medical illustration

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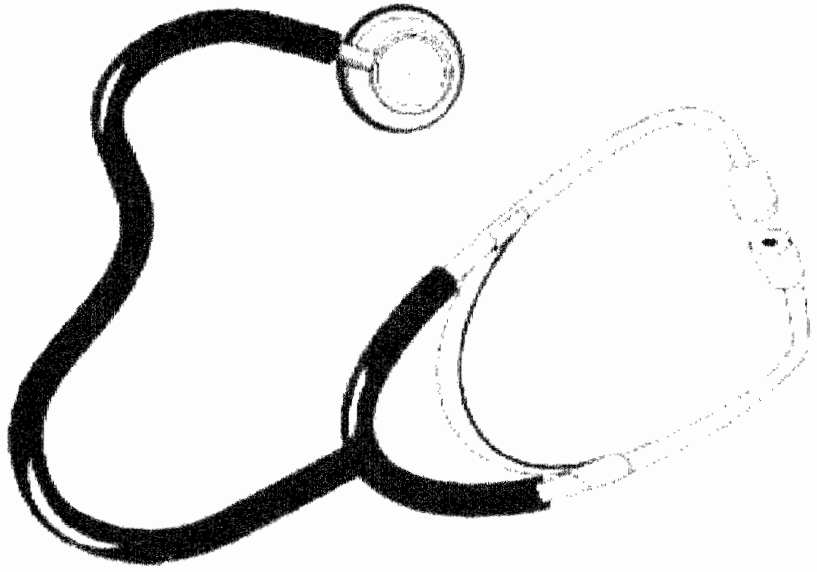

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A- Hands-On Guide To Medical Illustration In The Middle School

B- This is a hands-on unit about medical illustration is intended for use in the middle school. It can, however, be modified for use in lower or upper grades.

C- Students will work cooperatively to conduct scientific investigations that will help them solve a scientific problem using a variety of inquiry skills including observing, predicting and testing solutions. Students will communicate their experiences through their student worksheets, their drawings and in class presentations

.

D- Materials- Each cooperative work group will need the items that are listed in box number one on each experiment sheet. Each student will nee the drawing materials listed at the top of experiment number one.

E- Each experiment in this unit will require one to two class periods (approx 45 min) to complete. The entire unit requires about three months.

F- This unit includes twenty three hands-on experiments that teach children the need for careful observation techniques. Students will learn to observe their world and capture that world in their drawings. Scientific vocabulary is introduced throughout the unit.

G- Safety-

H- Teachers should send a note home to parents explaining the upcoming unit. It is important to explain that the children will be sharing equipment and that the children are working in cooperative learning groups whereby they learn from each other. Each student is responsible to do their share of the required work.

I- Questions for students are on the worksheets.

J- Assessment- After collection and review, the student worksheets should be graded from one to ten, ten being the highest grade. During lab time, question the students to see if they understand the material being presented to them. See of the students are engaged in the activity and if they are working cooperatively. Finally, after students finish with the unit test, have the students write in their lab notebooks their ideas and comments on these experiments.

Medical Illustration

Name _____
Class____Box No _____

What is medical Illustration ? Experiment 1

Materials you will need

- Paint Brush
- 9"x12" Drawing Pad
- Pencils 2B, 2H
- Colored Pencils (watercolor type)
- Crayons
- Ruler
- Drawing Board
- Pen
- 8½"x11" looseleaf book and Paper
- Case to hold everything

1 We need to answer a few questions like:

Why should we put drawings in science and medical books?

2 In what ways are they helpful?

lets look at a few medical drawings →

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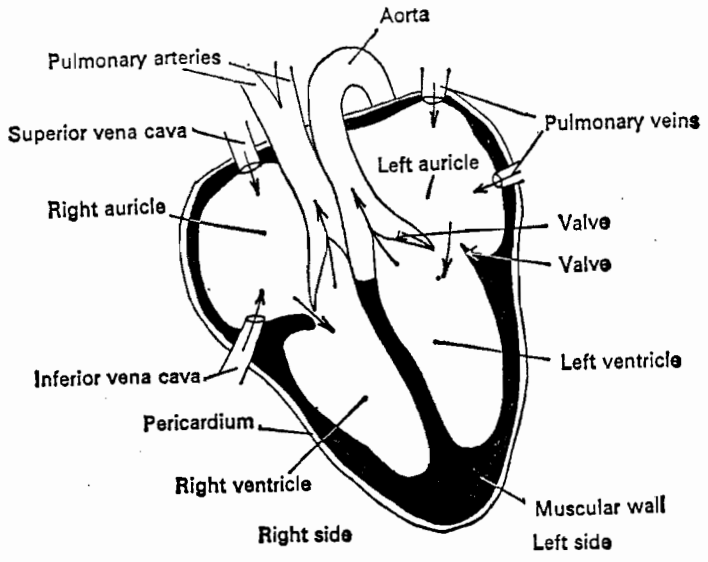

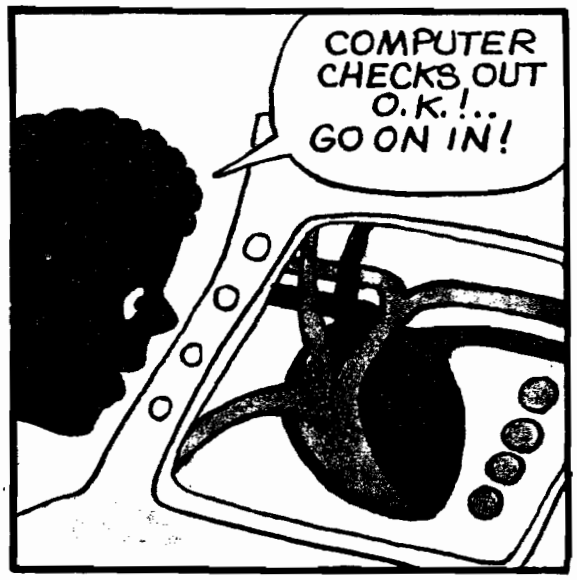

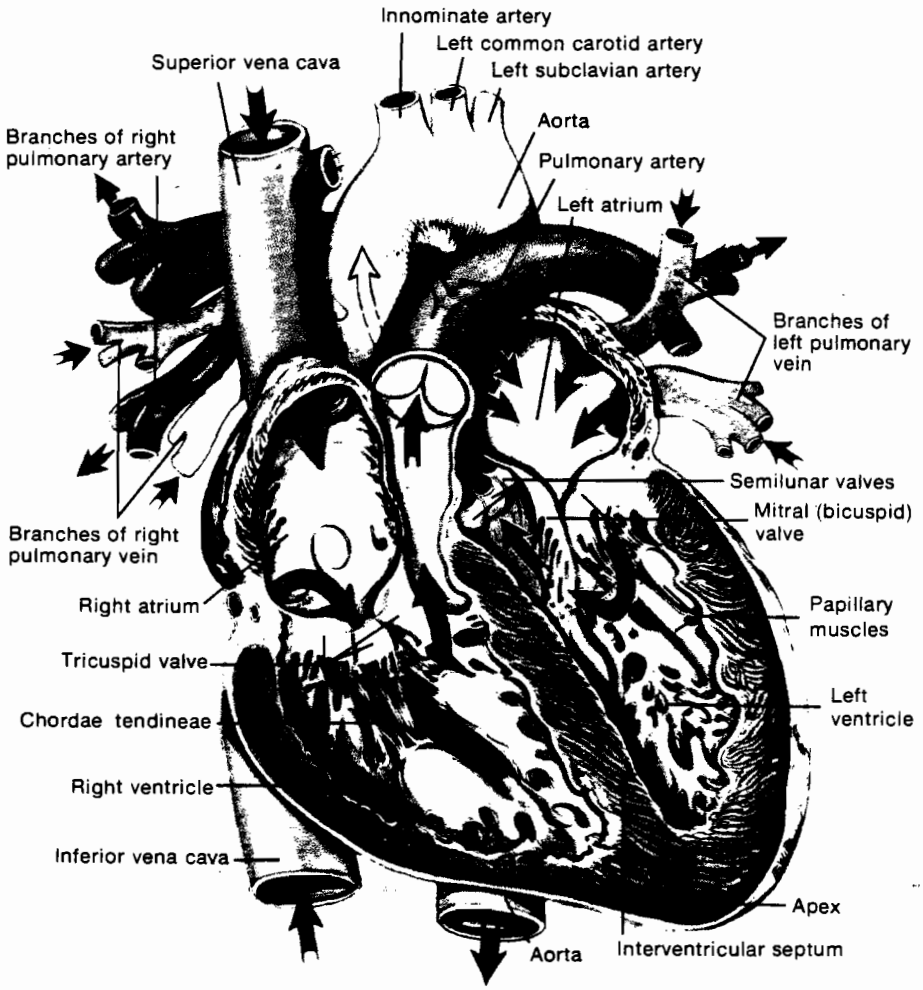

3) How are these drawings similar?

4) How are they different?

5) Where might you find each type of drawing?

6) Why do we draw the same thing many different ways?

Name _____

Medical Illustration

Class ____ Box No ____

How can we use line in our medical drawings?

Experiment 2

lines do not exist in nature. The artist uses the line to define forms and shapes. In nature all forms are 3 dimensional; all have length, width, and height. The artist must show the 3 dimensional form on a 2 dimensional surface, the paper. To do this the artist uses the line.

1) look at the ball and circle on the teachers desk.

2) How are they Similar?

3) How are they different?

4) How can we show the ball on paper?

5) How can we use lines to represent the ball?

