

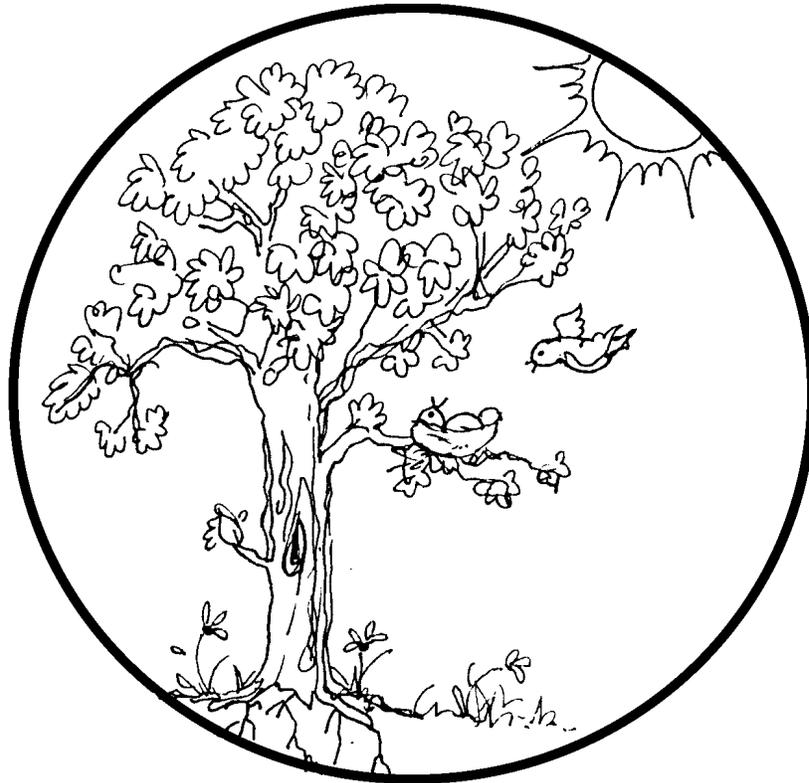


Life Cycle

Diversity in a Balance

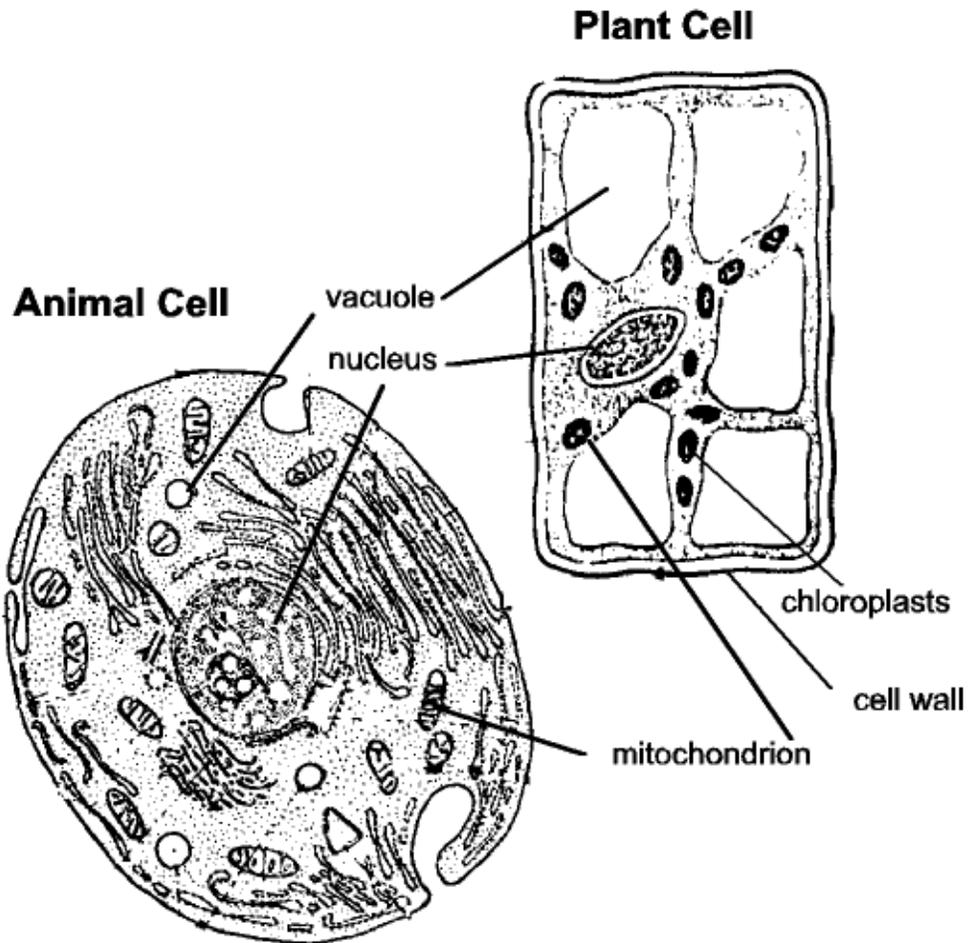


FOURTH GRADE WORKBOOK



student _____

LIFE CYCLE - ORGANISMS (4A)
PRE



COMPARE PLANT AND ANIMAL CELLS. HOW ARE THEY DIFFERENT? WRITE A PARAGRAPH ON HOW THEY ARE SIMILAR AND DIFFERENT.

