Bubble Challenges

Can you blow a bubble...

... bigger than your head?

... within a bubble?

... on top of another bubble?

... that doesn't pop when you catch it with your hands?

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DUKE ENERGY SCIENCE NIGHT

Galilean Cannon

Supplies

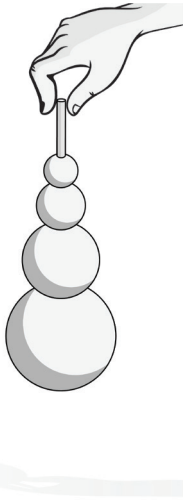
- a stack of balls (known as a seismic accelerator)
- safety glasses

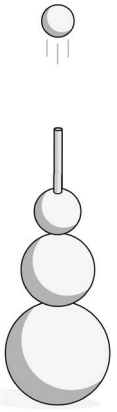
SAFETY NOTE

In this activity, the top ball can shoot off at high speeds! Be sure you wear the safety glasses when using the seismic accelerator - or are at a safe distance when the balls are dropped.

What to do

1. Hold the bouncy ball between two fingers, stretch out your arm, and observe the height of the ball.
2. Release the ball so that it drops and strikes the ground.
3. Observe how high the ball bounces relative to the original height of the ball.
4. Add the bouncy ball to the top of the seismic accelerator.
5. Hold the top of the seismic accelerator contraption between two fingers, stretch out your arm, and observe the height of the top ball.
6. Release the entire contraption. Stand back - the top ball can shoot into the air at high speeds!
7. Compare how high the ball bounced when it was on the stack versus not on the stack.





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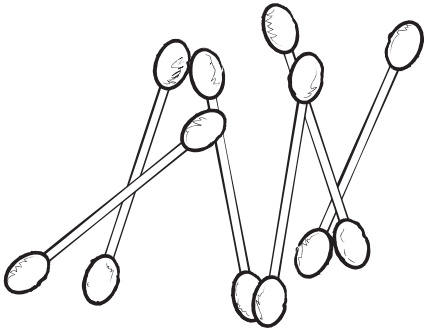
Invisible Ink

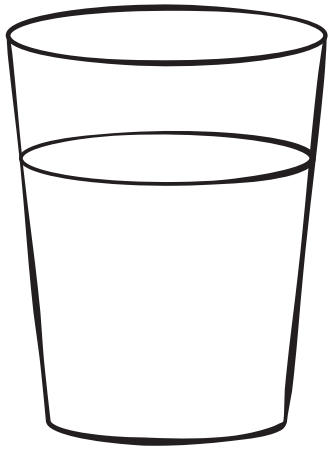
Supplies

- goldenrod paper
- cotton swabs
- vinegar
- water
- baking soda solution

What to do

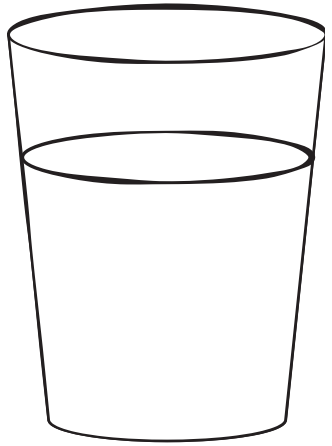
1. Dip a cotton swab into one of solutions. Draw or write on your paper. Did anything happen?
2. Using a new cotton swab, try one of the other solutions. What happened this time?