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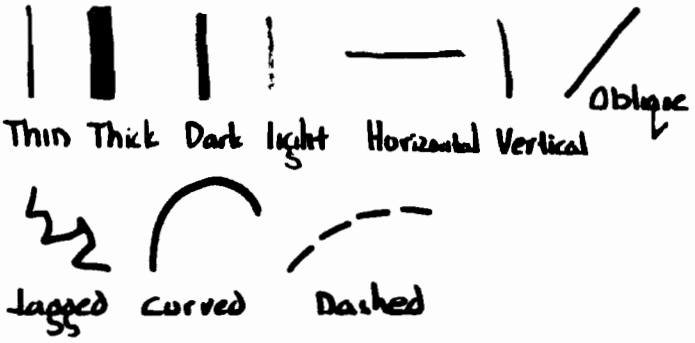
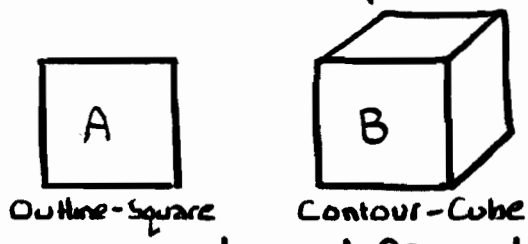
There are many types of lines youcan use.



6) Why might you use thick lines sometimes and thin lines at other times?

7) How can we make thick lines with a pencil?

8) look at these pictures



How are they different?

9) How are contours and outlines helpful to the illustrator?

Homework-

1) Take any 3dimensional form and draw it using the contour line. Try to make the line <u>continuous</u>, draw the whole picture without picking your pencil off the paper.

2) Do the samething but put the paper on a board on your legs. Put your legs under a table. Do not look at the drawing until you are finished drawing it.

Medical Illustration

Name _____
Class ___ Box No _____

How might shading help our medical drawings?

Experiment 3

1) look at the block with the light on it that is on the teachers desk.

2) How do we know this is a cube and not a square?

3) How did the light help us figure this out?

4) Why do some sides look darker than others?

Where is it darkest?

5) Why might medical artists use this light-dark idea in their drawings?

lets see how we can make something go from light to dark in a picture.

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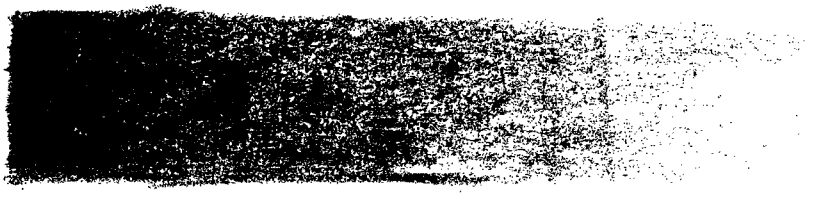
6

How does the newspapers make photos go from light to dark?

7 How can we go from light to dark by drawing only lines?

The light or dark of an object is called Value. A value scale goes from light to dark



Homework -

1) Draw a value scale with pencil -

2) How can values or shades help the artist?

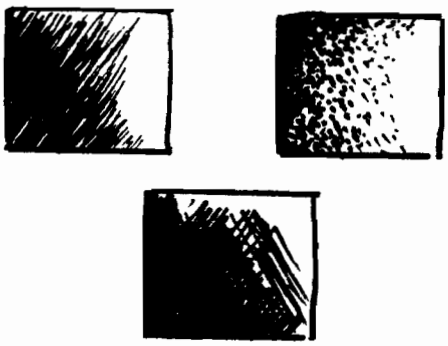
Medical Illustration

Name _____
Class ____ Box No _____

How can we use shading? Experiment 4

1) What is value? How is it used in a value scale?

Shading may be done with lines, dots, or solid areas of color.



2) In the drawing at the left, is the light hitting the block from the right or left?
Show it with a light

How do you know this?

3) When light hits an object it makes it bright where it hits. A shadow is cast on the opposite side of the object. The shadow makes that side dark. The light gradually decreases as the object moves away from the light.

4) How can you shade an object?
Describe it

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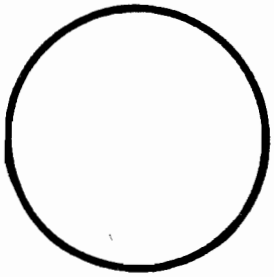
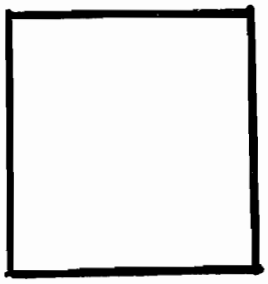
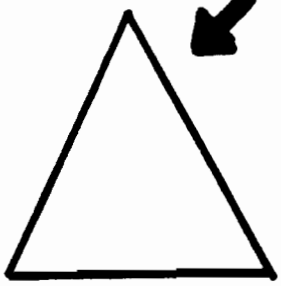
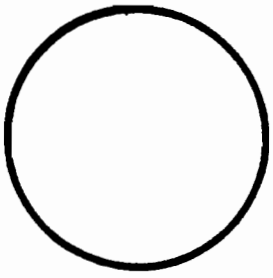
Shade these objects using Dots

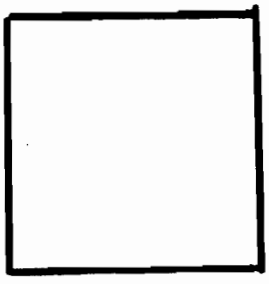


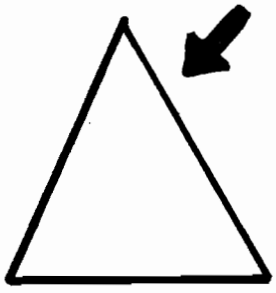




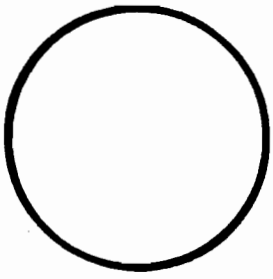
Shade these objects using lines

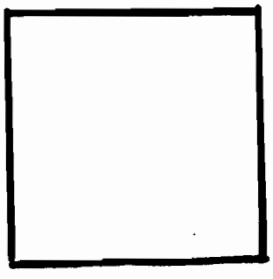


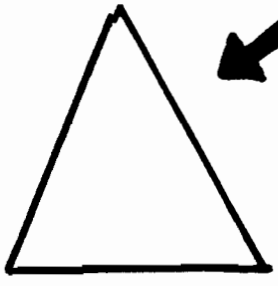




Shade these objects using any other method



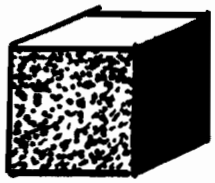




Homework

1-Draw an object and shade it using one of the methods you learned. Indicate the direction of the light.

2-look at the picture. Why are some sides lighter? Indicate the light source.



Medical Illustration

Name _____
Class____ Box No _____

What is texture? Experiment 5

look at this leaf.

How can shading help make it look more realistic?

1) How might this leaf feel?

2) Why would it feel this way?

3) How would knowing what an object feels like help you understand what an object looks like?

4) How might we show what an object feels like?

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5) All objects feel different. Some are rough because of bumps. Some are smooth because of lack of bumps. The way an object feels is called it's Texture

6) Place a penny under this box and rub over it with a pencil point.

7) Why did this happen?

8) We call this a rubbing. How do you think this process got it's name?

9) How do rubbings help show texture?

Homework

1-Using a crayon. make rubbings of three objects with different textures. Describe objects

1 _____ 2 _____ 3 _____

Time for a Quiz

Name _____

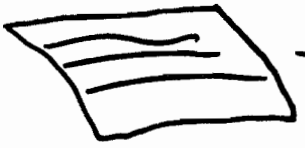
Class ____ Box No _____

Medical Illustration

Digestion and Absorption

Why do we eat food?

Experiment 6

1) Begin With   This Sheet

2) How does your body get the energy to walk, talk, and play?

3) Why do you get hungry?

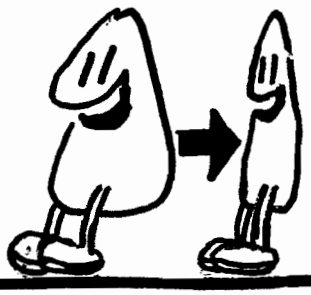
4) How do you know when you are hungry?

5) Why do you eat food?

6) What kinds of foods do you eat?

7) What might happen if you forget to eat?

8) Why will you get thin if you dont eat?



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9 Why will you die if you never eat?

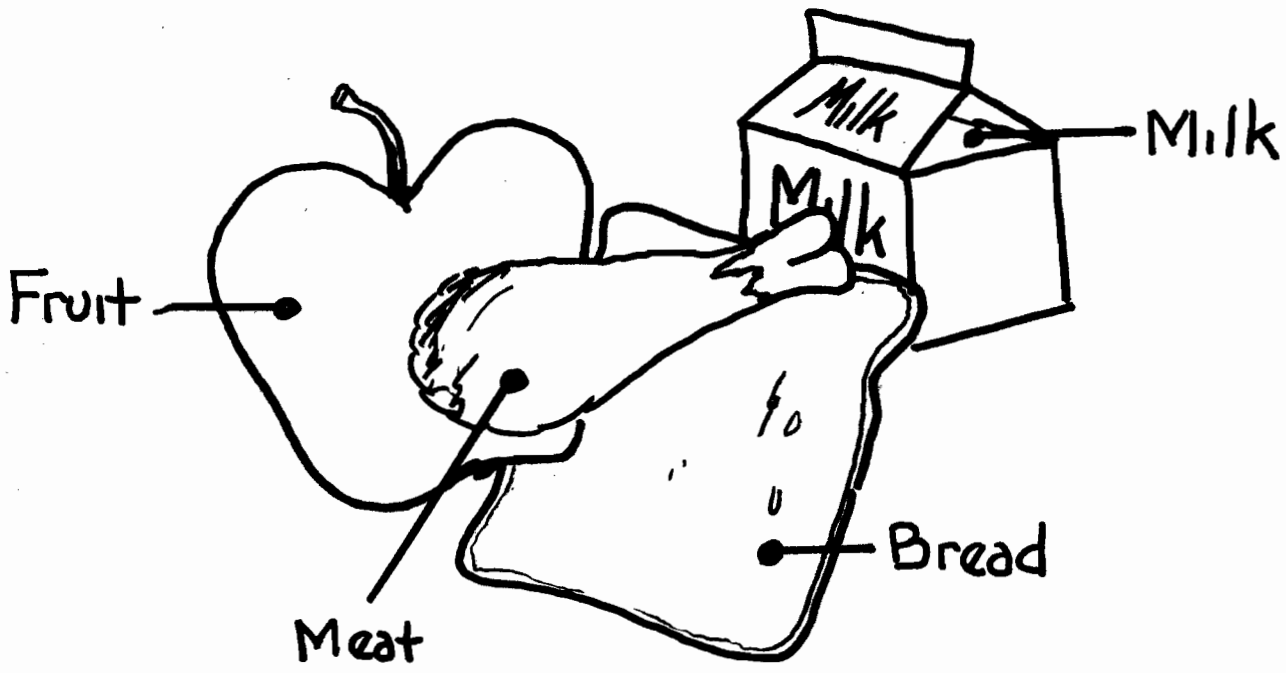
10 What does food do?

