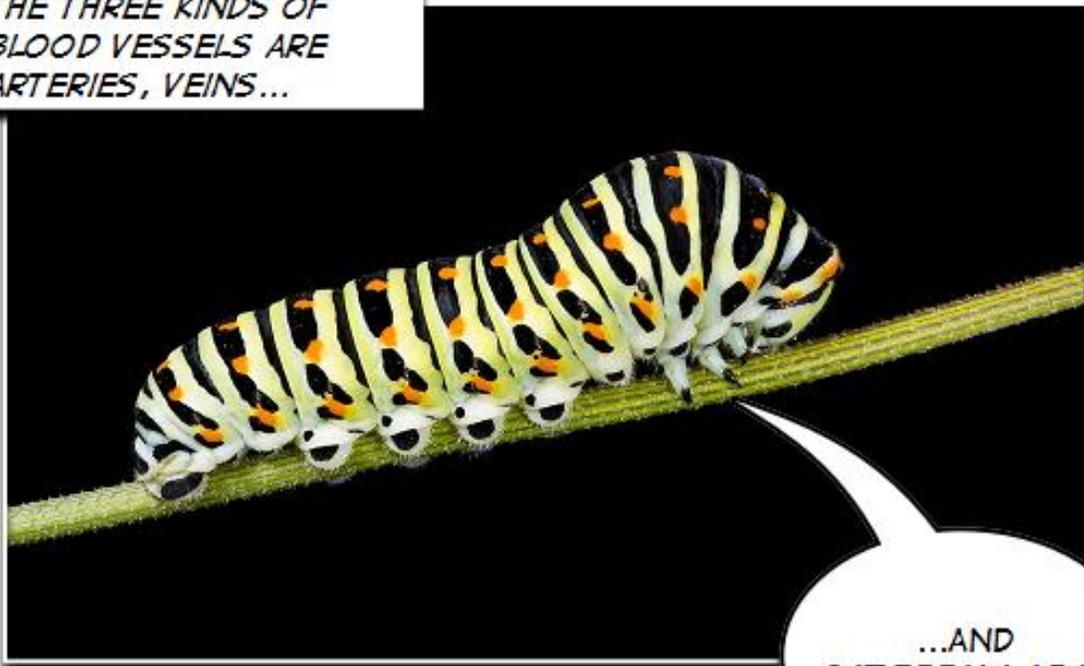


Chapter 26

Heart and Lungs

THE THREE KINDS OF
BLOOD VESSELS ARE
ARTERIES, VEINS...



...AND
CATERPILLARS!

Day One:

Today, you and your child will:

1. Read the text
2. Review the text with your child
3. Complete the student worksheets
4. Collect the materials you will need for days two and three

National Science Education Standards covered this week:

One major organ in the human body is the heart. This organ is made of cardiac muscle and is responsible for pumping blood throughout the body through “pipes” called arteries, capillaries and veins. Each of these pipes have separate jobs to perform.

Blood is a solution of plasma, red blood cells and white blood cells.

The blood that is pumped throughout the body interacts with the lungs to pick up oxygen that is used by all cells in the body for survival.

Definitions

Cardiac	anything related to the heart
Cardiac muscle	a kind of muscle that is only found in the heart
Arteries	"pipes" that are used to move blood out of your heart
Inhale	to breathe in
Exhale	to breathe out
Capillaries	"cap-ill-air-ez"; the smallest possible "pipe" that can be used to carry blood
Veins	large "pipes" that carry blood back into the heart
Plasma	the liquid part of your blood
Red blood cells	part of the blood that carries oxygen to all of the muscles and organs of your body
White blood cells	parts of the blood that attack anything that should not be in you

Sample questions to ask your child after completing the weekly reading.

What is the main job of your heart?

The main job of the heart is to pump blood throughout the body.

Why does your heart beat faster while you exercise?

Exercise requires a lot of energy and resources for your muscles. The heart pumps these resources at a faster rate to keep your muscles working hard.

How does oxygen from the air get into the blood?

The oxygen from the air is stored in the lungs. It then gets picked up by the red blood cells in your blood as they pass over the lungs.

Answers to worksheet questions:

Page 1:

Red blood cells
Cardiac muscle
Arteries
Plasma

Capillaries
Cardiac
Veins
White blood cells

Page 2:

8 - cardiac
3 - cardiac muscle
4 - arteries
6 - capillaries
5 - veins
1 - plasma
2 - red blood cells
7 - white blood cells

Page 3:

"Imagine you are a red blood cell that is inside a human body. Describe your journey as you are pumped throughout the body."

