

SCHOOL AGE

Week

17

Smart Activities



SMART CHOICE. SMARTER CHILD.®

Muscle Power Engineering

Materials: brick or heavy object

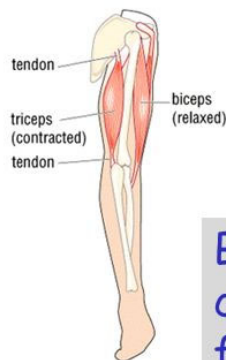
Instructions:

Without muscles attached to your skeleton, we all would be stuck in place like a useless “bag of bones!” We would be doing nothing and going nowhere. Some 650 muscles cover our skeletons to hold our bones in place and make them move. Attached at both ends by tough cords of tissue called tendons, these muscles work in pairs to pull the bones in position for some action.

1. Observe your muscles at work by placing your left hand on the large biceps muscle of your upper right arm as you bend that arm into a “strong-man” pose. The muscle will bulge as it shortens (contracts) to pull up your forearm. Under that arm is the relaxed triceps muscle.
2. Straighten your arm. Feel the biceps relax (lengthen) as the triceps tightens to pull your forearm down.
3. Now, demonstrate the benefit of using muscles as levers – simple machines.
4. Hold your arm out straight, grip the brick (or whatever heavy object you are going to use).
5. Grip the brick from the top and raise it in the air without bending your elbow. Pretty difficult, isn't it?
6. Now changing your grip, turn the brick over so it is resting in the palm of your hand.
7. Pull the brick up towards your shoulder as you bend your arm. This is way easier! This way is easier because your muscles worked as a lever pulling against the bone in your arm. This muscle activity illustrates the lever principle of a simple engineering concept of a simple machine.

Human Arm as a Lever

Biceps is a **third class lever** so a large effort force acts over a small distance to move a small load over a large distance.



Triceps is also a third class lever, which pulls the arm in the opposite direction.

Because muscles can only contract, they're almost always found in pairs, like biceps/triceps.

Help, I'm Shrinking!

Materials: door frame, pencil, paper

Instructions:

Believe it or not, you're taller in the morning than at night!

1. Measure your height against a doorframe first thing in the morning.
2. Record your height accurately.
3. Measure your height again in the early evening.
4. Record your height accurately.
5. This should prove that you've lost about a quarter of an inch (half a centimeter) during the day!

Gravity and your own daytime activity have compressed the cartilage pads (between vertebra disks in the spine) causing your spine to shrink. This explains the height differences between morning and evening.

No worries! When you are asleep, the cartilage between each vertebra absorbs water from your body and puffs up again adding height to your body!



Your Body's Air Conditioner

Strange as it may seem, perspiring, or sweating, cools you off. When nerves in the skin tell your brain that your body is heating up, the brain signals the sweat glands to go to work. There are about 650 sweat glands in each square inch of skin – more than two million in all. The salty sweat they produce squirts out to the skin's surface through tiny openings called pores. As your sweat evaporates, your skin cools off and your body temperature is lowered.

Think of your body as an air conditioning unit. The air conditioner in a building is set to a certain temperature, and if the temperature rises beyond that set level, the air conditioner starts blowing cool air into the space. This is exactly how your body works as well. Your body temperature rises beyond its normal level and your internal air conditioner sends sweat through the pores of your skin to cool you off. Pretty amazing how our bodies take care of us!



Roller Coaster Designs

Marcus Thompson is credited with having invented the United States' first roller coaster in 1884, at a park in Coney Island, New York. Thompson built a 450-foot steel and wood track on which the cars moved at six miles per hour. The oldest roller coaster dates back to the "Russian Mountains," which were hills constructed of ice located around Saint Petersburg, Russia during the 17th century. We know roller coasters today as a type of amusement ride that employs a form of elevated railroad track designed with tight turns, steep slopes and loops.

Materials: duct tape, foam pipe insulation, chart paper, marbles, masking tape, scissors

Instructions:

1. Cut the foam pipe insulation lengthwise to form two pieces of track. Cut these same pieces widthwise so that you have 4 pieces.
2. Now, construct a roller coaster that is tall, fast, and steep but still safe. Make sure your coaster has a starting point and ending point, your car (marble) must stay on the track. Add a hill and incorporate a loop or curve into your design.
3. Use your masking tape to secure the track to the sheets of chart paper.
4. Next, make your pipes move in different directions of twists and turns for your roller coaster. Keep testing often using your car (marble) to see if it is working and make changes as needed.



Design Your Own Clothing

Materials: butcher paper (heavy brown paper – comes on a roll), tape, paint, markers, colored tape, various trims (ribbons, buttons, any kind of trim pieces)

Preparation: Find a large work area.