Why is it so important?

11 Food is made of many parts. It contains things we need, called nutrients, and things we don't need, called wastes. The body seperates the nutrients from the wastes by digestion.

Homework –

This food contains many nutrients. Under each tell why they are important.



Name _____

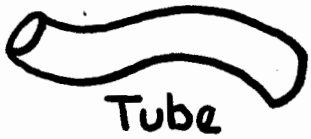
Medical Illustration

Class ____ Box No ____

Digestion and Absorption

Where does food go when it is swallowed?

Experiment 7

1) Begin with   Tube  marble

2) Place marble in one end of your tube 

3) How can we move the marble through the tube to the other end?

4) How does food enter the body?

5) Food moves down a tube in the body just like the marble moves through the tube. Muscles push food down the Esophagus like your fingers move the marble. This muscle action is called Peristalsis.

6) After food moves down this food tube it enters the food bag or stomach. Occassionally peristalsis reverses and food never reaches the stomach. This is when you "throw-up"

7) How does food get to the stomach?

Why do you vomit?

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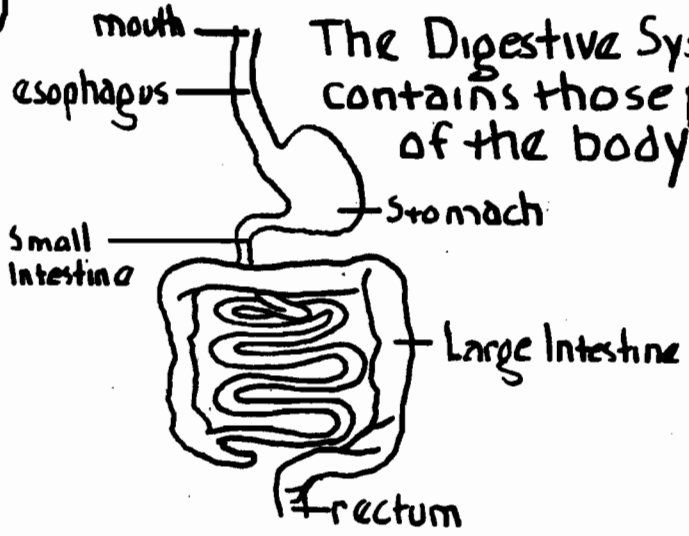
8) Your body can't use big hunks of steak or beans; Can you imagine a big piece of meat floating about in the heart. Instead, the body needs the things steak is made of.

9) How might we get these things we call nutrients out of the foods we eat?

10) Pieces of nutrients are small. Why do you think they are small?

11) Different parts of the body digest, or breakup, different types of food.

12) The Digestive System contains those parts of the body.



13) How does the mouth help break up food?

14) Why do you have teeth?

Homework

1- What does the esophagus do?

2- Draw a small sketch on paper, staple it to this sheet, of how food moves from the mouth to the stomach.

Medical Illustration

Digestion and Absorption

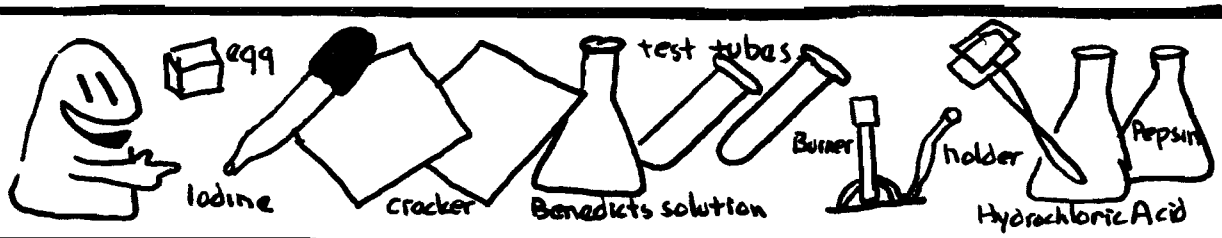
Name _____

Class ____ Box No _____

How does food get digested?

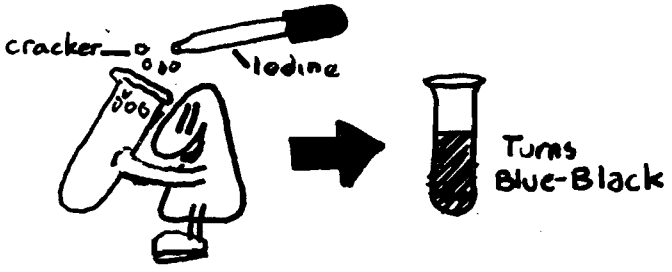
Experiment 8

1 Begin With

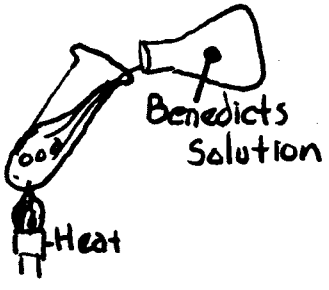


2 Howdoes your teeth affect food?

3 Test a cracker for **Starch**



Test a cracker for Sugar



Chew a cracker, then test it again for Sugar.

4 Test a simple sugar to compare to Benedict Solution test for Sugars. This is your control.

5 What is the purpose of a control?

6 How does chewing affect the cracker?

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7 How do you know this?

8 What caused this change?

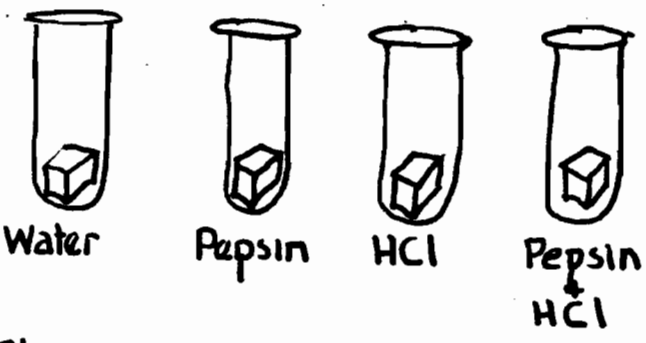
What is in the mouth?

The partially digested food moves to the stomach where it gets digested even more.

9 As we said before, large pieces of food cannot move around in the body. It therefore must be broken up.

10 Your stomach contains an enzyme called Pepsin and an acid called Hydrochloric acid.

11



Place a piece of egg in each test tube. Add indicated liquid and cover.

12 leave this sit for one or two days.

How do the liquids affect the food?

Homework-

1- How is food changed in the mouth?

2- How does the stomach affect food?

Medical Illustration

Digestion and Absorption

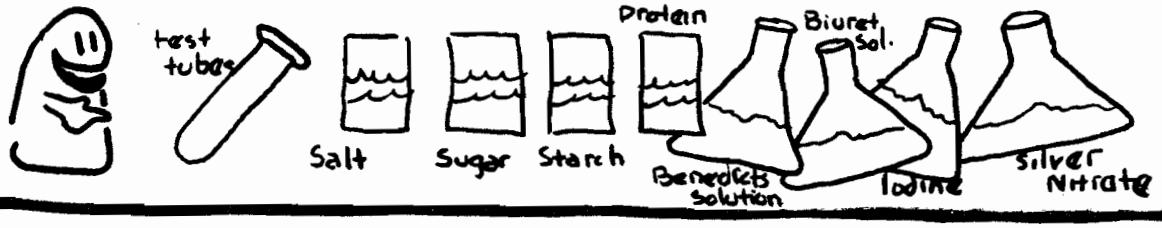
Name _____

Class _____ Box No _____

Where does the digested food go?

Experiment 9

1 Begin With



2 Set up the following

How are they similar?

3 Add Silver Nitrate to each. Describe What happened.

4 Clean and refill all test tubes

5 Add 3 drops Iodine to each

6 Describe what happens.

7 What can we use silver nitrate to test for?

How do we do this test?

8 What can we use Iodine to test for?

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9 Clean and refill all test tubes

10 To each add 3 ml of benedicts Solution and heat.

Howare the liquids affected?

11 Can we use Benedicts as a test?

How?

12 Clean and refill all test tubes

13 To each tube add 3 ml biuret solution

What happens?

14 How can biuret solution be used to test food?

Homework-

How can we test for

Food	liquid	Color
Sugar		
Salt		
Protein		
Starch		

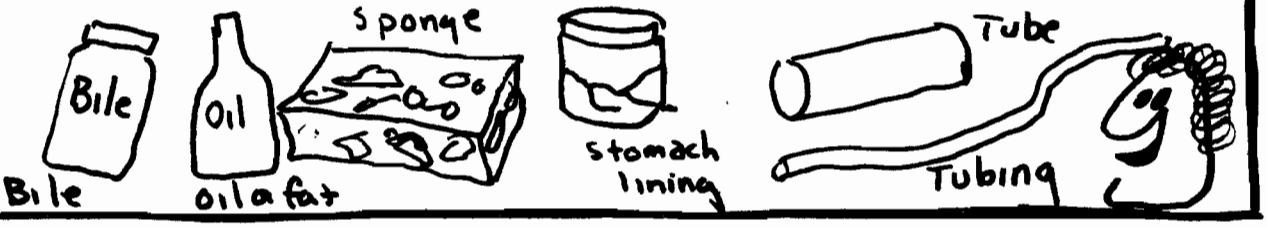
Medical Illustration
Digestion and Absorption

Name _____
Class _____ Box No _____

When does food become part of the body?

