



## Gravity Pulls

### PLAN

- Plan for a safe, high structure from which Cub Scouts will drop their objects. This could be a play structure or sturdy ladder.
- Decide what objects to bring for Cubs to drop. Select objects that may be misleading to predict. For example,

it may be surprising to some Cubs that a ping pong ball and a stone of the same size will fall at the same speed.

### DO

#### Activity #1: What falls faster?

- Ask each group to choose their objects, while considering any objects they think would fall at the same rate.
- To cut down on the number of objects that need to be dropped, give Cubs plenty of similar options to choose from.
- Encourage Cubs to consider shape and size, as well as weight, when making their predictions.
- Speed is distance divided by time.

- Encourage Cubs to consider all of the forces acting on the falling objects. The force of gravity makes objects fall and the air underneath the object make them go slower. The shape of the object will determine how it guides the air it is falling through will influence the speed.

#### Activity #2: Fall Faster

- Many short rounds will give Cubs the opportunity to experiment and make as many changes as they want.

### BACKGROUND INFORMATION ON GRAVITY PULLS

- Gravity is an "action at a distance" force, meaning it acts on other objects without coming in to contact with them. Gravity is the force that causes all objects to fall towards the centre of the earth, and keeps objects on the surface of the earth.
- In a vacuum, any two objects will fall at the same rate, as there is no air to offer any resistance. Objects in free fall accelerate at a rate of  $9.8 \text{ m/s}^2$
- When an object falls outside of a vacuum, it pushes air out of the way as it falls. This air pushes up on the object, slowing it down.
- The effect of air resistance will be nearly unnoticeable at a small distance.
- By creating objects with smooth, compact shapes, we can limit the effect of air resistance.

### SUGGESTED TIMING

- Plan: 10 minutes
- What falls faster? 10 minutes
- Fall faster! 10 minutes
- Slow down! 20 minutes
- Review: 10 minutes

### SAFETY TIP

- Remind Cubs that garbage bags and plastic grocery bags can be very dangerous, and should never be put over anyone's head.

