In this activity, kids make a puppet with moving limbs out of levers and string. After showing them how to make the arms, you’ll challenge them to construct the rest of the puppet on their own.

**Prepare Ahead**

- Try the activity yourself so you can anticipate where kids may get stuck or need guidance. Judging where the holes should go, using the hole punch, and tying the strings may be challenging for the youngest in your group.

- For the bodies of the puppets, cut rectangles (5" x 8" or larger) of thin cardboard, about the thickness of a cereal box. Poster board also works. Kids will need to punch holes in the cardboard, so the thinner the easier. Make plenty of extras.

- For the arms and legs, cut 3" x 5" index cards in half lengthwise. Each kid will need four index card strips, but make plenty of extras.

- Set up work areas. Each kid should have one cardboard rectangle, four index card strips, and four brass fasteners. Kids can share a ball of string and a hole punch.

- Set up the art supplies (construction paper, markers, glue or tape) in a separate location. Have kids concentrate on making a functioning puppet before they move on to decorating them. You may want to offer additional art supplies like pipe cleaners, foil, or glitter.

**Lead the Activity**

**Introduce Ruff’s challenge.** (5 minutes)

Hand out the activity sheets. Tell kids that today’s challenge is to make an action figure with moveable arms and legs. The moveable parts are levers.

- Ask kids if they can explain what a lever is, and to name some examples. *(A seesaw, scissors, catapult, crowbar, handle on a toilet, a door, a baseball bat.)*

- Hold out a pair of scissors or a ruler and ask someone to demonstrate how a lever works. *(Open and close the scissors, which are actually two levers working together. With a ruler, the movement of a seesaw, catapult, or crowbar can be modeled.)*

- Ask if anyone can explain what a fulcrum is *(a pivot point around which the lever moves)* and have him or her point out some examples.

**Materials**

- activity sheet for each kid
- 1 rectangle of thin cardboard (5” x 8” or larger) per kid
- 2 3” x 5” index cards cut in half lengthwise = 4 index card strips per kid
- hole punch (1 per group)
- box of ¾” or 1” brass fasteners (4 per kid)
- balls of string (1 per group of kids)
- scissors (1 per kid)
- construction paper
- markers
- glue or tape
- examples of levers: scissors, a ruler to demonstrate a seesaw, a catapult, or a crowbar

**National Science Education Standards**

**Grades K–4**

Physical Science: properties of objects and materials; position and motion of objects

Science and Technology: abilities of technological design

**Grades 5–8**

Physical Science: properties and changes of properties in matter; motions and forces

Science and Technology: abilities of technological design
Demonstrate how to make arms. (10 minutes) Help kids follow steps 1 through 4 on the activity sheet. Things to emphasize:

- Make the holes on the body at least 2” down—otherwise arms will stick out over the top of the puppet.
- Use fasteners in the lower holes on the arms—the upper hole is for the string.
- Pull the arms down to rest against the body before tying the string.
- Kids may have difficulty with the hole punch or tying knots in the string.

Have kids work out the rest. (20 minutes)
- Now that kids understand how the arms work, have them add the legs, repeating the same process.
- Then have kids tie a string to connect the arms and legs. By pulling on one string, all the limbs should move at the same time.
- Once their levers are working, it’s time to have kids decorate their puppets. By having them add a hole and a loop of string at the top, you can hang the puppets on a bulletin board.

Discuss what happened. (5 minutes)
Gather as a group, and have kids show off their puppets. Ask them to talk about any problems they encountered and how they fixed them.

Award points. (5 minutes). Time to rack up some points! Review the activity’s key ideas by asking the following questions, worth 50 points each.

1. How many levers are on the puppet? (Four) Where are the fulcrums? (The four brass fasteners)
2. Can you explain how a lever works? (A lever is a bar that’s attached to a pivot point called a fulcrum. When you pull one end of a lever down, the other end goes up.)
3. By pulling down on the string, you raised the arms and legs. What brings them back down? (Gravity)
4. Name three examples of levers. (Scissors, crowbar, catapult, door, toilet handle, baseball bat, seesaw, paddle)
5. What other kinds of puppets could you create using levers? (Kids might suggest puppets with moving tails, ears, jaw, or wings. Or they may suggest adding elbow and knee joints to the arms and legs.)
**Get what you need.**
- 1 rectangle of thin cardboard (5” x 8”)
- 2 3” x 5” index cards cut in half lengthwise
- hole punch • 4 brass fasteners • string
- scissors • construction paper • tape or glue
- markers

**Make arms.** With a hole punch, make two holes near the top of one of the index card strips, as shown. Leave about a half-inch between the holes. Do the same to a second strip.

**Make armholes on the body.** Punch a hole on each side of the cardboard rectangle, about two inches down from the top, one on each side.

**Attach the arms.** Use brass fasteners to attach the arms to the body. Be sure to use the lower armhole.

**Add string.** Pull the arms down against the body. Loop string through the top holes on the arms and tie, letting the extra string hang down. Pull on the string. What happens? You’ve just created two levers. The brass fasteners are the fulcrums—the point on which the levers rotate.

**Add legs.** Create legs the same way you made the arms.

**Connect arms and legs.** How can you attach a string to both the arms and legs to make them move at the same time?

**Add personality!** Once the arms and legs are working, it’s time to get creative. Use markers and construction paper to make a character of your own. Punch a hole at the top and add a loop of string to make it easy to hold.

**Chew on This!**
A lever is a bar that’s attached to a pivot (turning point) called a fulcrum. You use a lever when you flush a toilet, paddle a boat, or cut with scissors—they’re everywhere! Some are good at moving something heavy—a crowbar, for example, can pry open a door that’s stuck. Levers can also make something move fast—a baseball bat hitting a ball, for instance, or a catapult hurling a stone.
Dig Deeper

Take it outside. Make another action figure, decorating it with materials found in nature—you might try acorn eyes, pine-needle hair, a leaf jacket, and bark pants.

Jack-of-all-trades. Create a Jumping Jack puppet where the levers are NOT arms or legs. Can you use levers to make a tail that wags, ears that flap, or wings that fly? Can you make a Ruff or Blossom action figure?

Did You Know?

The Jumping Jack is an old fashioned mechanical toy. In Germany, it was called a Hampelmann. Made of wood, these dancing puppets were often clowns, jesters, or animals. Lots of mechanical toys from the past have hilarious names. There’s the Whirligig (a wind-powered spinning toy), the Flipperdinger (which suspended a ball in a stream of air), and the Gee Haw Whimmy Diddle (a propeller toy).

Check out the Ruff toy I made. He dances! He leaps! He’s got team spirit! He’s Rufftastic! Who needs a store-bought action figure when you can customize your own? Now it’s your turn. Use your toy-making talents to create a super hero, an alien, or a mini-you!

Watch FETCH! on PBS KIDS GO! (check local listings) and visit the FETCH! Web site at pbskidsgo.org/FETCH.