its center of gravity in a very obvious place: right at its center. But in a more complex object, like your body, the center of gravity is slightly higher than your waist because there's more weight in the top half of your body than in the bottom half. The lower your center of gravity, the easier it is to keep your balance. If you're sitting on a chair, you can lean over more than if you're standing up. With your center of gravity low, you can lean further to one side or the other without creating enough turning force to tip you over. Tightrope walkers use a slightly different trick to master their center of gravity. Some stretch their arms out or carry a long stick or an umbrella. These balancing aids help to give tightrope walkers more control over their center of gravity by keeping it locally oriented over the rope.

## Materials

Per student:

- 1 sheet of cardstock
- Masking tape (0.5 m)
- Markers, Crayons for decorating
- Scissors
- 2 pennies
- Robot Printable Stencil (printed)

## Safety Considerations

Careful when using scissors!

## Procedure

- 1) Print and cut out Robot cut out onto white cardstock - 2 per camper
- 2) Have campers colour their robots
- 3) Flip the robot over and place a roll of masking tape on the hands of the robot
- 4) Press a penny onto each hand
- 5) Put more tape onto the pennies and tick the second robot on top

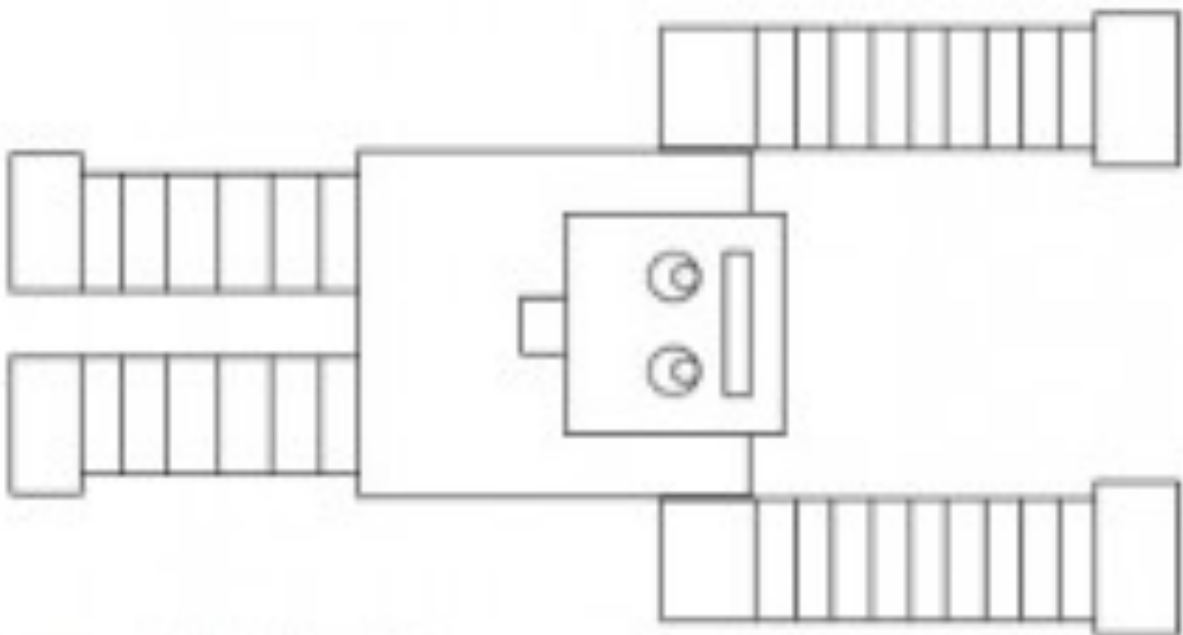
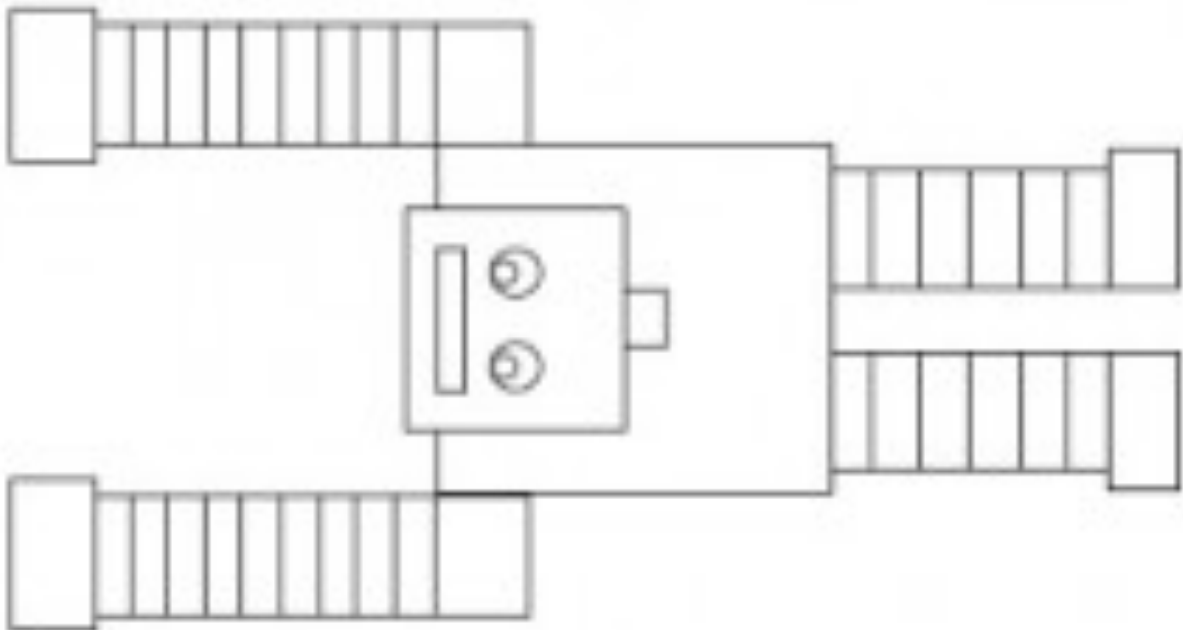
## Wrap-Up/Debrief

- Show the students a balancing robot in action on your finger, but don't let them know how to make it just yet.
- Give them time to try out sticking the pennies to different parts of the robot to try to get the robot to balance on their fingers. I love watching them explore and discuss with their friends all the various ideas they come up with! Many will figure it out on their own. For those that don't, you can show them the correct placement of the pennies or invite other students to help them.
- Once all the students have their balancing robots built correctly, let them explore balancing the robot in different places.

## Additional Resources

- <http://buggyandbuddy.com/science-kids-balancing-robot-free-printable/>

# Balancing Robots



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