Instructions:

1. Draw a basic shift-style dress or T-shirt pattern that will fit you on the butcher paper.
2. Fold that length of the butcher paper in half horizontally.
3. Cut the desired length for a dress or shirt from the folded sheet.
4. Turn the paper so the fold is on the right.
5. Cut a U-shaped armhole in the upper left corner.
6. Open up the fold and cut a U-shaped or a V-shaped neckline in the center of the top edge. This will form the shoulder straps between the armholes.
7. Hold up the pattern in front of yourself and trim as necessary for the right fit you desire.
8. Trace this pattern onto another sheet of butcher, so you have a front and back to your design.
9. Tape the shoulder and side seams, making sure your design can fit easily over your head.
10. Decorate your paper clothing making your own unique design!

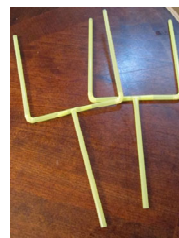


Football Anyone?

Aerodynamics is the study of the motion of air and its interaction with a solid object, such as an airplane wing. When a quarterback throws a tight spiral pass, there is air and gravity involved with the flight of the ball. To accomplish a perfect pass, quarterbacks study the forces acting upon the football moving through the air. The same is true for kickers in football and soccer as well as basketball players shooting the ball through the hoop.

Materials: recyclables and other objects from around the home (straws, paper cups, cardboard tubes, craft sticks), scissors, tape, paper

Instructions:



1. Build two goal posts using recyclable objects in your home. (Use pictures above as a guide.)
2. Find a smooth flat surface to use as your game field.
3. Fold sheets of paper into different shapes, including triangles or squares, or crumple the paper into a ball.
4. Attempt to make field goals by flicking the various shapes through the goalposts. If you want to make a football triangle shape, look at this website for step-by-step instructions: <https://www.itsalwaysautumn.com/how-to-make-a-paper-football-flick-football.html>
5. Which shapes travel the farthest and highest?



Price Tag Sticker Jar Art

Materials: neon price tag stickers (you can find in office supply stores, dollar stores, or online), jars, Mod Podge® (optional- but keeps stickers from peeling off)

Preparation: Gather materials.

Instructions:

1. Look at your jar(s) and stickers. Visualize a pattern you would like to create, such as a chevron or subway tile pattern.
2. Begin placing stickers on your jar until you have the desired pattern you like.
3. Paint over using Mod Podge to help protect the stickers from peeling or getting exposed to steam or moisture. (This is optional but will prolong your creation by providing a protective coating.)
4. Allow time to dry before moving it or placing materials inside the jar. Maybe add a tea light inside your jar. (There are great battery-operated ones available at the dollar stores.)





Rubber Band Power Boat

The goal of any paddle is to push against the water so that a boat goes forward. The old-fashioned paddle wheel rotates like a tire and just pushes the water straight back, thus making boat go forward. Your boat will run on energy stored in the rubber bands attached to the paddle wheel. As you wind the paddle wheel, the attached rubber band also winds storing its energy. When released the rubber band unwinds causing the paddle wheel to rotate and the boat to move.

Materials: plastic water or soda bottle with lid, 2 wooden skewers or chopsticks, low heat glue gun (**adult supervision needed**) or use duct tape, 2 plastic spoons, rubber bands, scissors, large container of water for testing boat power

Instructions:

1. Start by hot gluing (**adult supervision needed**) or duct taping the wooded skewers to opposite sides of your plastic bottle. You want to have 6-inches of skewer left sticking off from the bottom of the bottle.
Caution: the tips of the skewers are sharp.
2. Once the skewers are dry, take 3 rubber bands together and wrap around the bottle about halfway down to help secure the skewers (if you used hot glue instead of duct tape).
3. To make the boat's paddle, break or cut the handles off your 2 plastic spoons, leaving 1/2 inch of the spoon handles attached.
4. Glue the 2 spoon heads together or duct tape opposite sides (one spoon face in and the other one facing out as shown in the first picture).
5. To attach your paddle, stretch the rubber bands (3) over the skewer ends at the bottom of the boat and twist to attach them on each side. Then, slide your spoon paddle into the rubber bands.
6. Now, twist your spoon to make the rubber bands tight and place your boat in the water.



Crayon Magic T-Shirt

Be the first on your block to have this self-made design T-shirt!

Adult assistance is needed for this activity.

Materials: crayons, t-shirt, iron, fine sandpaper, cardboard, parchment paper/paper towel, paper

Preparation: Gather materials. Design your t-shirt on paper first.

Instructions:

1. Color a fun design on the sandpaper. You may want to design first on a piece of paper. Remember, when you are drawing on the sandpaper your image will be reversed.
2. Once you have your design on the sandpaper, go over one more time with each color of the crayons over your design creating a thick layer of crayon.
3. Place a piece of cardboard inside the t-shirt to keep the design from bleeding through to the back of the shirt. Position the sandpaper design-side down on the t-shirt.
4. Place a piece of parchment paper or paper towel on top of the sandpaper to protect the iron. **Adult assistance needed:** Iron, on cotton setting, the sandpaper for about 30 second. Gently lift one edge and make sure you have a good print before totally removing the sandpaper. Iron a bit more if you need to transfer more of the crayon.
5. Remove the sandpaper and get ready to go out in style with your new shirt.

