



Every Part Does Its Part



What Students Learn

Your students will learn about the **major parts of the heart** and **what each part does** to keep bodies healthy and strong.

Materials for each pair of students: copy of the “Every Part Does Its Part” printable, scissors, glue

Show students the heart model. Share that the heart is actually a **muscle the size of their fist** and that it **will stay that size even as they continue to grow**. Remind students that the job of the heart is to **pump blood to every part of their body**. Remove the front piece of the model so students can see inside the heart. Point out the right and left sides. Guide students to see that each side, is divided into two chambers.

Next, divide the class into pairs. Distribute the materials listed above. Have each twosome work together to complete the printable as directed. Check students’ work as a class, directing students to reposition any boxes they placed incorrectly. Once the position of each box has been determined, have students glue the boxes in place.

To conclude, divide the class into small groups. Help each group locate on the model each of the parts shown on the printable. (See the chart on the right.) Each time students find a part, have them shade the small circle beside the part’s name on the printable. (Note: The septum is not numbered on the model, but can be easily located.)

Part	Numbered part on model
vena cava	3, 4
veins	3, 4, 19, 20, 21, 32, 34
right atrium	1
valves	26, 27, 29, 30
right ventricle	5
left ventricle	15
septum	not numbered on model
left atrium	28
artery	10, 11, 16, 17, 18, 22, 31, 33
aorta	7, 8, 13