LIFE CYCLE - ORGANISMS (4A)

PROBLEM: Do cells vary on different parts of the body?

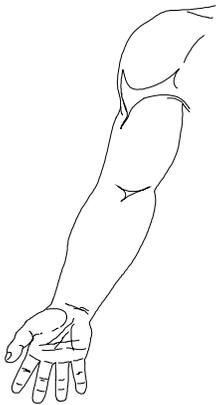
PREDICTION: _____

MATERIALS: MICROSCOPE, PREPARED SLIDES

PROCEDURE: Draw a picture of a cell, tissue, appendage, whole organism, or synthetic material.

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Look at the following parts of your skin (the largest organ) by using the microscope. Draw what you see. Pay attention to the shape and size of the cells in these areas.

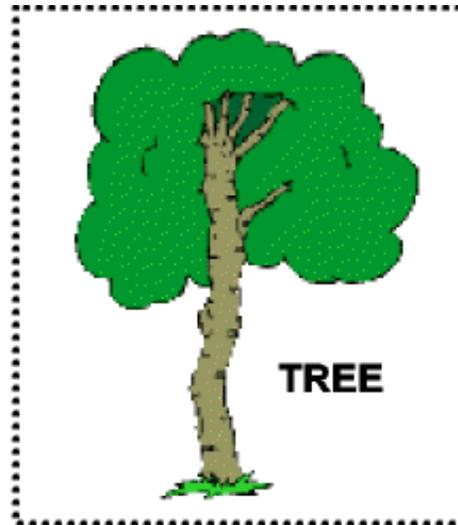


PALM	FINGERTIPS
BACK OF HAND	LEG (ANY PART)

CONCLUSIONS: Are the cells from different parts of your body the same?

Would other organisms have different skin cells over their bodies? Explain your answer. _____

**LIFE CYCLE - ORGANISMS (4A)
POST**



Write a sentence on whether you think the organism has cells, tissues, and/or organs.

1. _____

2. _____

3. _____

4. _____

LIFE CYCLE - ORGANISMS (4B)

PROBLEM: How do we group species into larger groups?

PREDICTION: _____

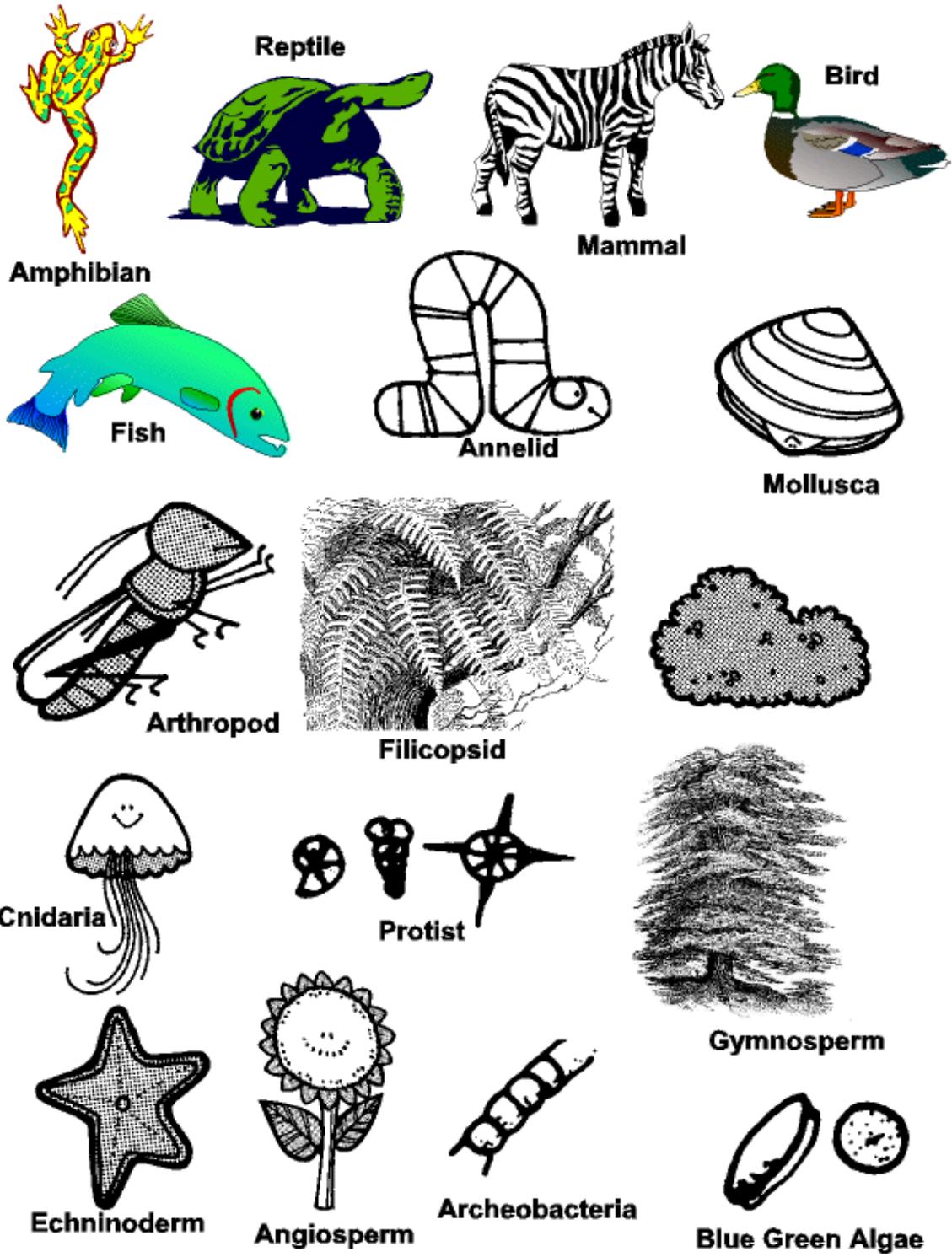
MATERIALS: packets of organisms (Marine Invertebrates)