Water

Vinegar



Baking Soda Solution

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DUKE ENERGY SCIENCE NIGHT

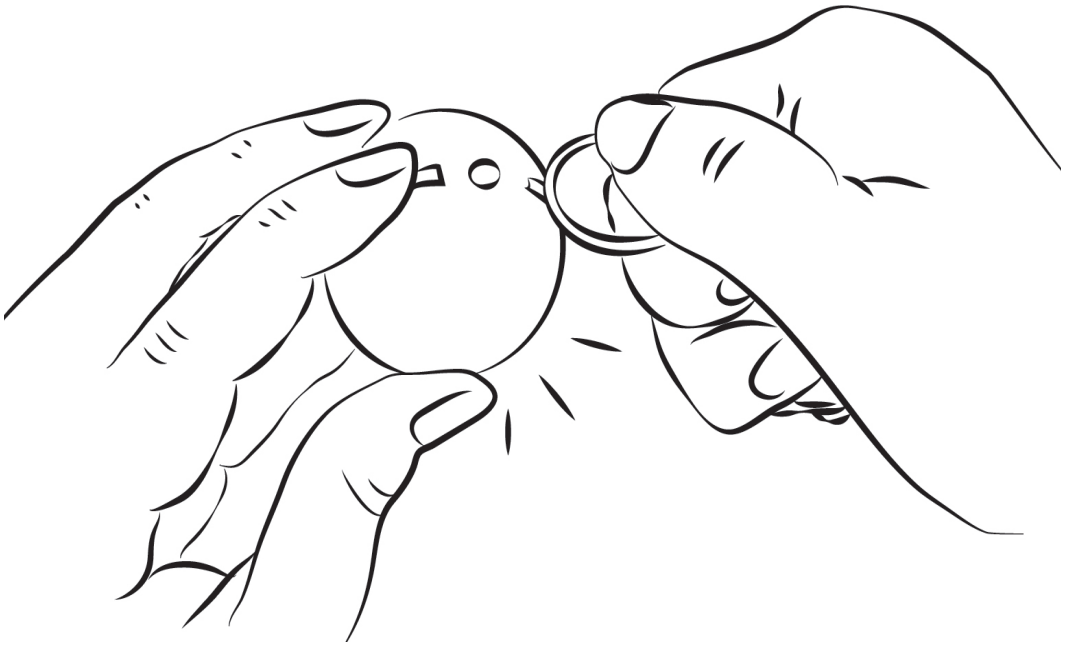
Light It Up

Light It Up challenges

- What happens if you place the ball between two people and each person touches one of the metal strips?
- What happens if you hold hands?
- What happens if you do not hold hands?
- Using the ball, create the largest human circuit possible by adding more people to the circle.

What to do

1. Test objects made of different materials - even try using your fingers.
2. Touch objects to the two pieces of metal on the Energy Ball.
3. If the object isn't able to touch both pieces of metal, touch it to one piece of metal while touching the other piece of metal with your finger.
4. Some materials will allow the electricity to transfer through them and "complete the circuit."



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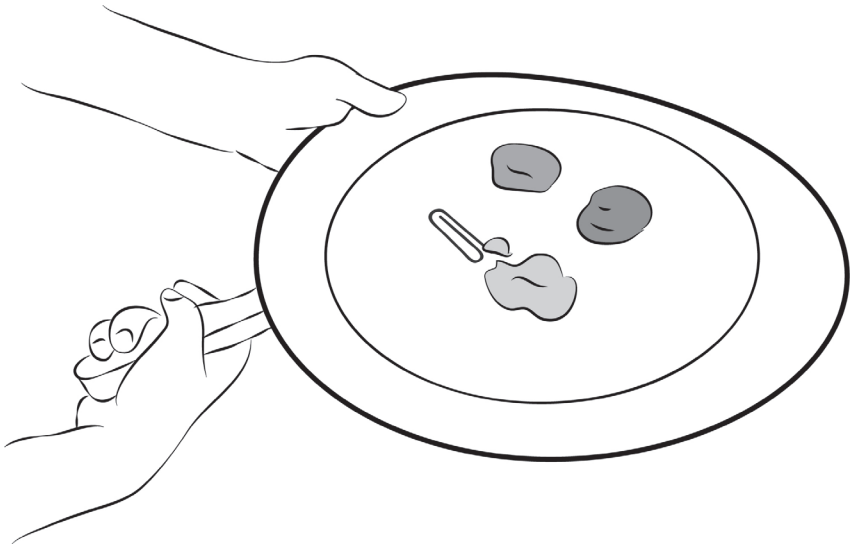
Magnetic Painting

Supplies

- 1 paper plate
- washable paint
- metallic objects
- 1 magnetic wand

What to do

1. Write your name on the paper plate.
2. Have an adult place 2-4 dime sized drops of paint on the plate – if you place too much paint on the plate it will get soggy and floppy.
3. Place one or more metal objects on your plate.
4. Hold the plate with one hand and hold the magnetic wand under the plate with the other hand. You can have a friend or a parent hold the plate for you.
5. Move the wand around slowly to drag the objects through the paint.
6. Observe the interaction of the objects and the magnetic wand as you create your masterpiece!