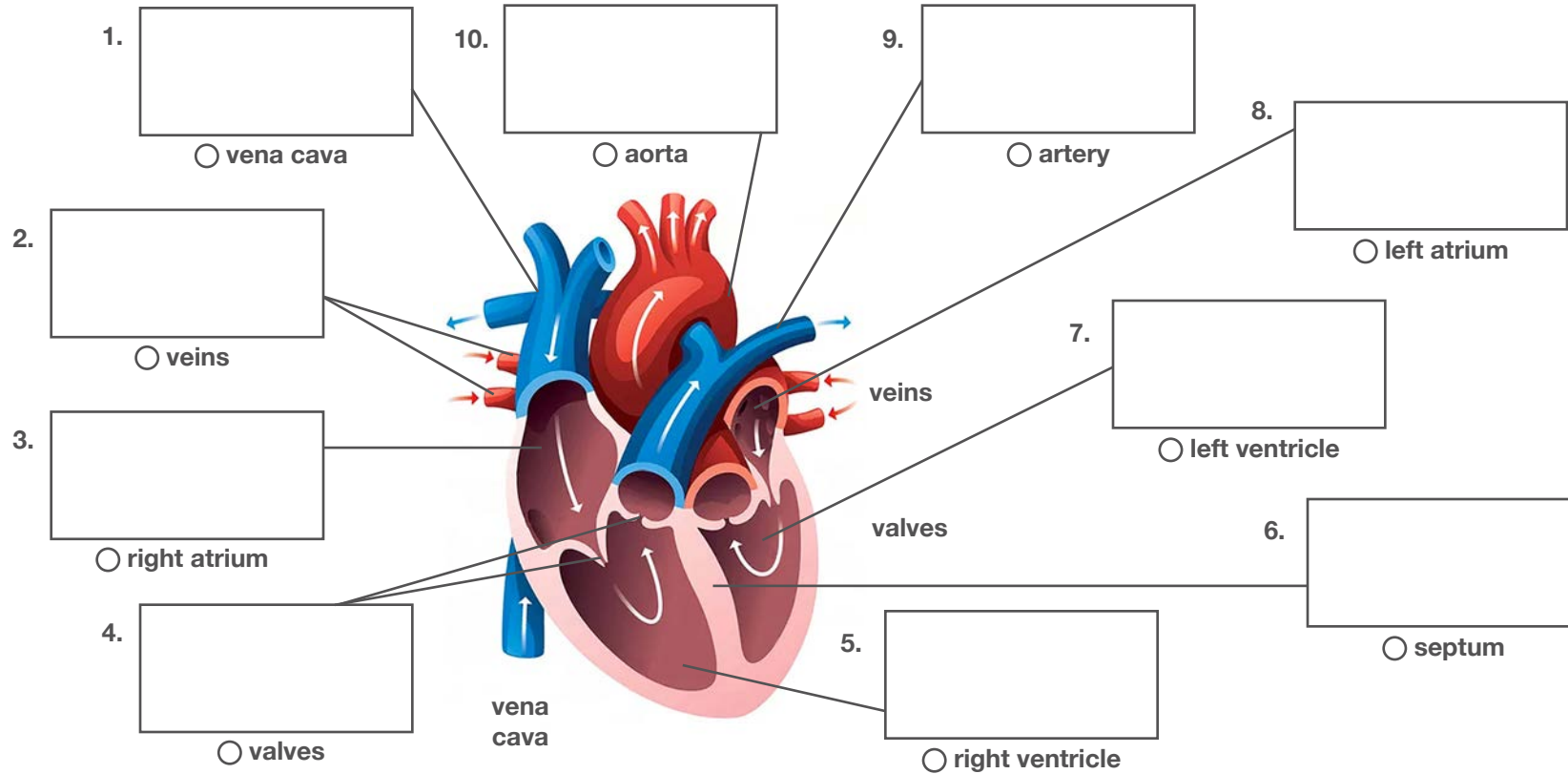
Extend With STEM

- The blood that is pumped to the lungs absorbs oxygen. Challenge students to design an experiment that will help them determine which of several types of materials are more absorbent, such as felt, cotton balls, washcloths, paper towels, cloth napkins, and bath scrunchies. Then have students conduct their experiments and share their results.
- The circulatory system is like a delivery system: the blood carries oxygen, and nutrients. It also picks up stuff your body doesn’t need (such as carbon dioxide) and takes it to a part of the body that can get rid of it (such as your lungs). Divide the class into small groups. Give each group a box of recyclables and art materials. Have the group position two student desks so they are 12 inches apart. Then challenge the group to use the box of materials to design and test a delivery system that will move a pencil from one desk to the other.

Every Part Does Its Part

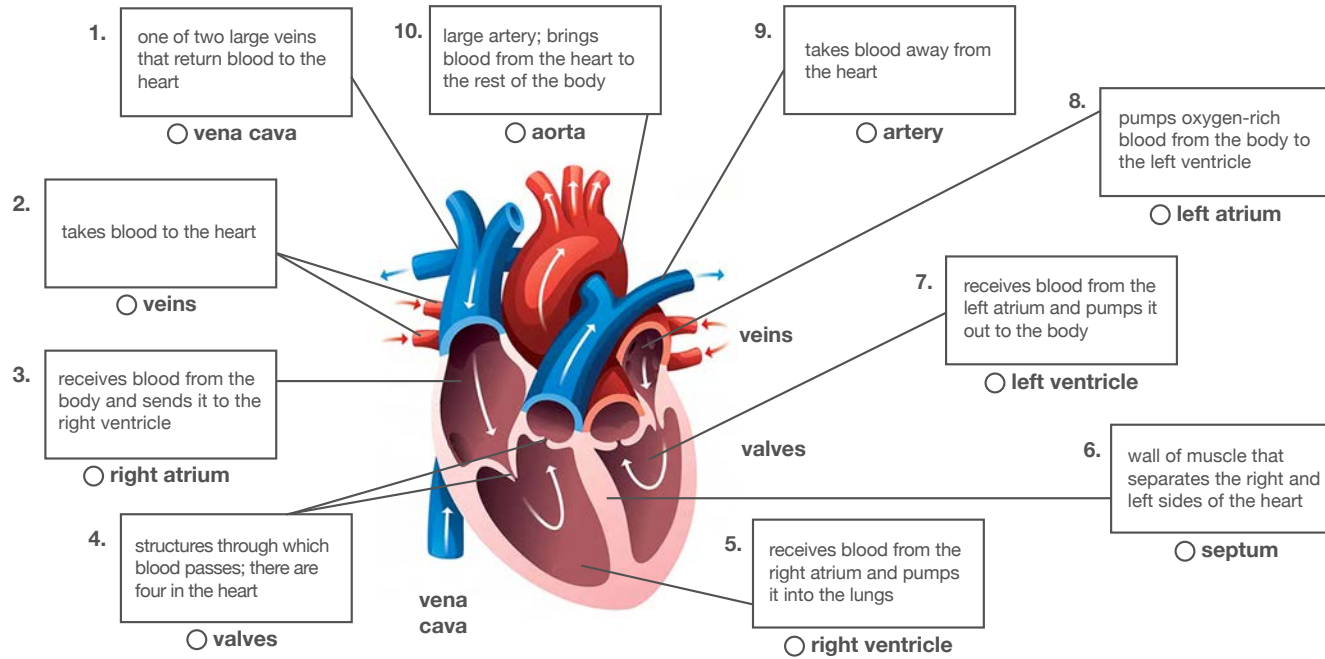


Cut out each definition at the bottom of the page and place it in the correct box. After checking and correcting your work, glue the boxes to the diagram.