PROCEDURE: You have different organisms in your packet that represent different species. Classify the organisms into large groups (Phylum) using characteristics that might link the individual samples. Draw the specimens and label the characteristics they have in common. (Hint: there are 5 major groups).

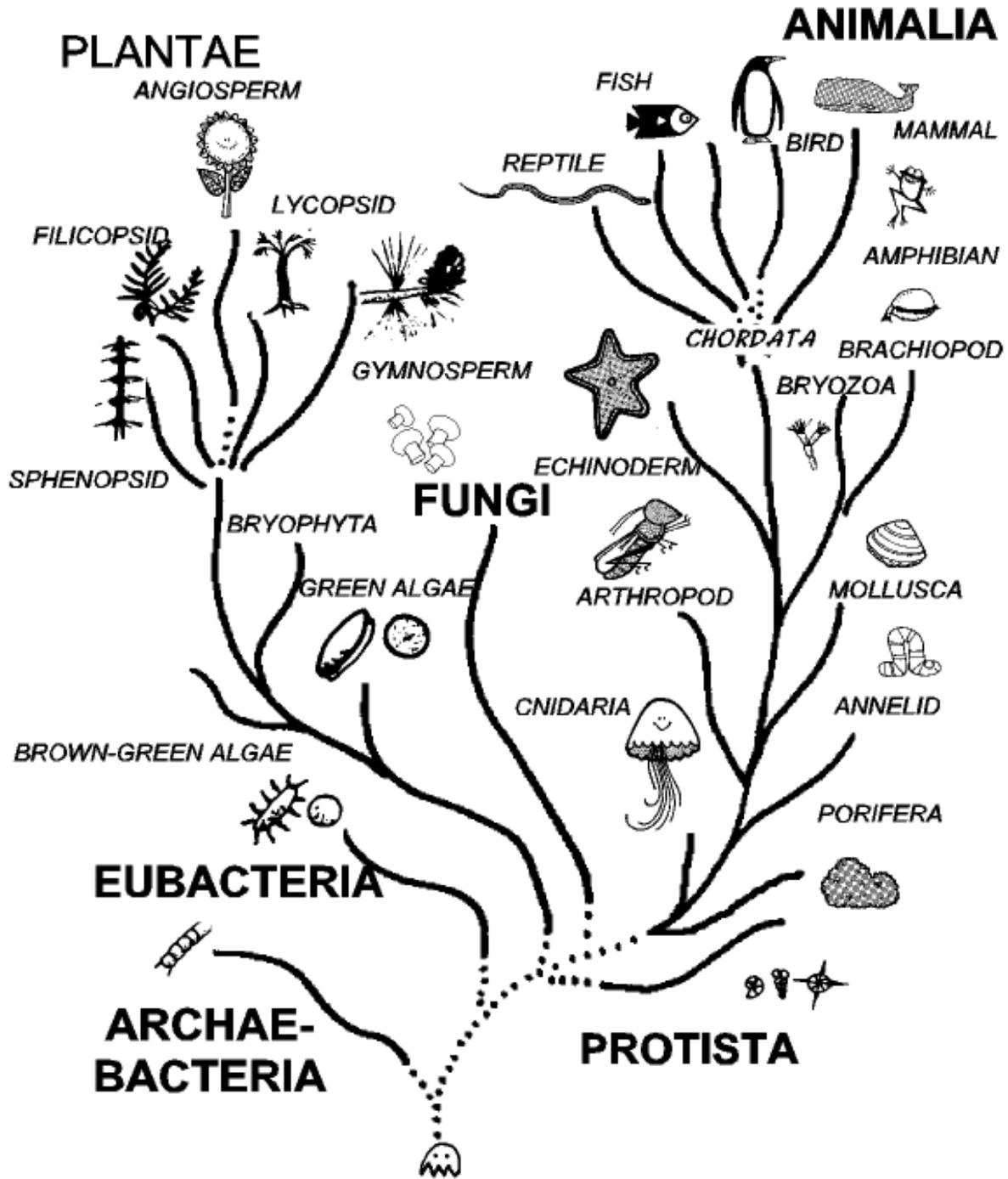
	CHARACTERISTICS	DRAWING

CONCLUSION: What were some of the characteristics that you used to sort these samples into groups?

