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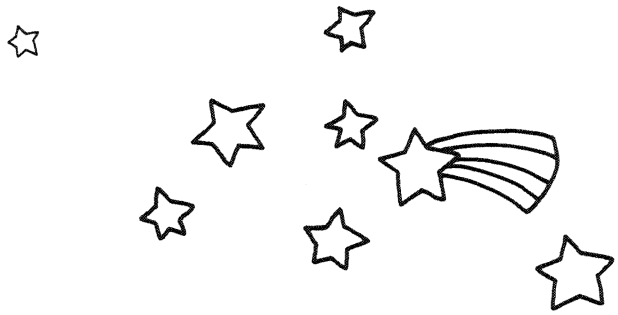

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Introduction

These projects are sure to fill your classroom with ‘oohs’ and ‘aahs’, but it is important to prepare first.

- Make a model of each project in advance. Know how it works.
- Have all materials ready. Some steps may be done in advance.
- If volunteer help is available, use it during these project times. Some students may need the added support.
- Encourage students to share ideas and experiment.
- Take the role of facilitator and let your students discover science concepts.
- Have the students record observations and data inscience journals.

Discovery approach to learning

Pose a problem or question, step back, and let the students seek the answers. Students begin hypothesising, then testing their theories, comparing results, and drawing conclusions. Discuss their conclusions. Encourage curiosity. Have students ask themselves, ‘I wonder what would happen if … ?’ This leads to open-ended discovery.

Inquiry approach to learning

As your students’ curiosity peaks, so does their desire to learn more. Support students as they seek answers for their own questions. Again, they begin hypothesising and testing their theories. They draw conclusions based on their own experimentation. Be sure to guide your students, support their interests, and learn together as they experiment. Have the students share what they have learned and give evidence supporting their discoveries.

To support you, the teacher, each project includes a section that describes the scientific aspects of the toy or craft. Questions offered in the Think about it! section help you guide your students through discover and new learning. Most importantly – try the activities with your students. Science motivates learning!

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Anemometer

Scientific concepts

- Forces and motion
- Meteorology

Supplies

(per model)

2 straws
1 straight pin
pencil with eraser
four small paper cups
masking tape

What's happening

A rotation anemometer is designed to measure wind speed using cup-like devices. The wind pushes the cups, much like the sail on a sailboat, causing the anemometer to rotate. Instruments measure the rotation speed, which corresponds to wind speed. This model works in a similar fashion. Fast-moving air pushes into the cups causing them to spin. The harder the wind blows (the force), the faster the anemometer spins (the object). This demonstrates Newton's second law of motion.

Description

This simple-to-make 'action toy' is a model of an instrument used to measure wind speed, and anemometer. This model actually spins and demonstrates Newton's second law of motion – the greater the force acting on an object, the greater the change in speed or direction.

What to do

1. Use making tape to secure the two straws together to form an 'X'.
2. Punch a hole into the side of each cup near the lip using a hole punch or pencil.
3. Place the straw 'X' flat on a table. Place a cup on its side, slightly inserting one end of the straw 'X' into the hole of the cup. Tape in position. Repeat with the remaining cups and straw ends, making sure that each open end of the cup faces the bottom of the next cup. See Figure 1.
4. Insert the straight pin through the centre of the straw 'X' and into the eraser of the pencil. See Figure 2.
5. Gently blow into a cup. The cups should spin freely.

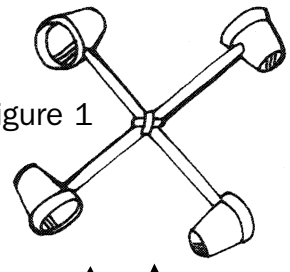

Figure 1

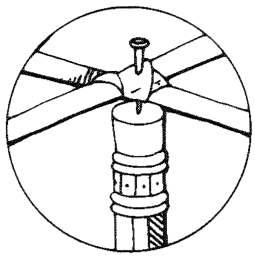

Figure 2

Think about it!

- How could wind speed be measured with this model?
- How would positioning the cups differently affect the way the model spins?
- Would cup size change the rate at which the model spins?
- How does an anemometer compare to a windmill or child's pinwheel toy?
- Why are wind speeds important to know? Who relies on that information?
- Besides using an anemometer, what other ways can you measure wind speed?