Experiment 10

1 Begin With



2 look at the sponge
Why is it able to soak up water?

3 look at the sample of stomach lining
How is it like the sponge?

The inside of the stomach is rough so it can soak up nutrients.

Some foods are not digested by the stomach acids and enzymes. They pass through the stomach into the small intestine, which is extremely long. Inside the body it is coiled up.

4 Why would the small intestine be coiled up?

5 The small intestine contains an enzyme called Bile. Lets see what it does

6 Mix oil and water in a test tube and shake. let it stand.

7 Describe what happens?

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8) Repeat this experiment.
Add <u>Bile</u> this time.

Describe what happens

9) How did Bile affect our experiment?

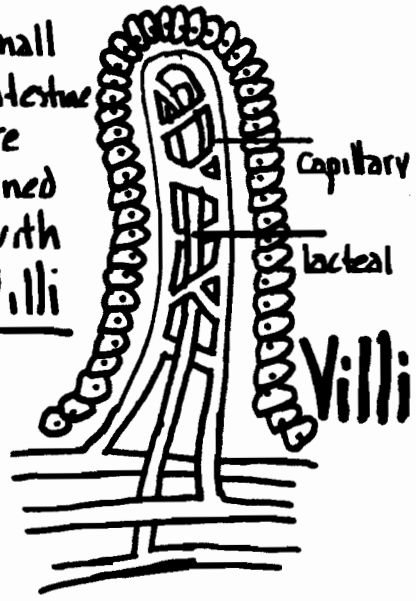
Oil drops were broken down to form an <u>emulsion</u>.
This caused the oil, a fat, and water not to seperate.

10) The walls of the small intestine, like the stomach, is rough. This allows nutrients to pass, or go, through them.

11) Any food left over goes to the large intestine, where it waits to be dumped a waste.

12) What is the job of the small intestine?

11) The walls of the small intestine are lined with <u>Villi</u>



nutrients go through Villi and into the blood.

Homework –

1- Draw a picture of the stomach lining.

2- Show how nutrients pass through the villi.

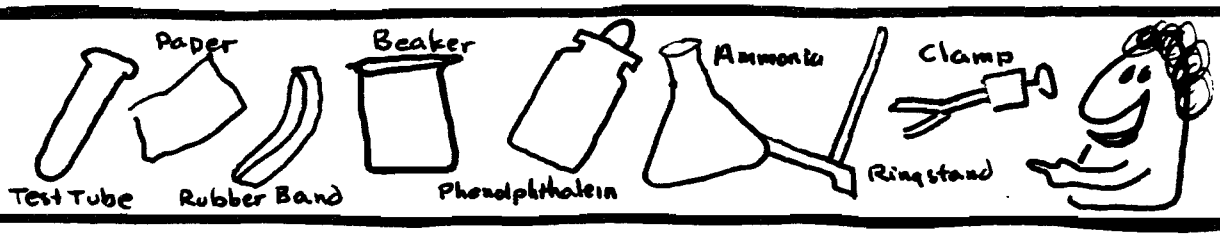
Medical Illustration
Circulation

Name _____
Class _____ Box No _____

How does food get to the parts of the body?

Experiment II

1) Begin With

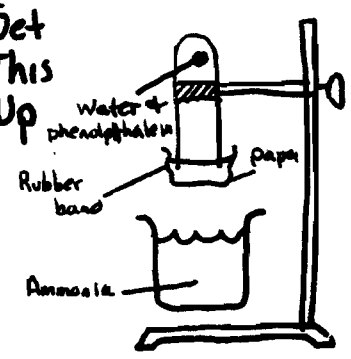


2) After food is digested, it must go to where it is needed; but how does it get there, and how does it get out of the digestive system?

3) Place a drop of ammonia in a test tube 1/2 full of water. Add a drop of phenolphthalein.

Describe what happens?

4) Set This Up



Why did this happen?

5) The paper did not get wet. The water and phenolphthalein did not drip out. However the ammonia could get in. The paper acted as a semi permeable membrane. It allowed only some things to go through it. The intestine walls also have these membranes allowing only digested food through

6) This food is then absorbed into the blood.

7) Red blood is made of a liquid with cells in it. Theses cells have special jobs. By spinning blood fast. The heavy cells fall out

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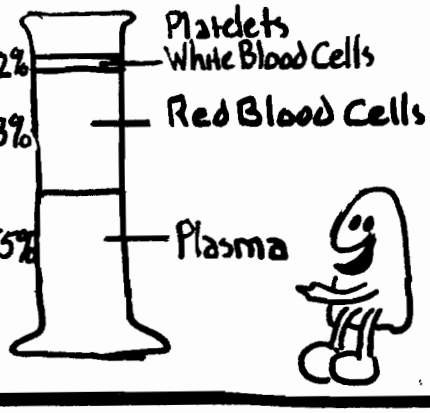
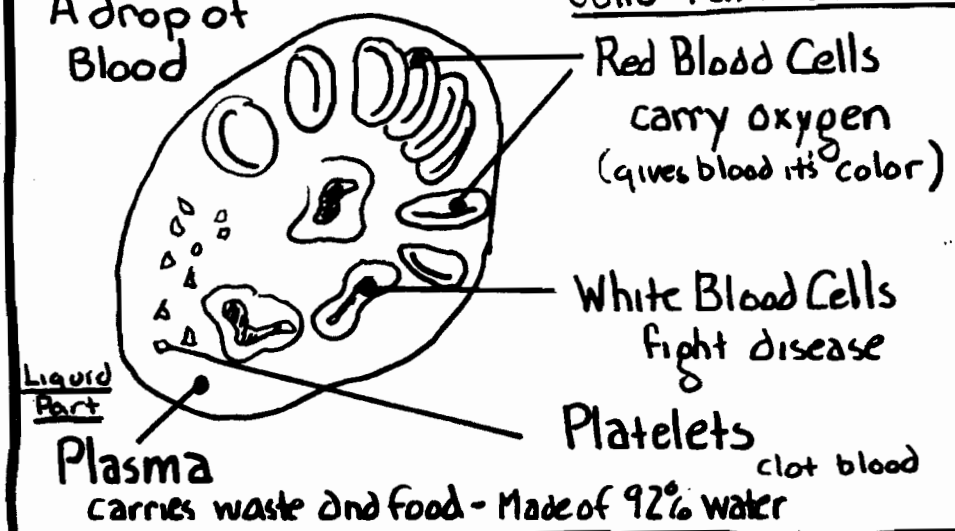
(8) Your body contains 6 quarts of blood

One quart contains



(9) These cells have very important jobs



(10) Water in a house flows through pipes. In order to go to the sinks. Blood has to get places so it must also flow through pipes. These pipes are called veins and arteries

Homework

1) - You were offered a job by a leading medical magazine. They need to show the composition of blood. Make a drawing (don't use the above drawing) to show the composition of blood. The drawing must fit in a space 3 inches by 4 inches and must be black ink on white paper

2) A children's book needs a full page color drawin showing The blood cells and plasma. Try to show their jobs.

Medical Illustration
Circulation

Name _____
Class _____ Box No _____

How does the blood move?

Experiment 12

1) Begin With

capillary model

2) After blood picks up its food it goes on it way to other parts of the body.

3) How does water move around in your house?

4) How might blood move around or <u>circulate</u> through the body?

5) Gravity wants to make things fall down. How can you get something like water or blood to move upward?

6) How is your water affected in the summer when everyone is filling pools, washing cars, and watering lawns?

7) What does water pressure mean?

8) What is meant by blood pressure?

9) How does the city build up water pressure?

Grambo

10) In the body there is a pump, called the heart, that forces blood to parts of the body

11) The blood is forced into thick tubes called <u>arteries</u> which carry blood away from the heart.

Blood moves through the body like a car moves on a highway. When a car has to pay a toll the road widens and breaks into smaller lanes with toll booths.

12) Why does this happen? Why doesn't the road stay as it is and have fewer toll booths?

When the blood reaches a toll, or place it has to give food, or air to, the Artery breaks into many small tubes, with thin walls, called <u>capillaries</u>.

13) Why would it break into capillaries instead of staying as arteries?

14) Examine the capillary model. Why do capillaries look like this?

The capillaries give food & air and take waste. The capillaries rejoin into one thin walled tube called a <u>vein</u> which brings blood back to the heart. By now the blood has made such a long trip that the pressure on the blood has decreased. The blood in veins flows instead of being pumped.

Homework-

1- Why are arteries thicker than veins?

Medical Illustration
Circulation

Name _____
Class _____ Box No _____

How does the heart work? Experiment 13

1) Begin With

This sheet

Model or real heart

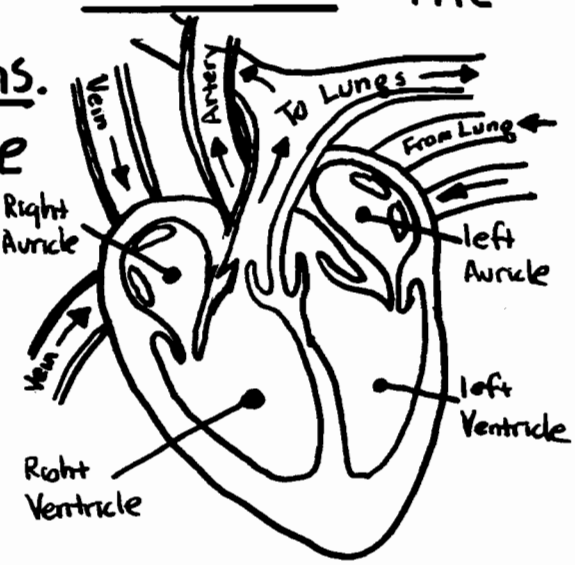
2) Press on your wrist with your index finger

This is the sound of blood being pumped through the arteries. A Pulse

3) Something must be making this blood pump in a certain way. The heart, or pump, beats, or pumps, with the same Ba-Bump rhythm, moving blood.

4) Why do you have a pulse in your wrist?