**LIFE CYCLE - ORGANISMS (4B)
POST**



TREE OF LIFE



LIFE CYCLE - HUMAN BIOLOGY (4A)

PROBLEM: Are girls more flexible than boys?

PREDICTION: _____

PROCEDURE: Do the following activities and record either a yes or No. Your teacher will discuss each activity. Record your partner's results.

	YOURS Sex _____	PARTNER Sex _____
1. body through broom		
2. squat with feet flat		
3. hand clasp (front)		
4. hand clasp (back)		
5. hand clasp (shoulder)		
6. knees to sit		
7. leg to chest		
8. ballerina		
9. bend touch toes		
10. bend touch toes reverse		

Collect the data from your class and then make a bar graph of the results. In your conclusion interpret the results and see if you can figure out if flexibility has anything to do with whether you are male or female.



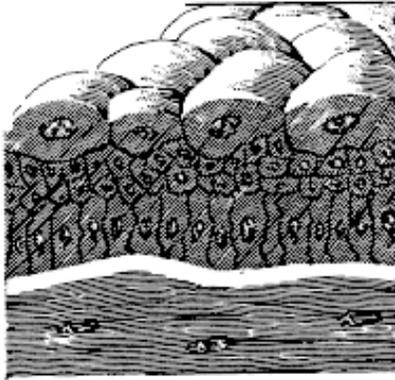
ACTIVITY #	# MALE	# FEMALE

CONCLUSION: Is there a difference between girls and boys? If there is a difference, can you explain why? _____

**LIFE CYCLE - HUMAN BIOLOGY (4A)
POST**

FOUR TISSUES OF THE HUMAN BODY

DIRECTIONS: Look at the following pictures and describe each of the tissues.



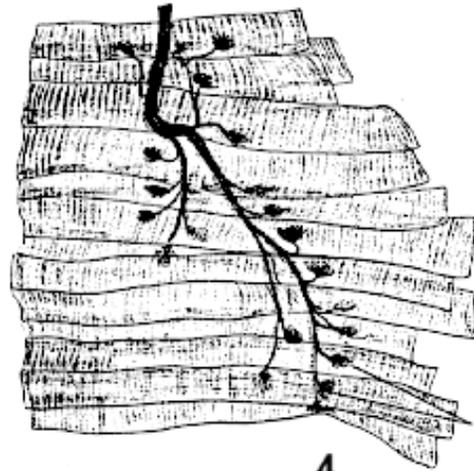
1



2



3



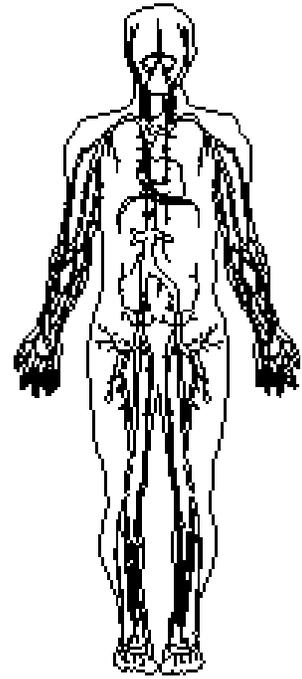
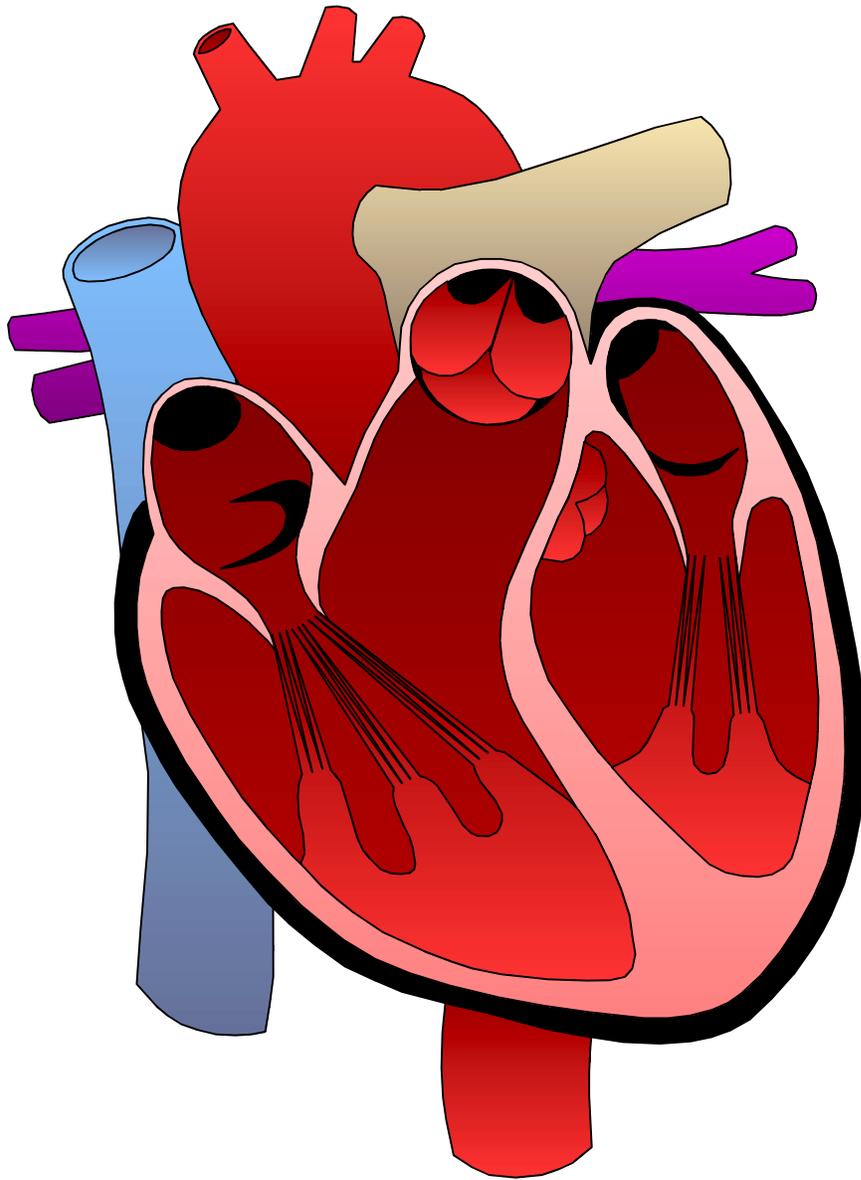
4