takes blood away from the heart	takes blood to the heart	one of two large veins that return blood to the heart	large artery; brings blood from the heart to the rest of the body	wall of muscle that separates the right and left sides of the heart
structures through which blood passes; there are four in the heart	receives blood from the body and sends it to the right ventricle	receives blood from the right atrium and pumps it into the lungs	pumps oxygen-rich blood from the body to the left ventricle	receives blood from the left atrium and pumps it out to the body

Answer Key for "Every Part Does Its Part!"





Go With the Flow!

What Students Learn

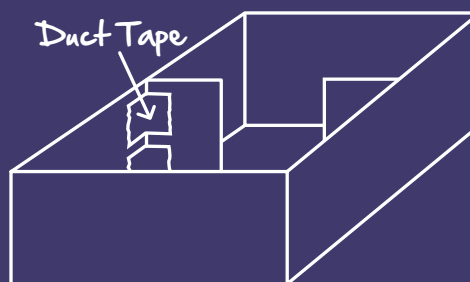
Your students will learn about the **path blood takes through the heart** and out to the body.

Materials for each student: copy of the 2-page printable, “Go With the Flow”; scissors; 12” x 18” sheet of construction paper; glue

To help your students understand how blood flows through the heart and out to the body, try this simple activity. Begin by **showing students the heart model**. Point out the many numbered parts of the heart, making sure to separate the model into its two parts. Ask students to **name any parts that they recognize** from your study of the heart. After the discussion, give each student the materials listed. Read the directions on the first page of the “Go With the Flow” printable together. Then have each student complete the activity independently or with a partner. If desired, have students color the diagrams using blue and red crayons or colored pencils to show the oxygen-poor blood and oxygen-rich blood as it travels through the heart.

Extend With STEM

- The four valves that keep blood moving in the right direction are among the most important parts of the heart. Each valve is a one-way valve, meaning that the blood can only travel through the valve in one direction. When muscles in the heart contract to pump blood, the valves open or close to make sure the blood is pumped in the right direction. Give each group of students a shoebox in which you have added a partial dividing wall made from the box’s lid (see the illustration). Explain that the shoebox represents two adjacent chambers of the heart. Challenge each group to create and test a valve that allows “blood” (marbles, beads, small pasta pieces, etc.) to move in one direction only from one chamber to the other when the box is tipped. Provide students with materials such as cardboard, duct tape, popsicle sticks, and other items to create and test their valve designs.



- The human heart is enclosed in a protective membrane called the pericardium. The pericardium secretes a fluid that reduces friction as the heart beats. After sharing this information with students, explain that friction is the resistance of motion when one object rubs against another. Then divide the class into small groups. Give each group two bowls; a pair of tongs; 60 interlocking, plastic counting cubes; a cup filled with water; a cup filled with dishwashing liquid; and a cup filled with cooking oil. Direct students to put 20 cubes in one bowl and place it beside the other bowl. Challenge students to take turns using the tongs to move the cubes to the empty bowl. Then have them pour one of the liquids over the cubes and repeat the activity. (Students will need to wash the bowl and cubes after the trials with the dishwashing liquid and oil). Have students identify the liquid that made it harder to move the cubes. Guide them to see that this liquid did the best job of reducing friction between the cubes and the tongs. Relate this to how the fluid produced by the pericardium reduces friction in the heart so it can keep pumping blood throughout your body.

Go With the Flow!

(page 1)



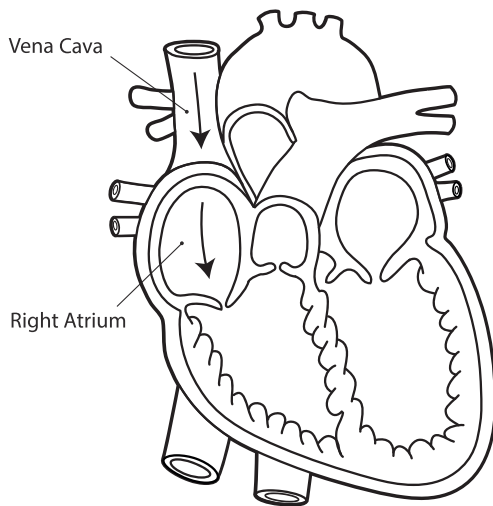
As your heart beats, it pumps blood through a system of blood vessels called the **circulatory system**. **Arteries** carry oxygen-rich blood from your heart to the rest of your body. **Veins** return oxygen-poor blood to your heart.

