

# PROJECT REFERENCE

## UNIT 2

### MAKE THE MUSCULAR SYSTEM OF A HAND

You can see how muscles in our hands work by doing this project.

Materials:



paper



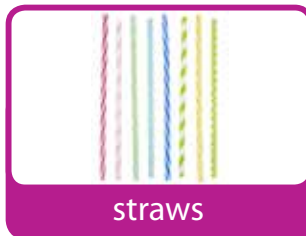
a pencil



scissors



double-sided tape



straws



a needle and thread

#### STEP

- Put your hand on the paper and trace its shape with a pencil.
- Cut out the drawing with the scissors.
- Stick three pieces of double-sided tape on each finger, with two pieces on the thumb.
- Cut the straws into small pieces and stick them to the tape.
- Make a hole in the tip of each finger with the needle and pull the thread through the straws.
- Tie the five threads together and put them inside a straw.
- Pull the straw. Watch the fingers move!

Movements of the hand are mostly started by muscles in the forearm. In the project, the straw connecting all five threads works as the muscles in the forearm. Tendons, pieces connecting a muscle to a bone, run from the tips of the fingers to the arm. Each thread pulled through the straws on fingers works as tendons.

## UNIT 5

# VALVES IN THE HEART

You can see how the valves and heart work to make blood flow through your body.

Materials:



a small jar



two bendy straws



a balloon



tape



water



red food coloring



scissors



a cup

### STEP

- Fill the jar halfway with water and add red food coloring.
- Carefully cut the neck off the balloon. Stretch the top of the balloon over the jar.
- Make two small holes in the top of the balloon. Leave 2.5 cm between the two holes.
- Push the straws through the holes. Tape the neck of the balloon to the end of one of the straws. Put the cup under the open straw. Push up and down on the balloon.

As the heart muscle contracts and relaxes, the valves open and shut. This process lets blood flow into each chamber of the heart. Thanks to the valves, blood flows up through the right veins. Also, they prevent the backward flow of blood.

# PROJECT REFERENCE

## UNIT 7

### MAKE YOUR OWN COMPASS

You can easily make your own compass and find the directions.

Materials:



a round magnet



scissors



a card



glue



a bowl of water



a pen

#### STEP

- Cut a circle shape out of the card.
- Glue the magnet to the card, so it sticks up.
- Put the compass in the water. Watch the compass move. It will always point north.
- Take the compass out of the water and write N, E, S, and W around the edges.

A magnet will always point to Earth's magnetic north if it can move freely. When we put the magnet in the water, it can move freely, so it lines itself up with the north. Even if we spin the compass or put it in the water in a different direction, it will still move to point north.

## UNIT 9

# SUGAR AND YEAST BALLOONS

What happens when you put sugar and yeast together? Let's check it out.

Materials:



four bottles



very warm water



four balloons



yeast (four packs)



sugar



a spoon



a funnel

### STEP

- Fill each bottle with the same amount of water (at about 40 degrees Celsius).
- Use the funnel to pour a pack of yeast into each bottle.
- In the first bottle, do not add sugar. Add one spoon of sugar in the second, put two spoons of sugar in the third, and put three spoons of sugar in the fourth.
- Close the lids and shake the bottles. Put a balloon on top of each bottle and wait a few hours. What happens?

Yeast is a living organism that actually eats sugar. As it eats the sugar, it produces a gas called carbon dioxide. The gas can't escape, so it fills the bottle and then begins to fill the balloons. Yeast is what makes the holes in bread that make it light and airy. It eats the sugar in the bread dough and creates small gas bubbles in the bread.



# PROJECT REFERENCE

## UNIT 10

### WHAT MOLD NEEDS IN ORDER TO GROW

When the environment is the same, what is essential for mold to grow?

Materials:



four containers



plastic wrap



a slice of bread



a piece of toast



sliced tomatoes



some baked beans

#### STEP

- In each container, put one of the following: a slice of bread, a piece of toast, some sliced tomatoes, and some baked beans.
- Cover each container with plastic wrap. Put them in a dark and warm place. Keep checking the containers every few days.
- What happens to the food in the containers? Did mold grow in each container?

Mold spores need three things to grow: nutrients, warmth, and moisture. When they find something to eat, they start to grow. Food that is outside of a cold refrigerator is warm and provides nutrients for the mold spores. Foods like beans and tomatoes are moist, so mold grows on them very quickly. It grows slower on dry foods like bread and toast.

## UNIT 13

# RAINBOW PRISM

You can make a rainbow with a prism and a piece of paper.

Materials:



### STEP

- Place the white paper flat near sunlight. Put the prism above or on the paper.
- Rotate the prism until you see a rainbow on the paper.
- What colors do you see?

In a rainbow, white light is split into many colors. The colors of a rainbow are always in the same order. This is because each color is at a different wavelength. The wavelength of color never changes. Red has the longest wavelength, and violet has the shortest wavelength.