CONNECTIVE TISSUE _____

MUSCLE TISSUE _____

NERVOUS TISSUE _____

EPITHELIAL TISSUE _____



LIFE CYCLE - HUMAN BIOLOGY (4B)

PROBLEM: Is the pulse rate the same for boys and girls?

PREDICTION: _____

EXERCISE 1. Find an artery close to the surface of your body (either wrist or neck). Count your pulse for 15 seconds. Have your partner keep watch of the time while you count. Add the number four times (or multiply by four). This will record your pulse rate per minute.

My pulse rate: trial 1 _____ X 4 = _____ beats per minute
 (15 second trial) trial 2 _____ X 4 = _____ beats per minute
 trial 3 _____ X 4 = _____ beats per minute
 sum of trials _____

Average pulse rate (sum of trials divided by 3) = _____

How does your rate compare with your partner's? _____

2. After running in place for one minute, my pulse rate is:
 _____ beats per minute

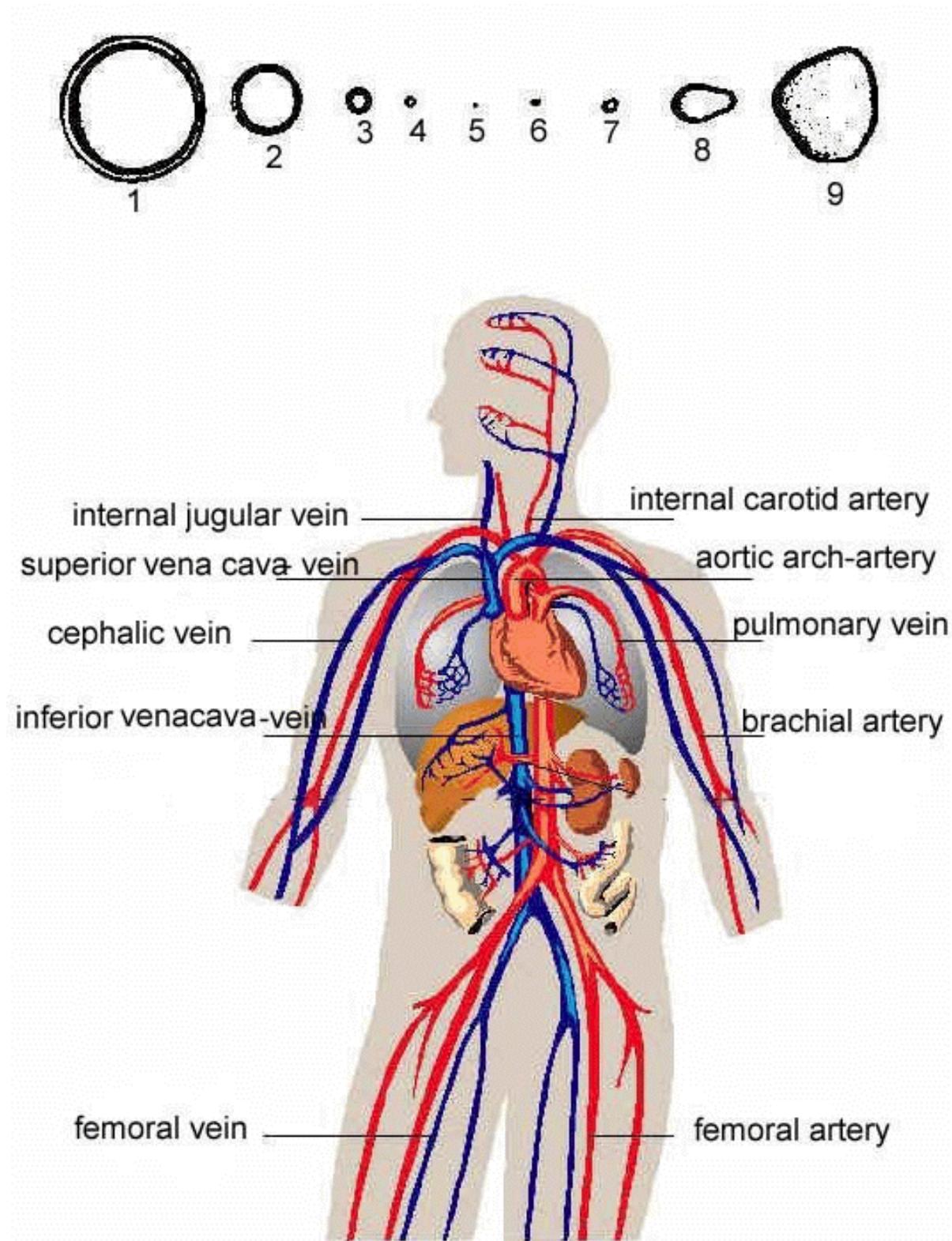
EXERCISE II. Let's look at the class average and see if there is a difference between the girls' and boys' pulse rate. (You may need to use the back of this sheet.)