Follow these steps to make a chart about the path blood takes through your heart.

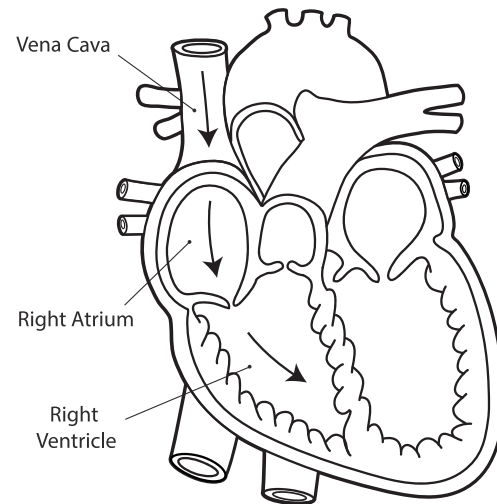
1. Cut out the heart diagrams. Glue the heart diagrams in order on the construction paper.
2. Cut out the phrases below. Pair the phrases to make five sentences.
3. Glue each sentence under the matching heart diagram.



1.

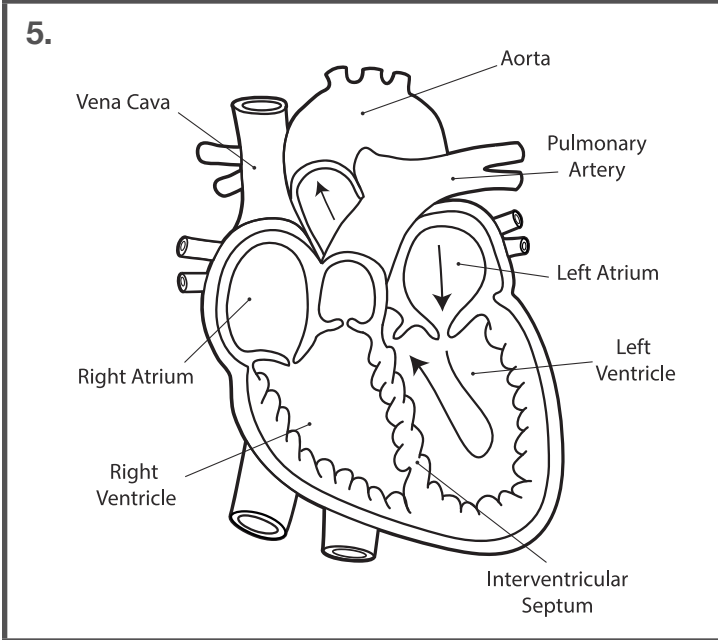
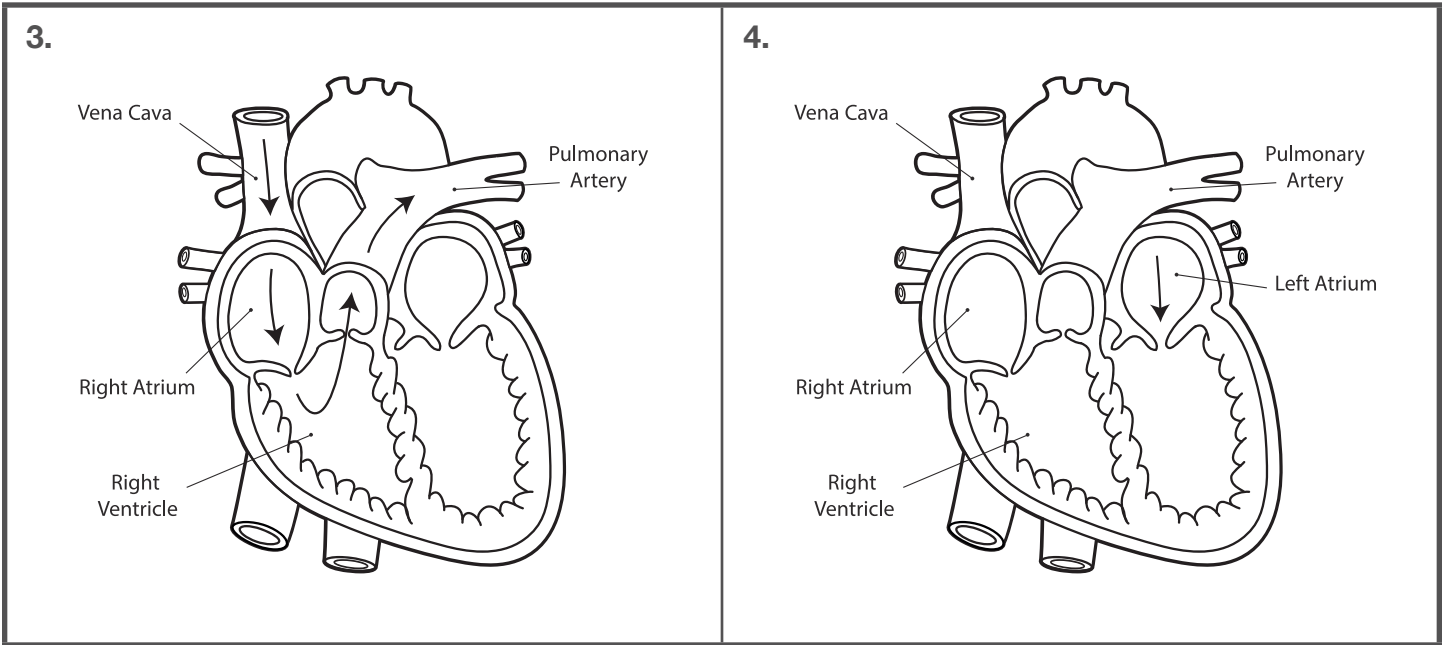