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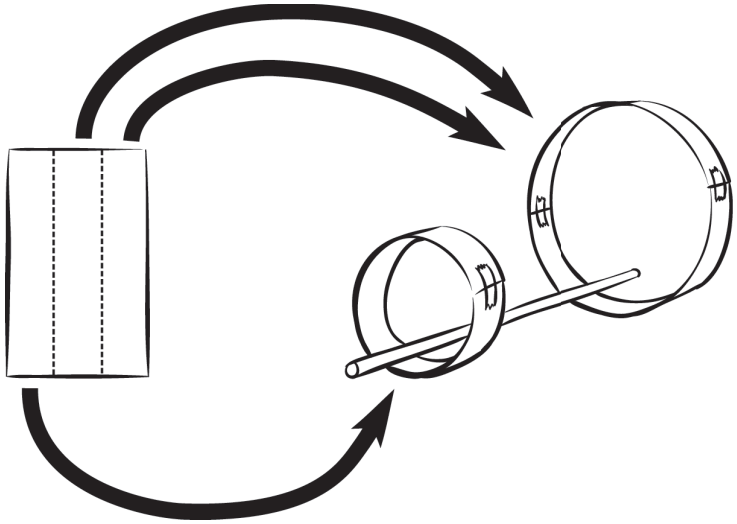
Paper Flying Machines

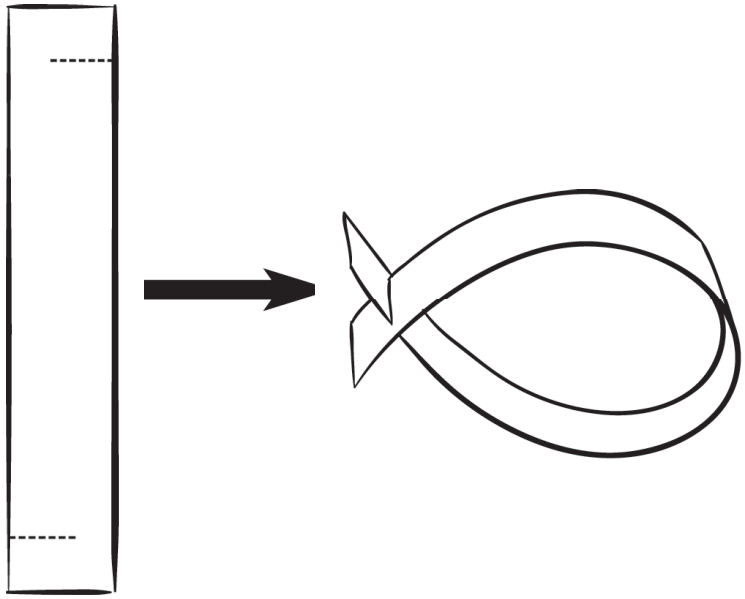
Straw Glider

1. Cut an index card into three vertical pieces.
2. Roll one piece into a small loop and tape it shut.
3. Tape the other two pieces together, then make a large loop and tape it shut.
4. Place your straw inside the two loops.
5. Tape the straw to the inside of the loops.
6. To fly, hold the straw, then throw it like a spear with the little loop in front and both loops pointing up.



Whirligig

1. Cut a strip of paper longer than it is wide.
2. Cut notches near each end from opposite sides of the paper.
3. Fold the strip into a loop and connect the notches.
4. Hold your Whirligig high above your head.
5. Let go and watch it twirl as it floats down.
6. Experiment: how should you hold it to make it twirl?



