SKATEBOARD PROJECTS

Balance

When you skateboard, ride your bike or carry a heavy box, do you lean your body in one direction to stay balanced? **Gravity** pulls downward on all parts of any object. **Center of gravity** is the point of balance where the forces acting on one side equal those acting on the other side.

If you try to balance by standing on one leg, do you move your other leg or spread your arms out? By leaning in one direction or another, you are trying to adjust your **center of gravity** so you won't fall over.

Here's a simple experiment you can do to illustrate this point!

What you'll need:

❑ *Craft stick / Popsicle stick*
❑ *Weights (you can use things like paper clips, washers, or coins)*
❑ *Adhesive tape or rubber bands*

❐ Attach the weights to the end of the sticks with the tape or rubber bands.
❐ Now try to put the stick on your finger so that it will not fall off. You may have to slide the stick towards one side or the other to bring the weights into balance.
❐ Your finger is placed at the **center of gravity** if the stick balances and doesn't fall off your finger.

Once you've mastered that, try this! Can you balance a grape or cherry on top of a pencil's eraser?

❐ Stab a cherry, grape, or marshmallow with a toothpick.
❐ Try balancing the free side of the toothpick on your pencil eraser.
❐ Now try adding weight to the object like you did with the Popsicle stick.

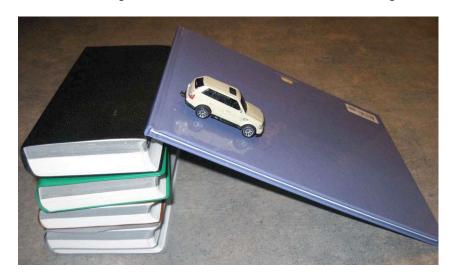# Speed

Ever wonder what makes a skateboard go? Will you go farther on a board if you're lightweight or heavy?

Let's find out!

- ❑ Build a simple inclined plane using a book or a piece of wood (a slide on a playground is an example of an inclined plane).
- ❑ Set a toy car or a fingerboard – a miniature skateboard - at the top of the inclined plane and release it.
- ❑ Measure the distance it traveled.
- ❑ Now tape a weight to the board (you can use a coin) and repeat the experiment.

Did the board travel a longer distance or a shorter distance with the weight attached?

Want to try another experiment?

- ❑ Place your inclined plane near the edge of a table so that the bottom of it is about one foot from the edge.
- ❑ Set your fingerboard or toy car at the top and release it.
- ❑ After it rolls down the ramp and across the table it will fly through the air.
- ❑ Measure how far it lands from the table.
- ❑ Now tape a weight to the board and repeat the experiment

How did this experiment differ from the first one? How is movement through the air different from movement across a solid surface?

And here's one more experiment:

- ❑ Find two objects, such as a book and a small toy.
- ❑ Hold one in each hand at the same height.
- ❑ Let go of the two objects at the same time.
- ❑ Which object hit the floor first or did they hit at the same time? (Make sure you released the two at the same time and from the same height.)
- ❑ The two toys should have hit at the same time, because gravity acts on an object in proportion to its mass. (In this experiment, friction from the air has little effect, since the distance is so short.)

Now think about fingerboards rolling down an inclined plane. If there is no friction, then a heavier and lighter skateboard should travel the same distance when they are released from the same point on the inclined plane. If the distance is different, how is friction acting on the object?

I Want To Know!

Some skateboard wheels are hard and others are softer. How does that affect the speed and distance that the skateboard travels?

How does weight change things?

How far will a skateboard go when you release it from the top of a hill? A variety of factors, like how the skateboard was designed, the hardness of the wheels, and the surface of the hill, may affect how far the skateboard will go.

To learn more about the physics of skateboarding, visit http://www.exploratorium.edu/skateboarding/

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