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Astronaut pudding

Scientific concepts

- Dehydration/hydration
- Space exploration

Supplies

resealable plastic bags
instant pudding (3 servings per box)
powdered skim milk
beakers or cups
spoons

What's happening

The instant pudding and powdered milk bought at stores are dehydrated foods. Adding water reconstitutes them. Due to weightlessness, astronauts in space must make modifications to the way foods are prepared and eaten. To keep water and powdery foods from floating away, plastic bag-like containers are used. An astronaut injects water into the container using a special water dispenser. The container is either shaken or kneaded to mix the contents. The question remains: if the purpose of dehydrated foods is to aid in reducing weight during liftoff, from where does the water come that is used in space? Water is a by product of the on board fuel cells used to make electricity. It is clean and abundant.

Description

Children are fascinated with astronaut life. To reduce weight during liftoff, much of the food on space missions is dehydrated, including pudding. Children can enjoy a space snack by hydrating powdered pudding, just as an astronaut would.

What to do

1. In advance, prepare the dehydrated pudding mixture as follows. In each resealable plastic bag add 3 tablespoons (45 mL) instant pudding and 3 tablespoons (45 mL) powdered milk. Seal the bag.
2. Give each student a prepared bag and spoon.
3. Instruct the students to measure 9 tablespoons (135 mL) of water. Add the water to the bag and close securely.
4. Mix by gently squeezing the bag – just like the astronauts!
5. Pudding is ready to eat in about five minutes. Eat the snack right out of the plastic bag.

Think about it!

- What other dehydrated foods/drinks do we use?
- What is the difference in weight between hydrated and dehydrated foods?
- Why is weight an important consideration during a rocket launch?
- Compare and contrast a given number of raisins with the same number of grapes. Why would raisins be bought on a space shuttle mission rather than grapes?

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Balloon squeezers

Scientific concepts

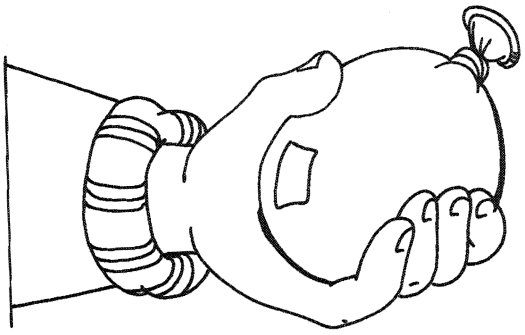
- Discrepant event
- Higher-level thinking
- Muscle development
- Physical properties
- Stress relief

Description

This flour-filled balloon has surprising characteristics. Make samples for students to squeeze. Have them guess what is inside the balloon. Students can them make their own balloon squeezers and have fun asking others to guess what is inside. Its compressibility makes it a good piece of exercise equipment for strengthening hand muscles and providing stress relief.

Supplies

31 cm or larger good quality balloons
2 kg bag of flour
funnels or film canisters



What to do

1. Place a funnel into the neck of a good quality balloon. If funnels are unavailable, make one by cutting off the bottom of an empty film canister. Stretch the neck of the balloon onto the canister.
2. Spoon the flour into the funnel or film canister. Gently tap.
3. Continue adding spoons of flour until the balloon is filled.
4. Gently remove the balloon from the funnel (canister) and tie off. Young children may need help tying a knot.

What's happening

Flour is a light powder, easily dispersed when touched. The flexible, yet confining, area of the balloon restricts the dispersion. The physical characteristics of baking flour are not easily recognised when felt through a balloon. Like scientists, students cannot always rely on the sense of sight or direct contact with matter when studying physical properties. Students are often surprised and even puzzled to learn that the balloon is filled with flour. Discrepant events such as this motivate students to think beyond the obvious, pushing them to use higher-level thought processes.

Think about it!

- Compare the characteristics of flour in a cup with that in the balloon. How are they the same? Different?
- Why do the physical properties of flour change when inside a balloon?
- Would sugar behave the same way? Salt? Sand? Dirt? Predict how their properties might change and try it!
- Why does squeezing a flour-filled balloon relieve stress? How?

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