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Pinwheel Power

Supplies

- 1 pinwheel template
- 1 pencil with eraser
- 1 push pin
- scissors

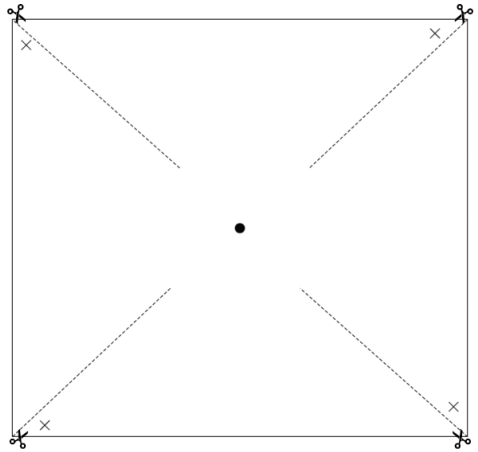
Note

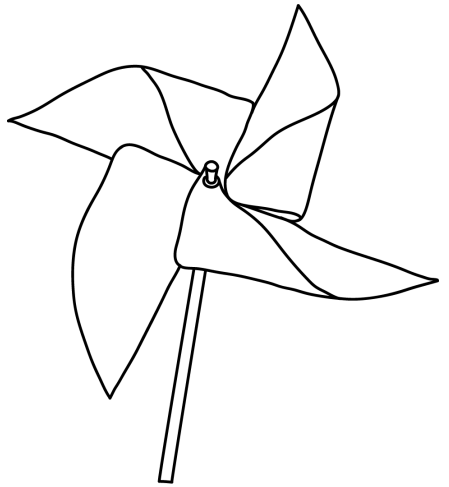
Experiment at home:

- Direct the air from a hairdryer on a low setting toward the pinwheel.
- Create a breeze by waving a piece of cardboard at the pinwheel.
- Take the pinwheel outside on a windy day to see wind power in action.

What to do

1. Cut out one square template for your pinwheel.
2. Cut on each of the four dotted lines. Be careful not to cut all the way across the template.
3. Write your name on your pinwheel template. You can also decorate it with markers if you wish.
4. Create your pinwheel's blades by pulling each corner marked with an X to the middle of the template. Don't fold the blades. The blades will need to be gently curved, or looped, so they can catch the wind.
5. Arrange the tips of the four corners so they overlap each other on the template's center dot.
6. Push the pin through the center of the template. Make sure the pin goes through the tips of all four corners to hold the blades in place.
7. Push the pin into the side of the pencil eraser. The pencil is now the pinwheel's handle.
8. Hold your pinwheel out in front of you so the front of the pinwheel is at a right angle to your body. Then swing your arm from side to side to push the pinwheel through the air and make the blades spin.
9. If the pinwheel seems stuck, you may need to loosen the push pin slightly to reduce the friction between the blades and the eraser.
10. If an electric fan is available, hold the pinwheel in front of the fan to watch it whirl!





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DUKE ENERGY SCIENCE NIGHT

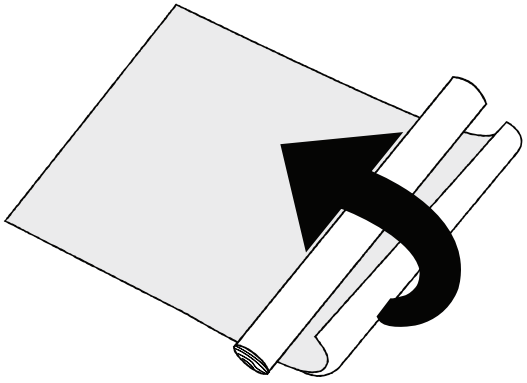
Stomp Rockets

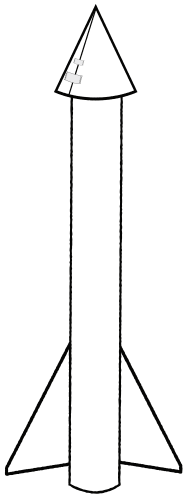
Supplies

- wooden dowel
- construction paper
- tape
- scissors

What to do

1. Wrap a piece of construction paper tightly around the dowel. Once completely wrapped, tape to hold in place.
2. Make a nose cone and attach to the top of your rocket. Make sure your nose cone is air-tight for a successful launch.
3. Slide the rocket off the dowel and try a test launch!
4. Try attaching fins to the back of your rocket – does it change the way it flies?





