BIO-PROCESS LAB
## SAMPLE TOURNAMENT #1

Station A: Microscopy

1. What is the range of magnification (lowest to highest) of this microscope?

2. How many millimeters is the field of view containing critter A? (diagram)
How many micrometers is it?

3. What is the approximate length of critter A in micrometers?

4. Which part of the microscope would you use to determine the depth and 3-D shape of critter A?
(A) diaphram   (B) fine adjustment knob (C) stage clip   (D) revolving nosepiece   (E) none of these

5. Assuming critter A is observed under low power, how will the appearance of critter change
when he is observed under high power as to size, detail, and brightness?

Materials: Microscope with 10X ocular and 5X, 10X, 40X and objectives, clear mm ruler,
photo of protozoan next to a mm. ruler.
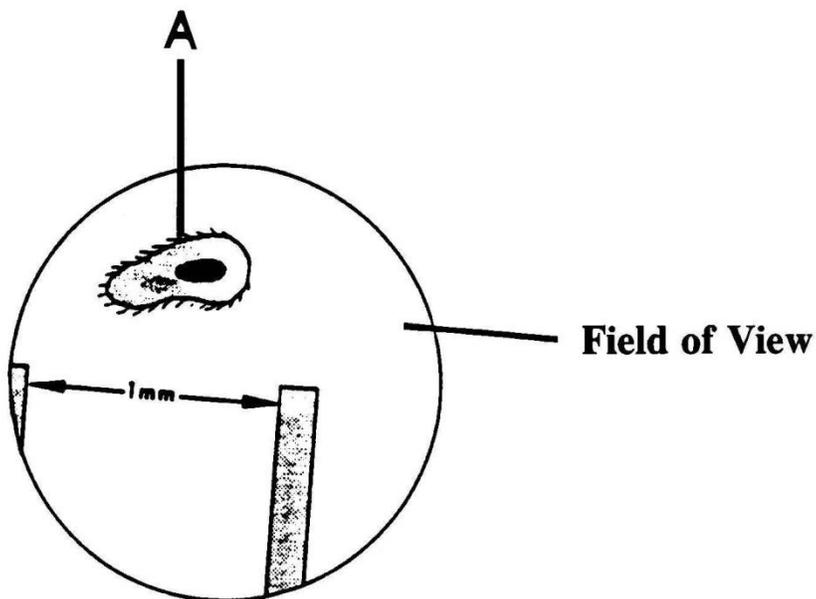
Station B: Lab Safety

Examine the safety symbols and list of activities provided and answer the following questions.

For questions 6 & 7 , use the safety symbols

6. Symbol "A" represents what type of hazard?

7. Symbol "B" represents what type of hazard?

For questions 8 & 9, use the list of observed activities

8. Which of the observed activities would be considered **safe** and **proper** for a student's health and safety?

9. Which of the observed activities would be considered **unsafe** and should not be done in the laboratory?

10. For the situation described below, explain the correct procedure for dealing with the emergency.

You are performing a lab and you spill some bleach on your hand.

SAFETY SYMBOLS

A.   **B.**

LIST OF OBSERVED ACTIVITIES

A. Eating a candy bar while doing your frog dissection.
B. Putting a broken test tube into the waste basket.
C. Using a plastic graduated cylinder for heating a liquid.
D. Mixing together chemicals to see what will happen.
E. Wearing safety goggles when working with glass or chemicals.

Station C: Hypothesis

Using the information about spider webs and the following key,
    decide which is the appropriate response.

Key:
A. A logical hypothesis according to the data.
B. Illogical hypothesis or contrary to the data.
C. Not a hypothesis, but a restatement of data.
D. Reasonable hypothesis, but not based on this data