2.



Go With the Flow!

(page 2)



Oxygen-poor blood from the body returns

Oxygen-rich blood returns from the lungs

into the pulmonary artery to go to the lungs.

blood is pumped into the right ventricle.

When the right atrium is full,

the left ventricle, and then into the aorta to go to all parts of your body.

and is pumped into the left atrium.

Blood from the left atrium is pumped into

to the right atrium through the vena cava.

Blood from the right ventricle is pumped

Answer Key for “Go With the Flow!”

1. Oxygen-poor blood from the body returns to the right atrium through the vena cava.
2. When the right atrium is full, blood is pumped into the right ventricle.
3. Blood from the right ventricle is pumped into the pulmonary artery to go to the lungs.
4. Oxygen-rich blood returns from the lungs and is pumped into the left atrium.
5. Blood from the left atrium is pumped into the left ventricle, and then into the aorta to go to all parts of your body.



Happy Arteries, Happy Heart

What Students Learn

Your students will learn about **arteries and how important they are to a healthy body.**

Materials for each pair of students: cardboard toilet tissue tube, small container of modeling compound, bowl, napkin, cup of small plastic beads or dried peas

Show students the heart model. Ask a student volunteer to **identify on the model an artery, which is a blood vessel that carries oxygen-rich blood from the heart to the rest of the body** (*numbered parts 7–8, 10–11, 13, 16–18, 22, 31, and 33*). Repeat with other students until several of the model's arteries have been identified. Then share with students information about arteries given in the box on this page.

After this discussion, distribute the materials listed to pairs of students. Then have them follow the steps below to create a model of a clogged artery. Discuss students' observations. Next have students suggest habits that can help keep their hearts healthy, such as eating a variety of fruits and veggies, moving more, and never vaping or using tobacco.

Steps:

1. Fold the napkin and place it in the bottom of the bowl.
2. Hold the cardboard tube (an artery) at an angle over the bowl. Pour the cup of beads (blood) through the tube into the bowl. Note how quickly the bowl fills. This step simulates how blood flows easily through a healthy artery.
3. Remove the beads from the bowl and put them back in the cup.
4. Carefully mold the modeling compound in the tube so the tube is at about halfway blocked. The tube now represents a clogged artery.
5. Repeat Step 2. What do you observe about the blood flow in the partially clogged artery? How might this affect a person's health?

Facts About Your Hardworking Arteries

- Arteries carry **oxygen-rich blood** from your heart to the rest of the body.
- Arteries are found **all over the body**, from the brain to the toes.
- Healthy arteries are **smooth** on the inside so blood can flow easily through them.
- Sometimes arteries get **clogged** by a substance called **plaque**. Plaque is created from different substances that can be in the blood, such as fat and cholesterol. It can build up on the walls of arteries. It reduces the flow of blood and can even block an artery.
- A person with clogged arteries has a greater chance of having a **heart attack or a stroke**. Both of these health events can cause death.
- **Healthy habits**—such as eating healthy foods, getting regular physical activity, and avoiding cigarettes and vaping—can help keep arteries healthy.