STANDING STILL: girls	STANDING STILL: boys	RUNNING: girls	RUNNING: boys
AVERAGE: _____	AVERAGE: _____	AVERAGE: _____	AVERAGE: _____

Find the average: add up all the pulse rates under each section and then divide by the number of people in that section.

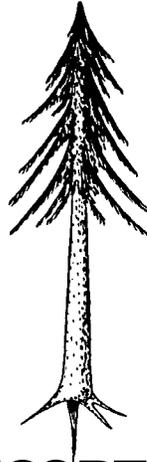
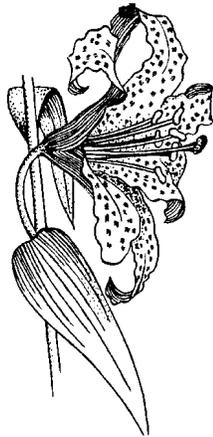
CONCLUSION: What did we determine in this experiment? _____

LIFE CYCLE - HUMAN BIOLOGY (4B)
POST



SIMPLE PLANT CLASSIFICATION

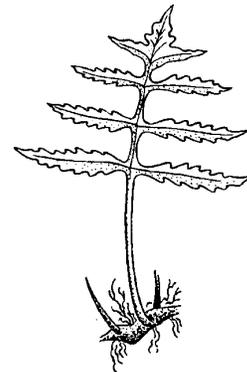
ANGIOSPERMS



SPHENOPSIDS



FERNS



GYMNOSPERMS



BRYOPHYTES

ALGAE



LIFE CYCLE - PLANTS (4A)

PROBLEM: Can you differentiate between a monocot and a dicot seed?

PREDICTION: _____

MATERIALS: 24 hour soaked corn and bean seeds, dilute iodine solution, 1 peanut in shell, hand lens or microscope

PROCEDURE I. CORN SEED

1. Examine the soaked corn seed your instructor has cut in half. Add dilute iodine solution to one half of the seed. Make a careful drawing of exactly what you see using a hand lens or a microscope.
2. The part which turns blue-black is the endosperm, the light purple area is the cotyledon. Be sure to label your drawing.
3. Can you find the young leaves inside the seed? _____ How many are there? _____ Which part of the seed do you think is the seed coat? _____

BEAN SEED

1. Carefully remove the seed coat from the bean seed and examine what you find.
2. Separate the two halves of the bean seed with your fingers. Be careful you don't damage the sample.
3. Again, apply dilute iodine solution to one half and make an accurate drawing.
4. Can you find the endosperm, young leaves (how many?) _____ cotyledon? _____, and seed coat? _____.
5. Try to open another corn seed like you did the bean seed. Can you do it?

CORN	BEAN

PROCEDURE II. Using the peanut, carefully illustrate the following sequence on the back of the paper: 1. the peanut with shell 2. the peanut in open shell. 3. a cut section of the peanut (label seed coat, cotyledon, and endosperm) Is this a monocot or dicot?

CONCLUSION: _____

GUIDE KEY CHARACTERISTICS



Monocots

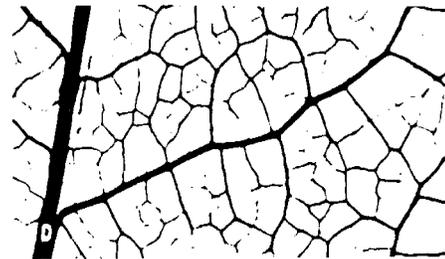
MONOCOTYLEDONS	DICOTYLEDONS
1. One cotyledon or seed leaf.	1. Two cotyledons or seed leaves.
2. Generally marked parallel leaf venation.	2. Generally marked netted venation of leaves.
3. Flower parts typically in groups of 3 or multiples.	3. Flower parts typically in groups of four or five.