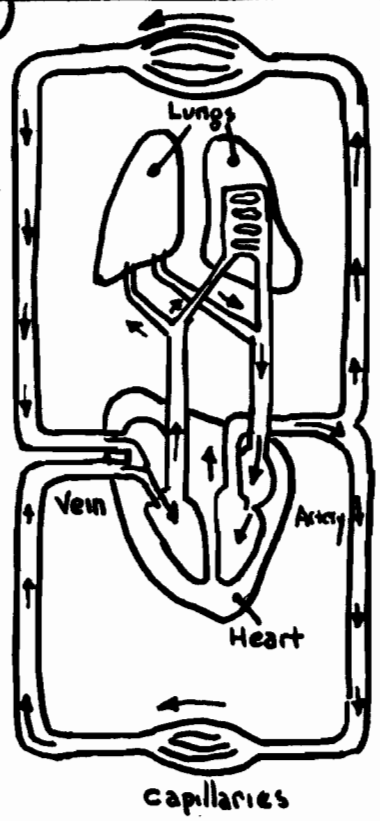
The heart is a muscle that is devided into 4 parts or rooms. These rooms are called <u>chambers</u>. The upper chambers are called <u>atriums</u>. Blood enters the heart through the atriums. The lower chambers are called <u>ventricles</u>. Blood is pumped out of the heart through the ventricles.



Grambo

The left side of the heart is seperated from the right side by a thick wall. The only way to go from the left side to the right side is by going around the whole body.

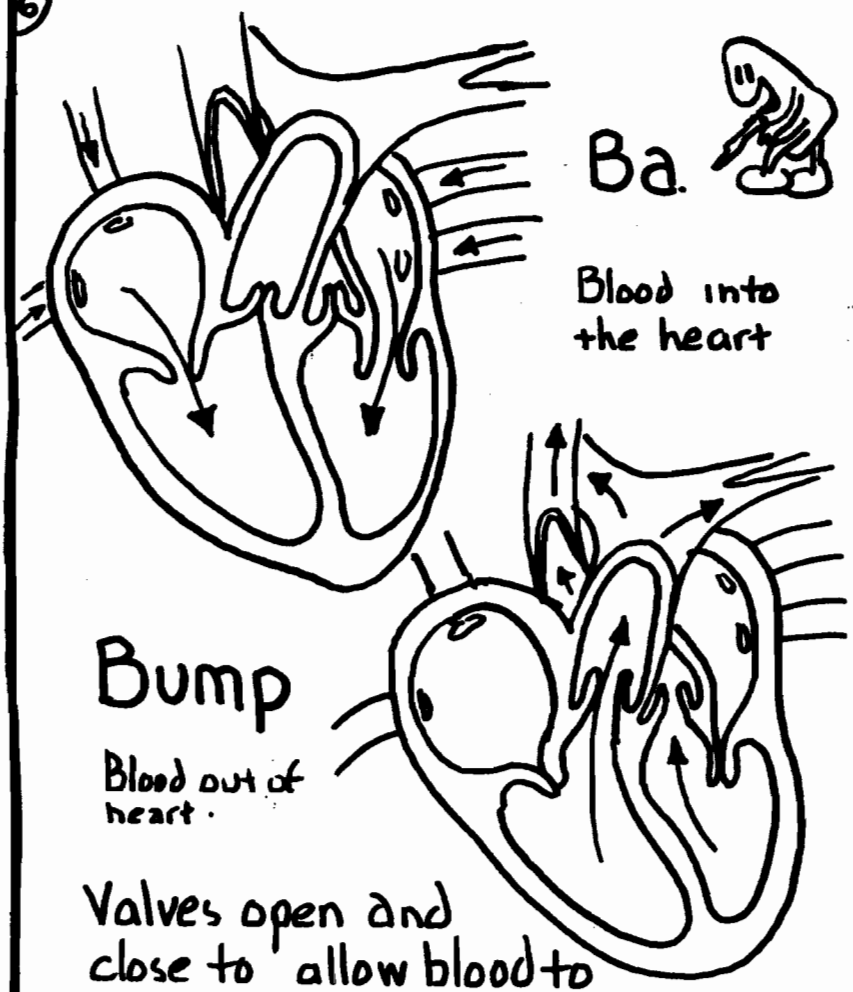
5



Cycle of Blood

From the right side blood moves to the lungs. It Then goes to the left side so it can be pumped to the body.

6



Ba.

Blood into the heart

Bump

Blood out of heart.

Valves open and close to allow blood to flow in only one direction. Both atrium valves open at the same time, then close. Ventricle values then open giving us the Ba Bump rhythm.

7

Describe the flow of blood from the left ventricle to the right ventricle.

Home work-

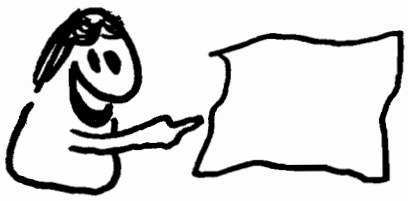
1- A book publisher needs an 8 inch by 10 inch color illustration of the heart. The colors need to be on seperate sheets so you will have to make tracing paper overlays. (teacher will show you samples) Label drawing

Medical Illustration
Circulation

Name _____
Class _____ Box No _____

How does the blood get oxygen?

Experiment 14

1 Begin With  This sheet  piece of lung (if available)

2 Why is there a wall between the left and right side of the heart?

3 Why are valves necessary in the heart?

4 The valve in the right ventricle opens. Where does the blood move to?

5 Why does it move there?

6 If someone covers your head with a plastic bag why will you feel sick?

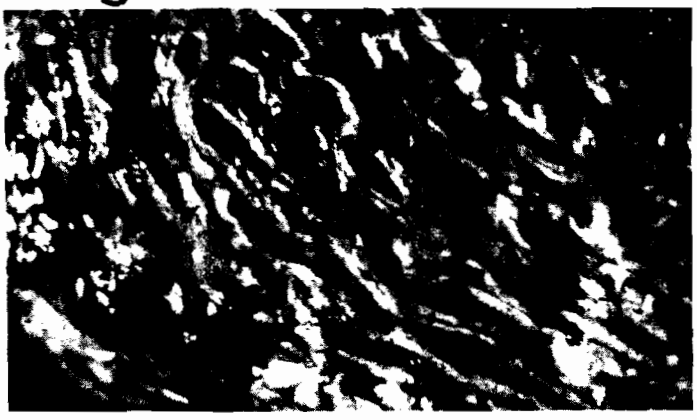
Oxygen is needed by the parts of the body for many reasons. Red blood cells carry oxygen around the body. They pick up clean air at the lungs, and get rid of used air at the lungs. When blood picks up $\underline{O_2}$ the cells turn bright red and puff up. When blood cells carry used blood they turn a red-brown. <u>Blood is never blue</u>. Veins are blue blood is not.

Grambo

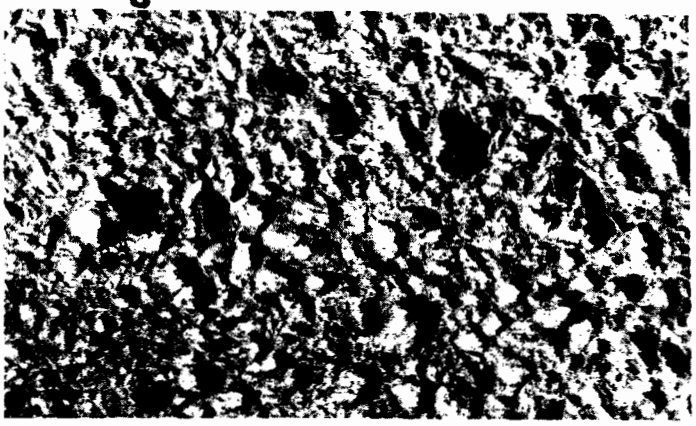
7) lungs are like sponges they contain many spaces for air. These air spaces are like tiny balloons. They are called alveoli.

Examine these pictures

lung tissue

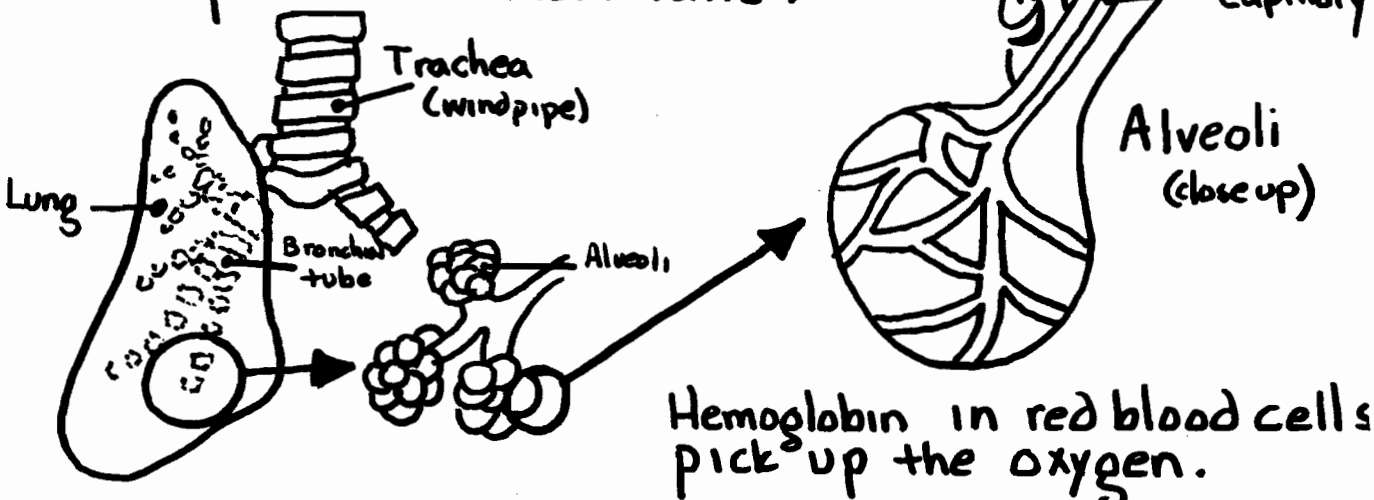


Sponge



In what ways is the sponge like the lung tissue?