Extend With STEM

- Explain to students that biomedical engineers work to develop devices that can clean out the fatty build-up on the walls of arteries. Divide the class into groups. Provide groups with various materials such as craft sticks, pipe cleaners, cardboard, chopsticks, tape, etc. Challenge each group to use the materials to create (and test) a tool that can clean out the modeling compound inside their toilet tissue tubes (see previous activity). Require groups to use at least five different materials in their designs. Provide time for each group to share its most successful design with the rest of the class.
- Have each student label a sticky note with the healthy heart habit he or she thinks is most important for good heart health. Have students place their notes on the whiteboard. Use the notes to form groups of students with similar interests. Direct each team to come up with a plan for how to inform other students in your school about the importance of each healthy heart habit.



Move to the Beat

What Students Learn

Your students will learn **how much blood is pumped throughout the body** every minute.

Materials: 2 dishpans or other plastic containers, quart container, water, $\frac{1}{4}$ C. measuring cup, timer, copy of center directions and recording sheet

Begin this lesson by sharing the heart model with students. Guide them to help you **locate the heart's four chambers** (*numbered parts: 1=right atrium; 5=right ventricle; 15=left ventricle; and 28=left atrium*). Point out that the adult heart pumps about **five quarts of blood each minute** through the chambers and out to the body. Demonstrate this amount by using the quart container to fill up one dishpan with five quarts of water.

Next, dip the $\frac{1}{4}$ C. measuring cup in the water. As you slowly pour the water back into the dishpan, explain that the heart pumps a little more than two ounces of blood, or about $\frac{1}{4}$ C., with each heartbeat. Announce you are going to challenge students to mimic the heart's hard work by trying to move the water in the dishpan into an empty dishpan in one minute or less using only the measuring cup.

Assign a job to each of three students:

- The *timekeeper* will start the timer for one minute and announce when a minute is up.
- The *pumper* will use the measuring cup to transfer the water.
- The *counter* counts the number of scoops (heartbeats).

At the end of the simulation, ask the pumper if he or she had to work hard during the challenge. Then ask if students think they could continue the simulation for 24 hours without getting tired. Share that, at the rate of five quarts per minute, the heart pumps approximately 2,000 gallons (or 8,000 quarts) of blood each day! Students will quickly realize the heart is one hardworking muscle.

To give all students a shot at the heartbeat challenge, place the materials at a center, along with a copy of the center directions and recording sheet. Let groups of three students try the challenge during free time.

Extend With STEM

- Doctors use a stethoscope to listen to the hearts of their patients. Challenge your students to use household items to make their own stethoscopes. Provide small groups of students with plastic tubing, funnels of different sizes, duct tape, balloons, cardboard tubes, modeling clay, and scissors. Provide time for each group to share its best design.
- The hardworking heart needs to stay healthy so it can pump blood nonstop all day, every day. One way to do this is by making physical activity a part of your day. Direct students to pretend that a week of bad weather is keeping the class indoors. The school gym is closed for repairs, so students must find a way to stay physically active while in the classroom. Have each group come up with a plan for adding 20 minutes of fun physical activity into an average classroom day. Provide time for each group to share its plan. Select one or more ideas to try.



Move to the Beat

Center Directions for Groups of 3 Students Each

1. Each group member selects a job: timekeeper, counter, or pumper.
2. The pumper fills one of the dishpans with five quarts of water.
3. The timekeeper announces the start of one minute and sets the timer.
4. The pumper uses the measuring cup to transfer water from the full dishpan to the empty dishpan. The counter counts the numbers of scoops that are transferred.
5. The timekeeper announces the end of one minute, and the pumper stops scooping water.
6. The timekeeper completes the recording sheet for group.

One Amazing Muscle

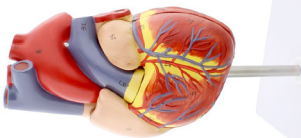
The heart pumps five quarts of blood each minute throughout the body. This equals about 2,000 gallons per day. That means your heart will pump about 730,000 gallons of blood in one year!

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Move to the Beat

Recording Sheet



Student Group	# of Scoops	Did you empty the dishpan? (circle one)
		Yes No
		Yes No
		Yes No
		Yes No
		Yes No
		Yes No
		Yes No
		Yes No