Answers may vary; however, the child should identify their journey as they pick up oxygen from the lungs, deliver it to the muscles/cells and obtain more oxygen as the heart pumps them throughout the body.

Day Two:

Today, you and your child will:

1. Review Day One using the following text
2. Run the first activity this week

The following text will give you the most important items to review for your activity today.

The heart is an efficient pump that is made of four separate areas called "chambers".

Each chamber is used for a separate function. In simple terms, oxygen-rich blood is pumped by the right chambers of the heart throughout the body. The left chambers are responsible for moving non-oxygen-rich blood to the lungs.

Modeling the heart

Objective:

Children will make a pumping model of a four-chambered heart.

Materials:

four small soda bottles with screw-on lids
electrical tape
two large clips (called "bulldog clips" you can find in an office supply store)
two plastic funnels
two pieces of (each $1 \frac{1}{2}$ feet long) of clear plastic tubing
two pieces of 4" clear plastic tubing
red and blue food coloring
masking or duct tape
modeling clay (bubble gum will work temporarily)

Procedure:

Make one small hole in each bottle lid that is large enough to fit the small piece of plastic tubing. Connect two lids together, with their tops facing each other, with a small piece of plastic tubing. Leave about one inch of tubing between the lids.

Repeat this with the other two lids. Seal the holes around the tubes with the modeling clay.

Make holes in the bottom of two bottles that are large enough to fit the plastic funnels into.

Make two holes on the sides of the other two bottles that are about 2 inches from the top.

Thread the two longer pieces of plastic tubing through the holes in the sides of the bottles. Push the tubes almost to the bottom of the bottles and seal the holes with the modeling clay.

Screw all four lids onto the bottles. Use the electrical tape to secure the bottles next to each other in pairs. Make certain that the bottles with the holes on their bottoms are next to each other. You may want to secure the ends of the longer plastic tubing by taping them to the upper two bottles.

Mix up enough red water and blue water to fill up one of the bottles.

Attach the clips onto the sections of tubing between the lids. These clips will act as heart valves, allowing the fluid in the heart to only travel in one direction.

Using the funnels, pour the red water into the top of one of the bottles and pour the blue water into the top of the other bottle.

Open the clips to let the "blood" flow through the tubes, then close them again.

Squeeze the lower bottles. Notice how quickly the "blood" squirts out of the tubes.

Explanation:

Your heart is a muscle that pumps blood through small vessels around your body. Blood containing oxygen is pumped through the left side of your heart and to all of the other cells in your body. When the oxygen is used up, the blood is sent back to the right side of your heart and then your lungs. Here, the blood is filled with oxygen once again.

As your child is enjoying their heart model, remind them that their heart is pumping blood at a rate of about 60 times a minute.

Day Three: Lab Activity

Today, you and your child will:

1. Review Day One using the following text
2. Run the first activity this week

The following text will give you the most important items to review for your activity today.

The lungs are storage areas for the air we breathe in and breathe out.

They are flexible “balloons” that are moved by a muscle called the diaphragm which increases and decreases the amount of space around the lungs. When the diaphragm stretches out, it allows more space in the lungs to exist which draws air inside your body. When the diaphragm stretches back, it places pressure on the lungs to force air out through our mouth and nose.

Modeling the lungs

Objective:

Children will make a working model of a pair of lungs.

Materials:

modeling clay

two balloons

two rubber bands

one small strip of wood (1/4" x 4-6")

one drinking straw

the upper half of a plastic bottle with the lid

glue

Procedure:

Cut the wood to fit the width of the bottle. Glue it inside the cut end of the bottle.

Secure one balloon over the open end of the bottle with a rubber band. You may need to cut the balloon to make it fit.

Make a small hole in the bottle top. Push the straw through.

Attach the other balloon to the end of the straw with a rubber band. Seal the hole with modeling clay.

Screw the lid onto the bottle after feeding the balloon through the bottle.

Stretch the balloon on the bottom of the bottle downward. You should notice that the balloon inside the bottle inflates.

As you release the balloon on the bottom of the bottle, the balloon inside the bottle will deflate.

Explanation:

As you pull downward on the balloon, you are reducing the air pressure inside the bottle. How? Because you are increasing the space that exists inside the bottle by stretching out the bottom balloon (this is the same thing your diaphragm does!) Since there is more space inside the bottle, air gets pushed through the straw to fill up the empty space. With air flowing in the straw, the inside balloon (your lungs) start to inflate. This is what happens when you breathe in.

The wood that you glued inside the bottle keeps the walls from caving in when you lower the air pressure inside the bottle. When you release the balloon (diaphragm), the air pressure inside the bottle increases and pushes on the "lungs" in your bottle. This forces the air out through the straw. This is what happens when you breathe out.