8) These Alveoli have thin walls and are surrounded by capillaries which also have thin walls. Gases pass through the semi-permeable membrane.



Hemoglobin in red blood cells pick up the oxygen.

Homework –

1) How does the blood get oxygen? (describe it step by step)

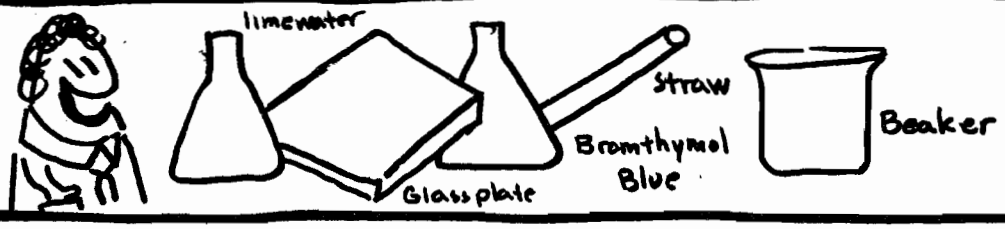
2) If available, place a piece of lung in water. Why does it float?

Medical Illustration
Circulation

Name _____
Class _____ Box No _____

What do we breath out? Experiment 15

1 Begin With



2 How is lung tissue like a sponge?

3 What is an alveoli?

How does it get oxygen?

4 Why are there capillaries around alveoli?

5 Breath on a piece of glass
Why does it fog?

Water is a biproduct of the oxidation of food and oxygen.

6 Place some bromthymol blue in a beaker and add some water.

How does the air affect it's color?

Grambo

7) Breath into this solution using a straw.

8) How does your breath affect the color?

A yellow color shows the presence of carbon dioxide gas

9) Try the same experiment using lime water instead of bromthymol blue. If it gets cloudy you have Carbon dioxide.

Gases are exchanged through the walls of the alveoli. Exhaled air contains some oxygen because you breath in more than you need. This is why if someone stops breathing you can breath into their mouth to keep them alive.

10) How is inhaled air different from exhaled air?

Homework -

1- Beside excess oxygen, what are two (2) things you exhale, or breath out?

2- A children's book publisher needs a 6 inch by 6inch drawing showing how the alveoli work. This is a <u>black and white</u> drawing.

Medical Illustration
Respiration

Name _____
Class ____ Box No ___

What are the parts of the Respiratory System?

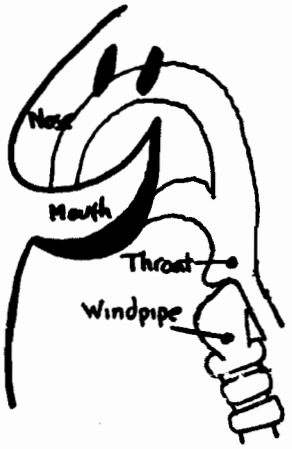
Experiment 16

1) Begin With   Lung Model (Respiratory System Model)

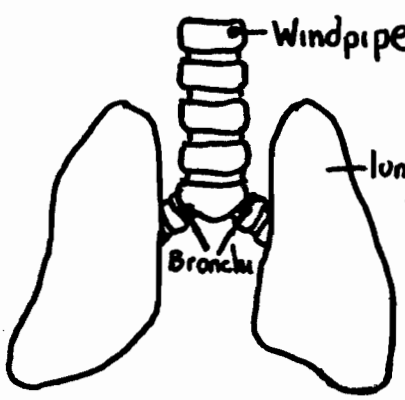
2) You have found out that you need air. How does it get into your body?

3) Close your mouth and Inhale. How is the air getting in now?

Show how air gets in

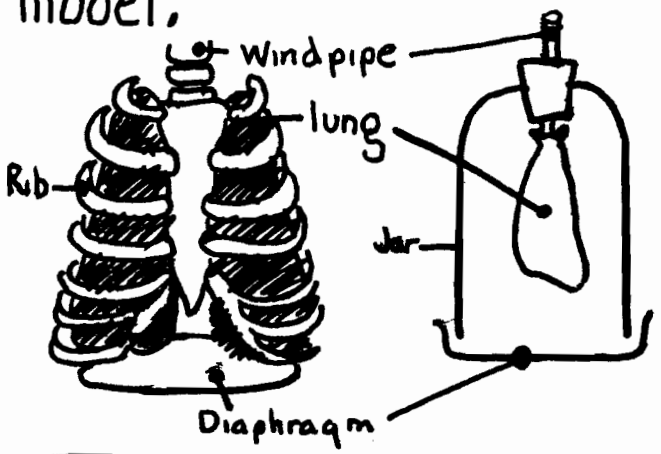


4) After air enters the body it moves down the <u>wind pipe</u> or <u>trachea</u>. The wind pipe is very hard and strong. Since you have two lungs, the wind pipe devides into two sections called <u>bronchi</u>. Each tube connects to a lung. These tubes devide in the lungs and connect to <u>alveoli</u>.

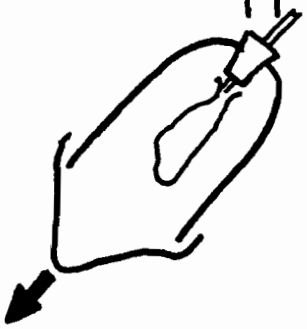


Gramba

5 Find the respiratory system model.

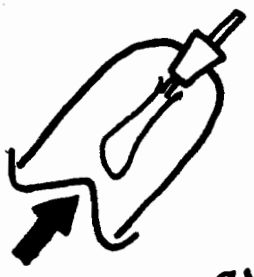


6 Pull the diaphragm. Why does this happen?



Inhale

7 Push on the diaphragm. Describe what happens.



exhale

8 How does the diaphragm affect breathing?

Homework-

1- Why is the wind pipe made of a hard material?

2- What is the job of the jar, in our model?

3- Describe how you breath.

Medical Illustration
Respiration

Name _____
Class ____ Box No ____

What happens to air before it gets to the lungs?

Experiment 17

1 Begin With

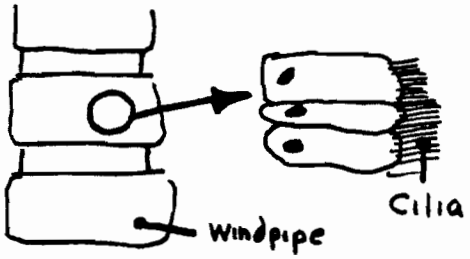
2 How is the air affected if cars and factories are nearby?

3 Why do coal miners and firemen wear gas masks?

Inside the nose are hairs which act as a filter. removing dirt from the air.

Dust and dirt would clog the lungs so they wouldn't work.

4 Some dirt gets passed the nose hairs. There are, however, hairs in the windpipe. These hairs are called <u>cilia</u>. These hairs move and collect dirt.

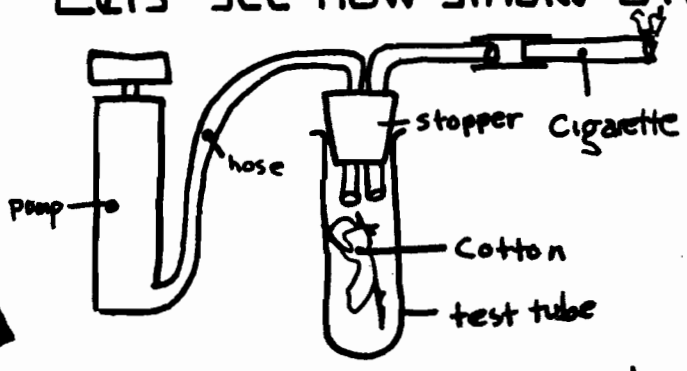


Grambo

5 There is also a sticky mucus in the nose and windpipe. How would this help remove dirt?

6 Explain how the body keeps dirt dust and bacteria out of the lungs?

7 Lets see how smoke affects you



Use the pump to suck smoke into the test tube.

8 Why did this happen to the cotton?

9 How would this tar affect the alveoli of the lungs?

10 Cold air would bother your lungs. The body heats up air entering the nose and mouth, so it is warm when it reaches the lungs.

Homework -

1- Why do you want clean air to enter your lungs?

2- Why is cigarette smoking bad for you?

3- Draw a picture showing how air enters the lungs

Medical Illustration
Excreation

Name _____
Class _____ Box No _____

What are waste Products? Experiment 18

1) Begin With   Alcohol  cotton balls  Water.

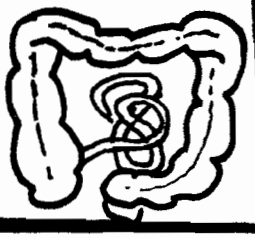
2) How are ashes formed?

3) What has to be done to these ashes?

Ashes are waste products. The body is like a furnace, it takes food and oxygen and mixes them together. Heat, the temperature your body is at, and wastes are left over after the body uses what it needs.

4) What are two things you breath out?

5) These two waste products are removed from the body by exhaling

6) Ashes are solid wastes that must be removed. Undigested foods pass to the large intestine where water is removed from unwanted food. The solid wastes then move to the rectum. 

Gramho

7) Hold up two fingers. Wet one finger and blow on both fingers.

Which feels cooler?
Why?