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DUKE ENERGY SCIENCE NIGHT

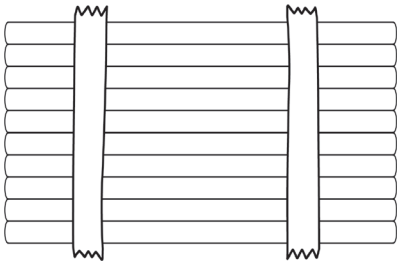
Straw Flutes

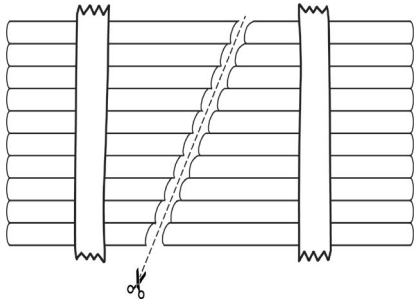
Supplies

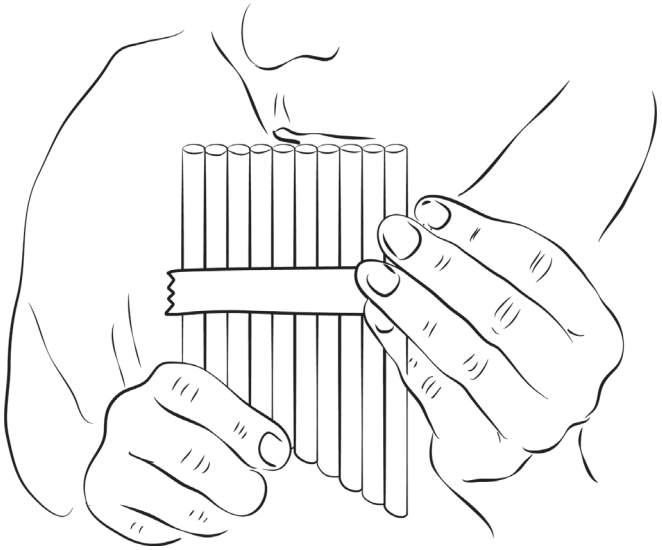
- 10 straws
- masking tape

What to do

1. Get a partner to work with if you can.
2. Select 10 straws and line them up evenly.
3. Wrap masking tape around the straws near each end.
4. Have an adult use the scissors to cut diagonally through all 10 straws.
5. You will now have 2 straw flutes – one for each partner!







Test your flute

- Blow across the tops of the straws, not directly into them.
- Do you hear a difference when you blow across the shorter straws versus the longer straws?
- Can you could play a song such as “Twinkle, Twinkle, Little Star”?

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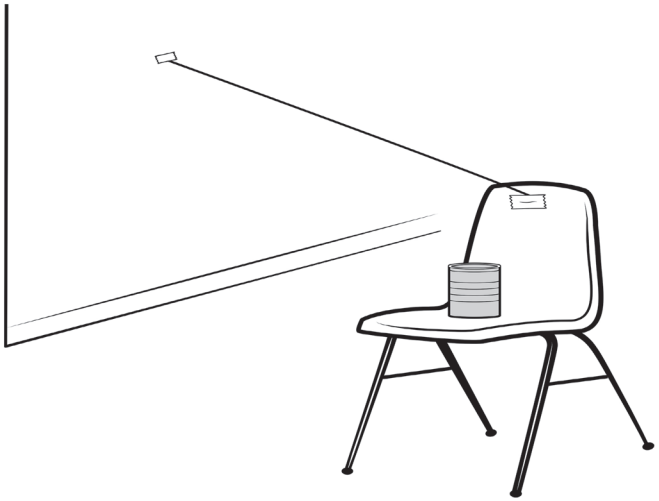
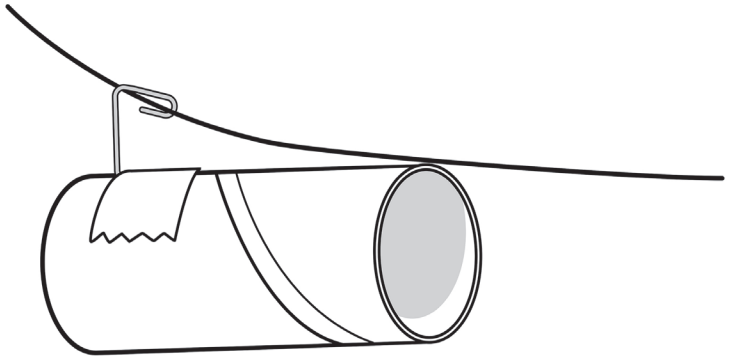
Zip Lines





Zip line set up

1. Cut a length of fishing line, approximately 4 feet.
2. With masking tape, attach one end of the fishing line to the wall.
3. Attach the other end of the line to a chair, allowing the line to extend down at an angle.
4. Place a coffee can or other container on the chair to catch the ping-pong balls.
5. Set up other lines throughout the room. Change the angle or length to provide different challenges, or set up identical lines for races!

Zip line cars

This is just one example of a zip line car. Use your imagination to come up with a brand-new design!

Can you ...

... build a car using any of the materials provided, to carry a ping-pong ball to the can at the end of the line?

... make a car out of only one piece of paper?

... make a square car?

... make a car to carry multiple ping-pong balls?

... make the fastest car?

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