Build Your Own

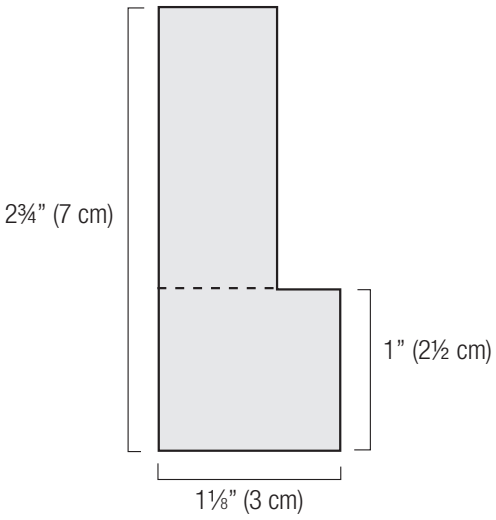
PASSIVE DYNAMIC MINI-WALKER

A ***passive dynamic*** walker doesn't need a motor or actuator of any kind. Its only power source is the force of gravity! Also called a ramp walker, this system of walking works best on a slightly downward-tilted surface. Give it a little push and gravity will pull it downhill the rest of the way. This method of walking doesn't just save energy, it looks more natural too. Here is one way of making a small-scale passive dynamic walker. Experiment with different sizes and shapes, or use other materials that you have on hand. You can also try four legs instead of two, give your walker knees, or attach swinging arms to add energy to each step.

Words to Know

passive dynamic: a robot walker that is powered by gravity.

1 Cut out two legs from the cardboard, 2¾ inches long (7 centimeters) and 1½ inches wide (3 centimeters). From one end of each rectangle, measure 1 inch up (2½ centimeters) and make a ½ inch cut (1 centimeter). From there, trim up the cardboard so it forms an "L" shape, or a leg and a foot. With the pencil or nail, poke a hole at the top of each leg in the center. Fold the cardboard at the "ankle" so the foot sits flat.



2 Cut out two pieces craft foam, felt, or cork the same size as the foot. Glue it onto the bottom of each foot for padding and traction.

3 Slip one of the beads onto the skewer a little past the middle. Try to use a bead that is a little tight on the skewer. If it's loose enough to slide around, just keep it in place with your finger for now.

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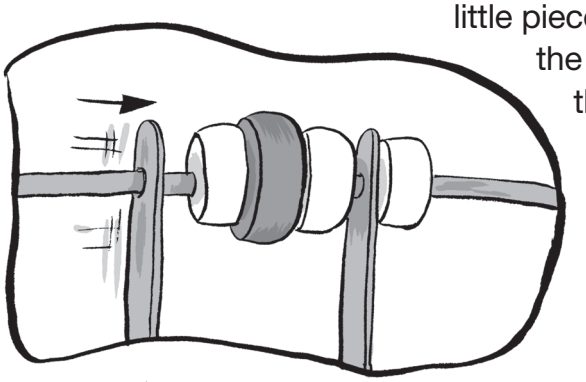
SUPPLIES

- cardboard
- scissors
- sharp pencil or large nail about as wide around as the skewer
- 1 small sheet craft foam, felt, or thin cork (peel-and-stick is best)
- glue stick
- bamboo skewer about 10 inches long (25 centimeters)
- wooden or plastic beads
- mini craft sticks about 2½ inches (6½ centimeters) long, or regular craft sticks or coffee stirrers cut to size
- clear tape or 2 rubberbands (optional)
- large sheet foam core (optional)
- masking tape (optional)

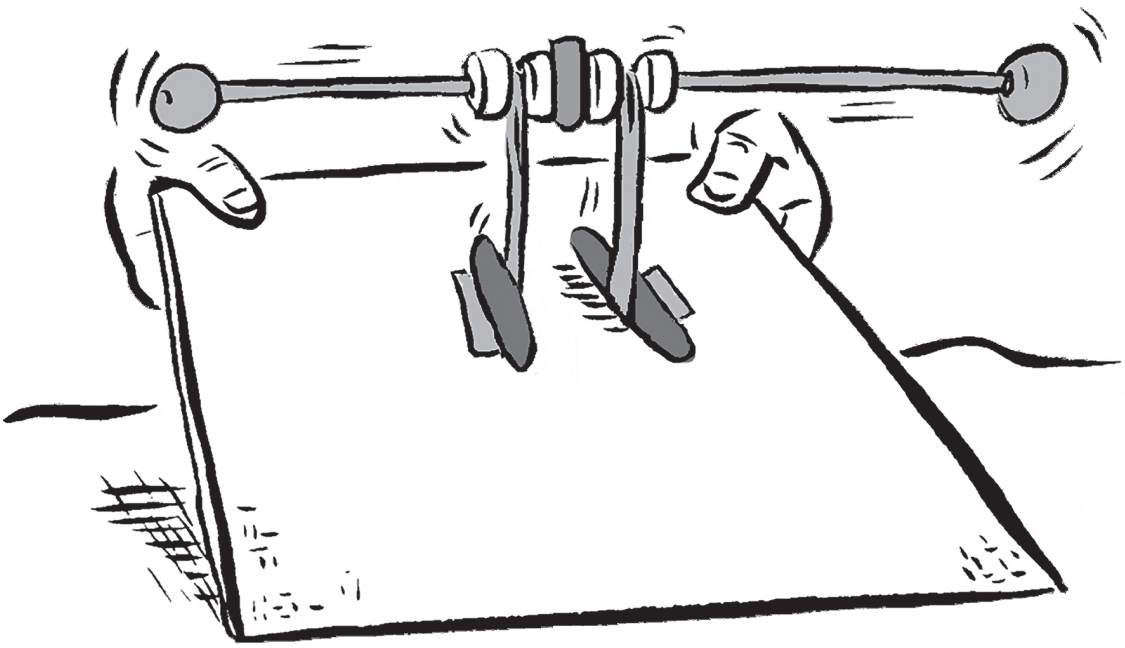
4 Slide one of the legs onto the skewer through the hole so that the foot faces the end of the skewer with the bead. The leg and the bead should be almost touching.

5 Slide one big bead or several small beads onto the skewer so they are just touching the inside of the first leg. The bead(s) should cover about ½ inch of the skewer (1 centimeters).



6 Slide on the second leg so that the front of the foot is pointing in the same direction as the first foot. Slip another bead onto the skewer to hold the legs in place, making sure there is just enough space for the legs to swing back and forth easily. If the outside beads are not staying in place, wrap a rubber band or a little piece of tape around the skewer to keep them from sliding around.

7 Stick a bead on each end of the skewer. It should be tight enough to stay on. If not, attach with tape. You can glue the beads on, but first make sure the legs are in the center of the skewer and your mini-walker is balanced. Avoid getting any glue on the legs!

8 Stand the walker on its feet. Glue a mini-craft stick onto each foot, right next to the leg.

9 Make a test ramp with a long flat surface that you can tilt slightly, like a big book or a sheet of stiff cardboard. Foam core makes a nice walking surface. For added traction put some strips of masking tape down the length of your ramp. To test the walker, set it at the top of the ramp and gently tap one end of the skewer. The walker should tip from side to side as it makes its way downhill.