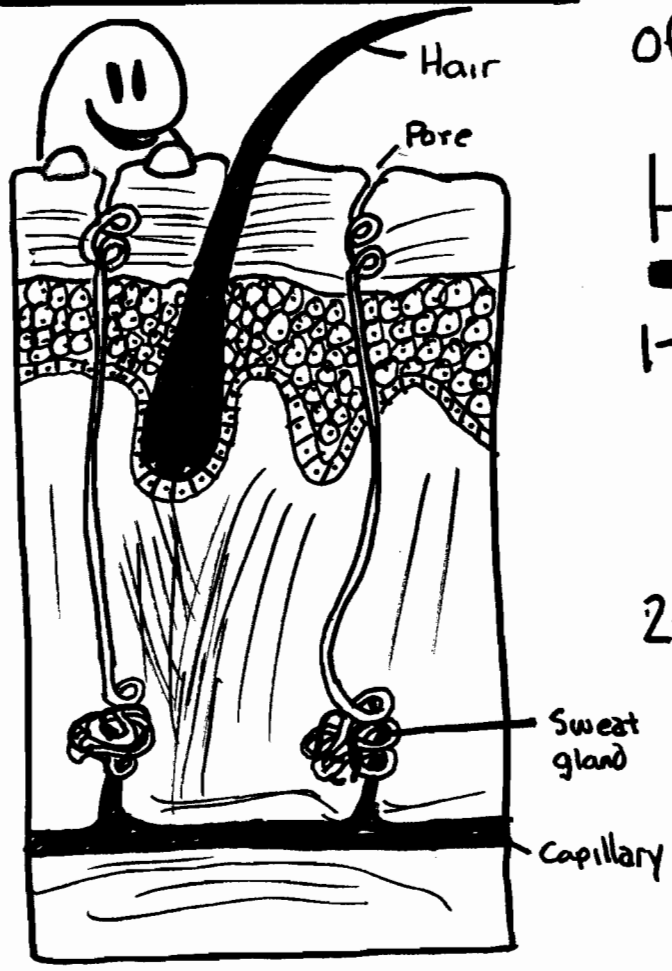
8) Put Alcohol on the back of your hand. Use a cotton ball to do this.

9) You just ran one mile You are hot and covered with sweat.

Why did you sweat?

10) What happens to your hand as the alcohol evaporates?

<u>Perspiration</u>, or sweat, comes through holes in the skin called pores. Sweat is made of <u>water</u> and <u>salt</u>.



Homework -

1- What are 2 ways the body gets rid of water?

2- How does the body get rid of solid waste?

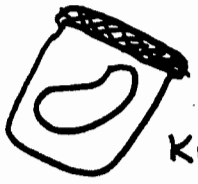
Medical Illustration
Excreation

Name _____
Class ____ Box No ____

How else are wastes removed from the body?

Experiment 19

1 Begin With

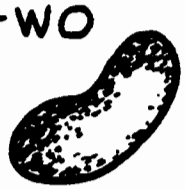


2 How are solid wastes removed from the body?

The body also has liquid waste that must be removed.

3 look at the kidney. Draw a picture here.

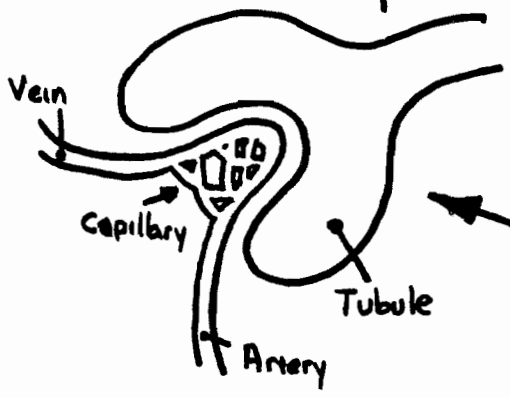
4 liquid wastes are removed from the blood by two Kidneys

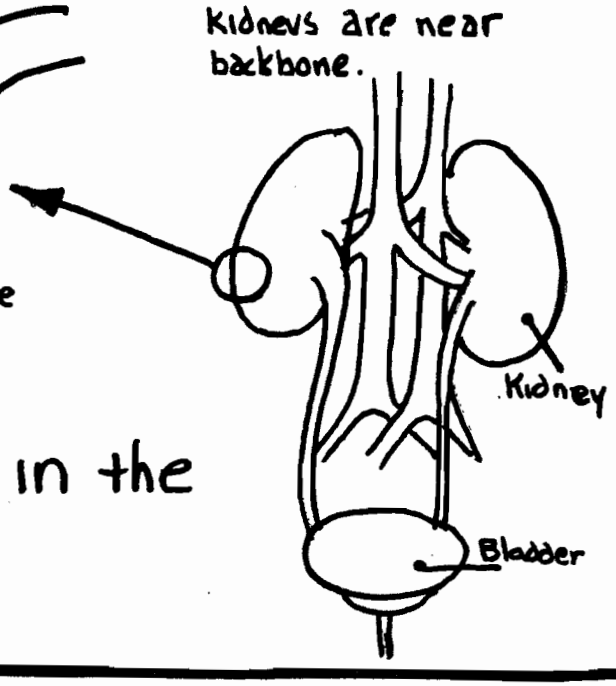


5 liquid waste, or urine, contains water, salt, and minerals. One salt, Urea, is yellow

Grambo

6 Bowmans Capsule





The kidneys contain many cup shaped tubes which remove liquid waste from the blood. The cups are called tubules.

Urine collects in the bladder.

7 Why is urine yellow?

8 Why is the bladder needed by the body?

9 Why do you need kidneys?

Homework-

1- What are 3 ways the body removes water?

2- What do the tubules do?

3- What is liquid waste made of?

Medical Illustration

Nervous System

Name _____

Class _____ Box No _____

What is a reflex?

Experiment 20

1 Begin With   This sheet.

2 I blow a whistle and you jump. I move my hand toward your face and you blink.

Why do you do these things?

These are reflexes. You have no control over reflexes. A reflex is a response that protects you. When there is a <u>stimulus</u> there is a <u>response</u>.

3 Dust is a stimulus. When it gets in your nose, the response is to sneeze.

<u>You blink</u>

What could be the stimulus?

4 What are possible responses to these stimuli.

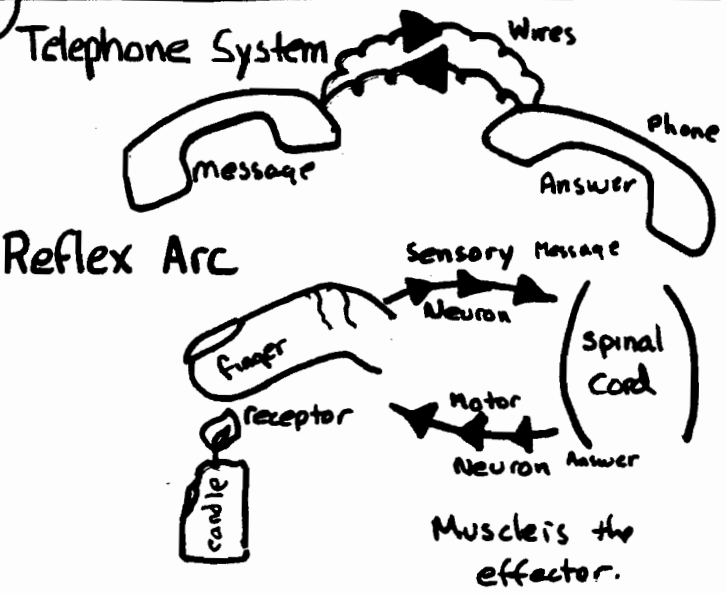
finger in a flame

ball coming at your face.

Grambo

5 Reflexes are
a) automatic
b) inborn
c) protective

6 If I wanted to call California what would you need?

7 

The finger, or receptor, picks up a stimulation. Information travels over the sensory neuron as a conversation travels over a telephone wire. The message goes to the spinal cord where an answer is given, over the motor Neuron. Muscles tighten and the finger moves. This is the Reflex Arc. This is how body parts move.

Homework -

1- How is a reflex arc like a telephone system?

2- What is a reflex?

Medical Illustration
Nervous System

Name _____
Cass _____ Box No _____

What is learned behavior? Experiment 21

1) Begin With  This sheet

2) What do you do when something flys at your face?

Why?

3) How is this kind of reaction different from learning math or science?

4) How would you teach a dog a trick?

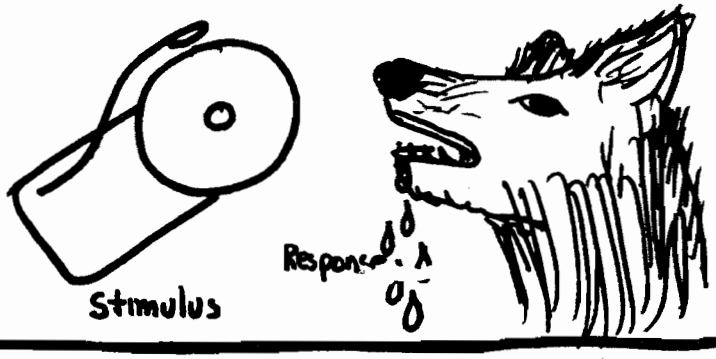
5) At a fish show, why do the trainers give the dolphins a fish when they jump a hoop?

Rewards, like the fish, are sometimes given when a person or animal does something good. This helps them remember.

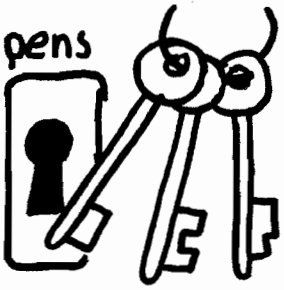
6) A man named Pavlov noticed that a dogs mouth watered when it saw food. He showed dogs food and rang a bell. After a while the dogs thought that the bell meant food. The dogs mouth watered when they heard the bell. The dogs learned this. Their response was conditioned.

Grambo

7) In Dr Pavlovs experiment, the bell was a stimulus. The dogs response was a watery mouth.

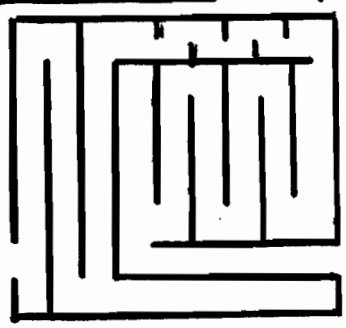


8) How can we find out Which key opens the lock?



This is a type of learning

9) How does trial and error help you get through this maze?



10) How does repeating things help a baby learn?

11) How does imitating someone help you learn?

Homework —

1- What are four styles of learning?

2- Pick one and describe how to learn something using this style?