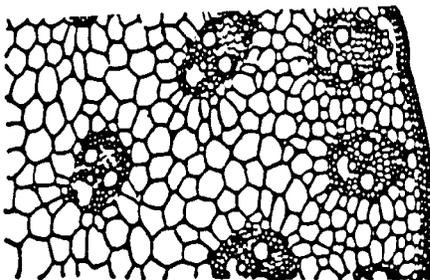
Dicots



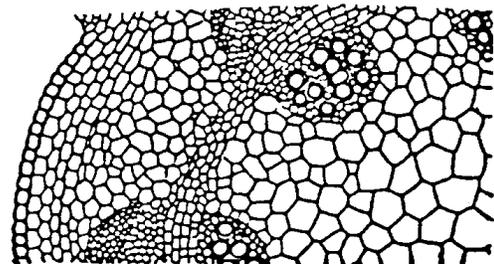
leaves of a monocot



leaves of a dicot

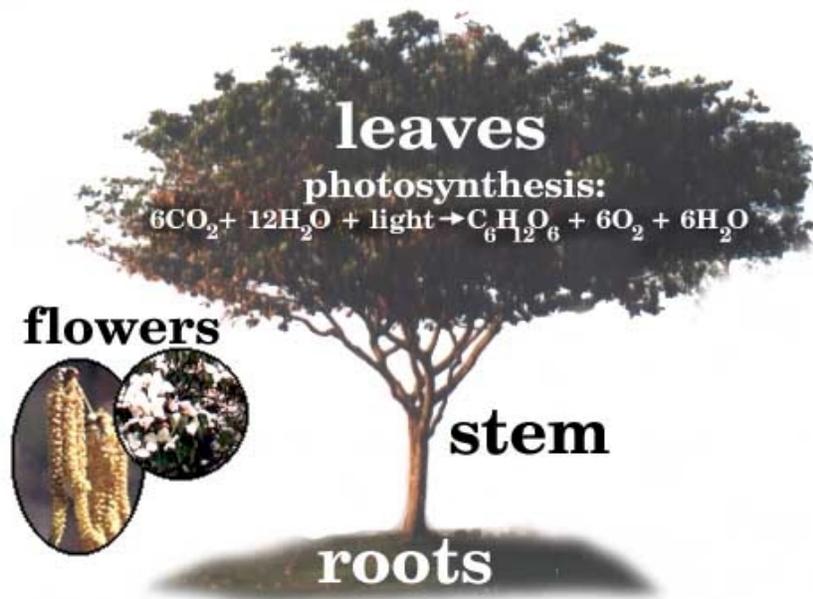


cross section of monocot stem



cross section of dicot stem

PHOTOSYNTHESIS



carbon dioxide + water
yields (with help from chlorophyll and sunlight)
sugar + oxygen + water

Using the word equation above, make a cartoon equation for photosynthesis. Make a legend of your symbols. Don't forget the + signs and arrows.

LIFE CYCLE - PLANTS (4B)

PROBLEM: Why is starch important to plants?

PREDICTION: _____

MATERIALS: dilute iodine, medicine droppers, small containers

PROCEDURE: Iodine can test for starch. Crush all the solid substances and place all liquid substances into containers before applying iodine. Place one or two drops of iodine on the items below, record what happens. In the space below, enter + or - to indicate whether it gave a positive or negative starch test result.

ITEM	RESULT	ITEM	RESULT
bread		water	
potato		bean	
candy		orange juice	
banana		butter	
apple		oil	
cracker		leaves	
meat		paper	
potato chip		plastic	
lettuce		onion	

Iodine is used as an indicator for the presence of starch. It is a dark orange liquid but when applied to something that contains starch, it turns what color?

CONCLUSIONS: How is starch produced by a plant?

**LIFE CYCLE - NATURAL ENVIRONMENT (4A)
PRE**

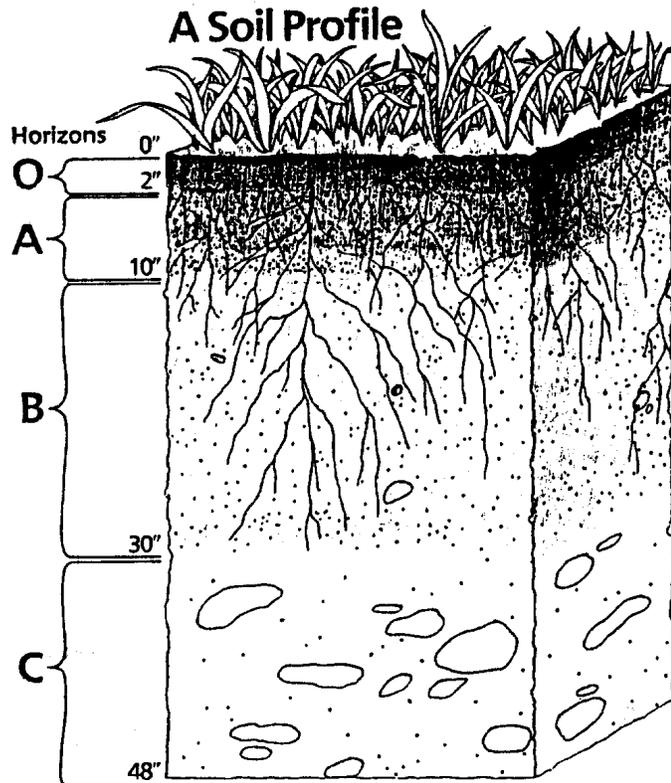
Use the picture of a soil profile to write a paragraph describing soil. Start with the surface and describe each layer working down the section.