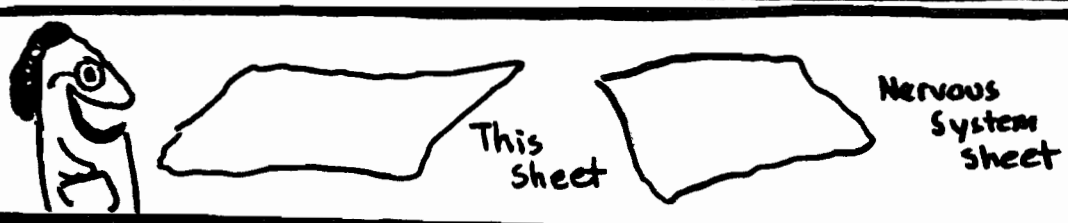
Medical Illustration
Nervous System

Name _____
Class _____ Box No ____

What is the brain?

Experiment 22

1. Begin With



2. When things have been learned, information has to be stored somewhere. like in a file cabinet, learned information is stored so it can be used later.

The part of your body that stores this information is your <u>brain</u>. Different parts of the brain store different bits of information.

3. How are you able to balance yourself?

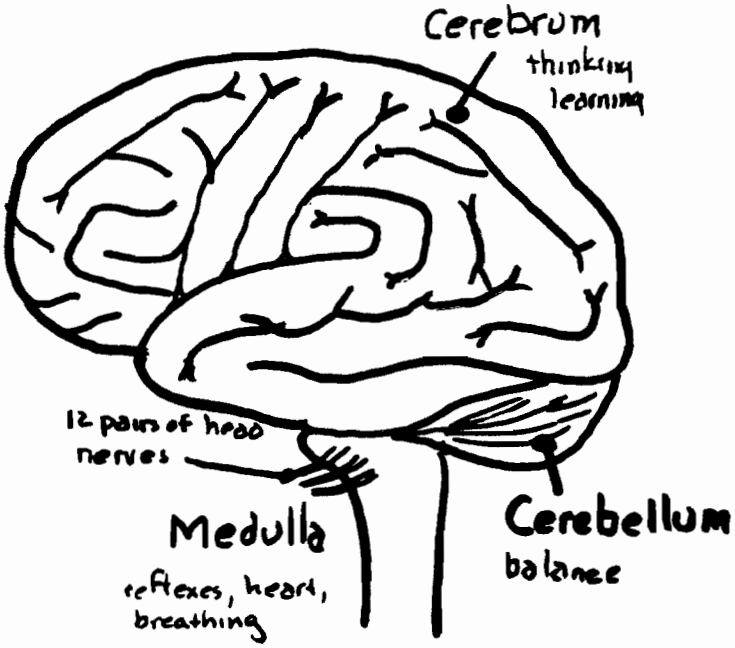
4. The part of the brain that controls your balance is the <u>cerebellum</u>.

5. How does a baby know how to swallow?

How do you know to pull your foot out of a fire?

6. These things were never tought. These are inborn responses called reflexes. Reflexes are controlled by the <u>medulla</u>

Grambo



7 There is a third part of the brain that controls thinking and learning this is the <u>cerebrum</u>.

8 How can someone damage their brain and still be able to breath?

11 The brain is inside a hard bone called the <u>skull</u>. Why is it inside hard bone?

10 How can we find out which part of the brain controls what?

Homework-

1- A cat falls. Which section of his brain helps him land on his feet?

2- A children's book company needs a drawing to show what the three main parts of the brain do. The drawing must be 8½x11 and must be in color.

Medical Illustration
Nervous System

Name _____
Class _____ Box No _____

How does information travel? Experiment 23

1. Begin With

2. Brain impulses are in the form of electricity. How does electricity travel around your house?

3. How does electricity get to your house?

Where does the electricity come from?

4. There is a main power cable that comes from the power plant, or brain; we call it the <u>spinal cord</u>. <u>Nerves</u> carry information from the Spinal cord to the body parts.

5. How would the city be affected if the main power cable was cut?

How would your body be affected if your power cable, or spinal cord, were cut?

Gramba

6) How would the city be affected if one of your house wires broke?

7) What would happen to the whole body if one nerve was destroyed?

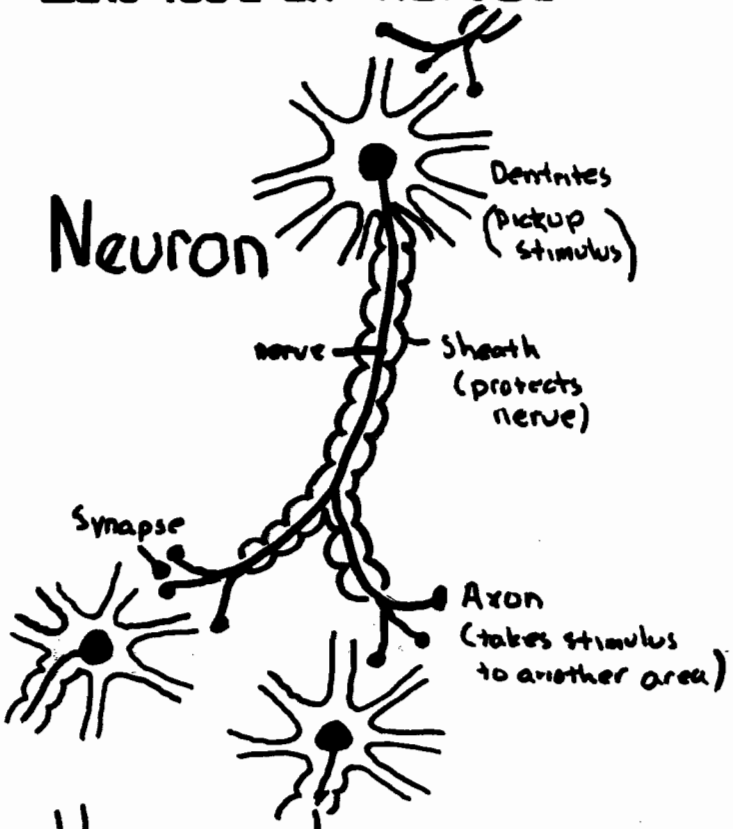
8) The spinal cord is inside of a fluid. The fluid and spinal cord are inside bone

9) Why is the spinal cord inside of a bone?

10) Why are 2 wires needed in an electric circuit?

11) Why are 2 nerves needed to make something move?

Lets look at nerves



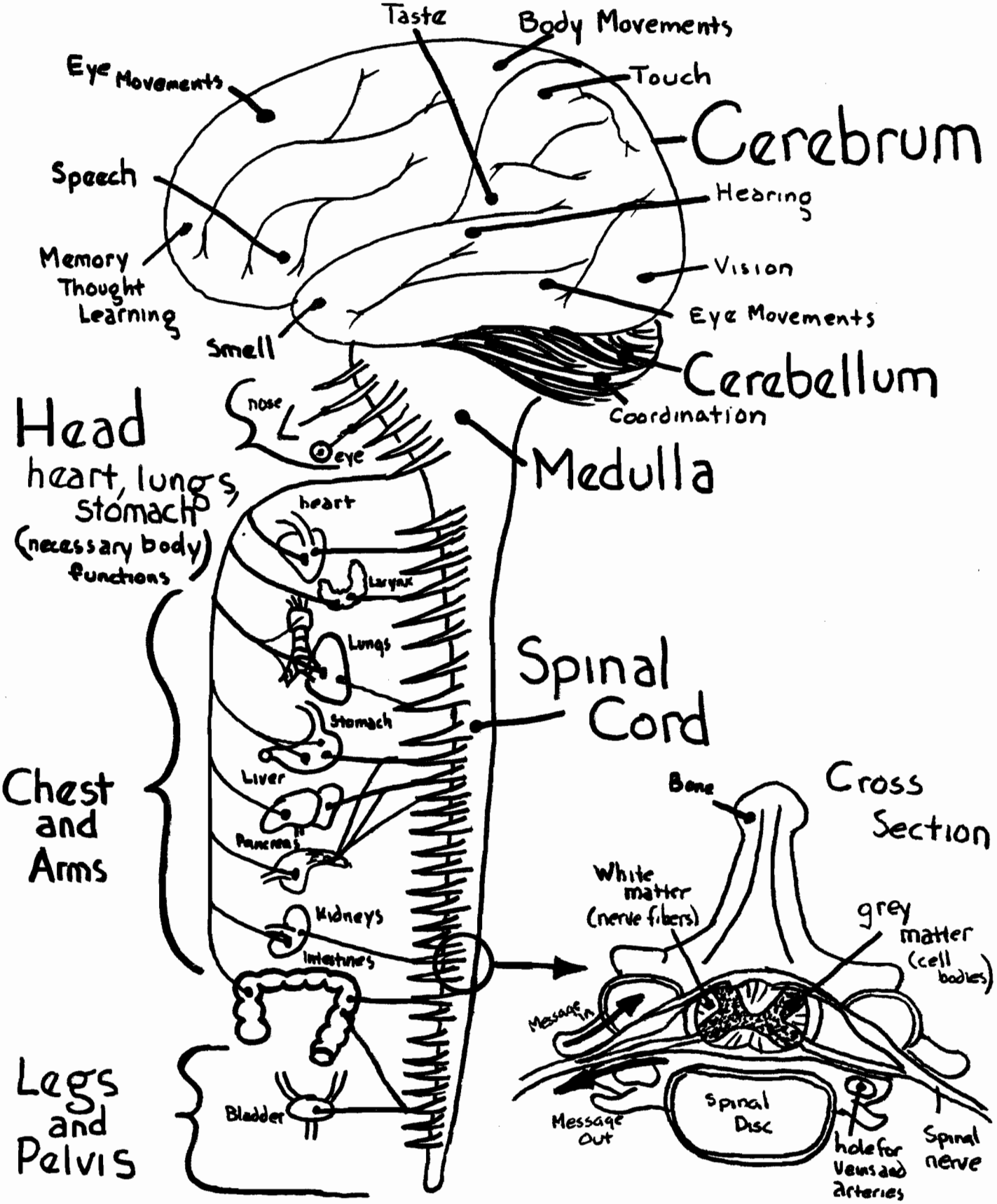
12) Why can't you run one long telephone wire from N.Y to California?

For the same reason we can't run one long nerve. Many nurons connect. The dentrites of one to the Axon of another. The connection is a synapse

Home work -

1- How are nerves like wires?

Medical Illustration
Nervous System



Grambo