Surface: organic material
dead plants, animal material
O horizon

Topsoil: plant roots,
bacteria, fungi, small animal
A horizon

Subsoil: Fewer organisms
less topsoil; plants don't
grow well
B horizon

Altered Parent Material:
Weathered, less living matter
layers above were formed from it
C horizon



title _____

LIFE CYCLE - NATURAL ENVIRONMENT (4A)

PROBLEM: How can you distinguish the different soil horizons?

PREDICTION: _____

PROCEDURE:

MATERIALS: different soils samples, magnet, microscope, hand lens, cup of water
Look at the soil samples. Use different techniques described by your teacher to learn about soil. Write the information down in complete sentences. Predict which soil horizon your sample may have come sampled from.

SOIL	DESCRIBE CHARACTERISTICS	HORIZON

CONCLUSION: Which characteristics were the most valuable in describing soil?

LIFE CYCLE - NATURAL ENVIRONMENT (4A)
POST

INVESTIGATING A SCHOOL YARD ECOSYSTEM

MATERIALS: Hand shovel, sticks, 1 meter length string, containers or trays

PROCEDURE: Go outside and measure a 1 meter square area following instructions from your teacher. Describe the soil, animals, and vegetation that are present. Record what you see.

OUTSIDE OBSERVATION
DESCRIPTION OF AREA
ANIMALS PRESENT
DESCRIPTION OF SOIL (TOP)
VEGETATION PRESENT

How are the plants surviving? What are the animals eating? Is this area a permanent living place for the organisms you found? How long do you think the "ecosystem" will survive?

LIFE CYCLE - NATURAL ENVIRONMENT (4B)

PROBLEM: How many different types of organisms live in a mudflat?

PREDICTION:

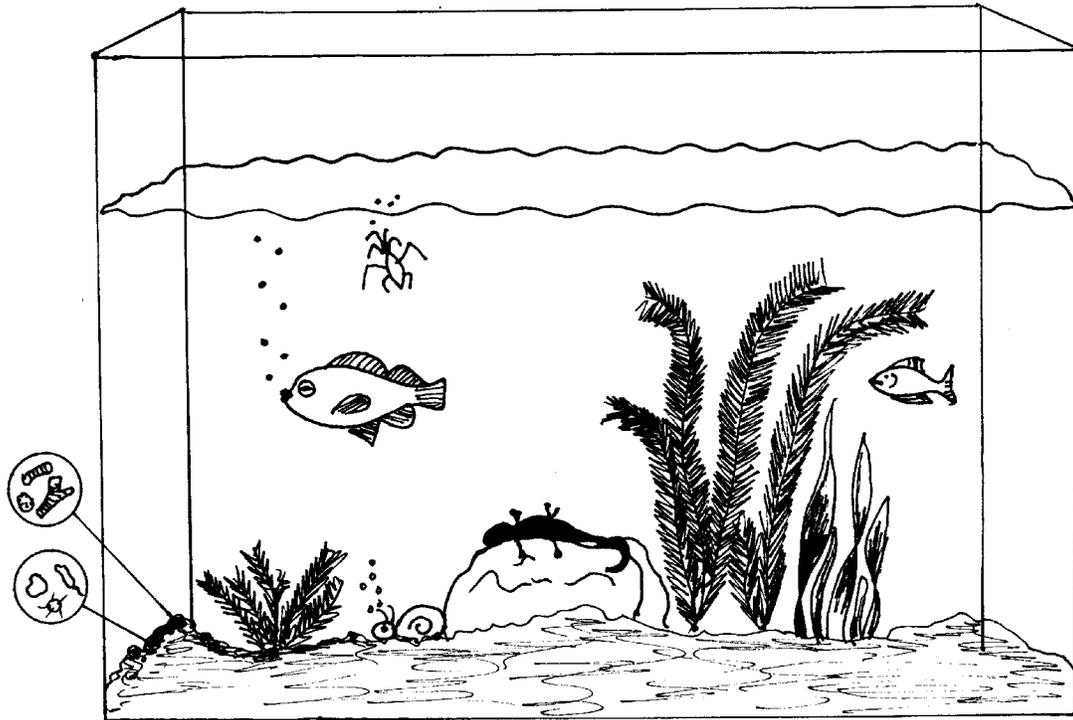
PROCEDURE: Using the bag of organisms from the San Francisco Bay mud, determine how many different organisms there are. Then discuss with your instructor the possible "food chain" of these organisms. You may use the back of this lab sheet if you need more room.

DRAW SPECIMEN AND NAME	DESCRIBE

CONCLUSION: Recreate the food chain of these organisms by stating who eats whom.

Sketch a food web of organisms in the San Francisco Bay mud by linking the food chains you've identified on the back of this lab sheet.

A FRESH WATER AQUARIUM ECOSYSTEM



DESCRIBE THE FOOD CHAIN THAT IS OCCURRING IN THIS AQUARIUM. IS THERE MORE THAN ONE FOOD CHAIN? DESCRIBE THE FOOD WEB?