11. Web B was built when the spider was one month old.

12. As a spider gets older, its web becomes smaller in order
    to conserve energy.

13. All members of a species of spiders will build similar
    spider webs.

14. The spider needs more food as it grows, so it builds a
    larger web to catch more food.

15. These spider webs were built by the same spider.
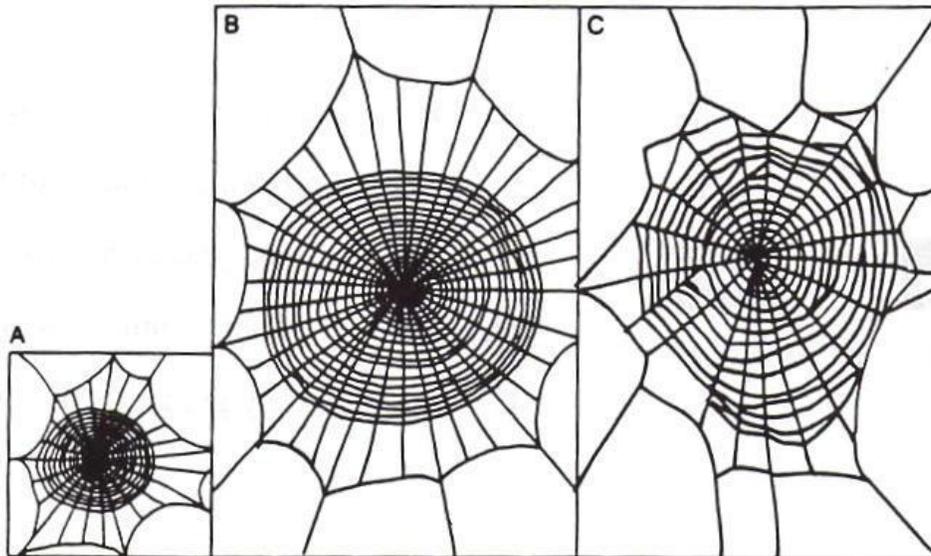
Station D: Lab Equipment

Use the list of equipment provided to answer the following questions

16. Give the letter of the piece of equipment that should be used to measure 0.1 mL of a liquid.

17. Give the letters of the pieces of equipment that should be used to dissect a shark.

18. Give the letters of the pieces of equipment that should be used to make a wet mount?

19. Give the letters of the pieces of equipment that should be used to heat 10 mL of a liquid.

**20**. Give the letters of the pieces of equipment that should be used to observe a planarian feeding.

LIST OF EQUIPMENT

A. compound stereoscope

B. dissecting pan

C. safety goggles

D. dissecting kit

E. Pyrex test tube

F. 1 mL pipet

G. microscope slide

H. 10 mL graduated cylinder

I. coverslip

J. dissecting microscope

K. small culture dish

L. test tube holder

M. eye dropper

N. Bunsen burner

O. mortar & pestle

P. 10 mL beaker

Station E: Measurement

Using the instruments provided, obtain the requested information.

21. Measure the length of the critter from A to B.
What is it's length in millimeters? in centimeters?

22. What is the value of the numbered and unnumbered increments or graduations of the thermometer.

23. What is the temperature recorded on the thermometer?

24. What is the value of the numbered and unnumbered increments or graduations of the graduated cylinder?

**25**. What is the volume present in the graduated cylinder?
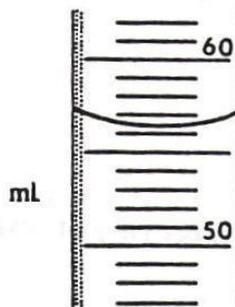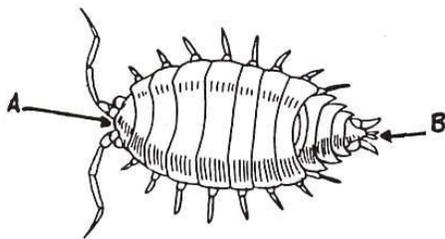
Station F: Balances

Use the balances to determine the requested information.

Be sure to include units with all answers.

26. What is the **most specific** graduation or increment on <u>either</u> balance?

27. What is the **capacity** of the electronic balance in **grams**?

28. What is the capacity of the triple beam balance as it is equipped with these auxiliary weights in **grams**?   in **kilograms**?

29. You place an object on the electronic balance and it reads **ERR**.
What does this tell you about the object?

30. What is the mass of Object X in grams? In kilograms?

Materials: A triple beam balance with 2-1000g and 1-500g auxillary
weights, an electronic balance with a capacity of 400g and
.01 g graduations. Mass X is indicated by the balance diagram.
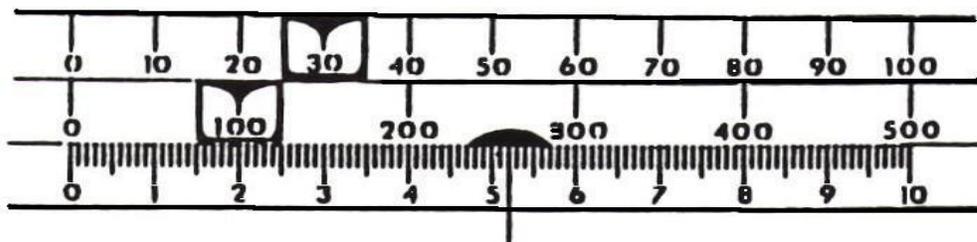
Station G: Inferences

Inferences are logical conclusions based upon observations.

31. From list 1, give the letters of those statements which are observations

32. From list 1, give the letters of those statements which are inferences.

33. From list 2, how many peanut seeds are in the shell? Is this an inference or is it an observation?

34. From list 2, about how many cm. should each lobe be?   Why?

35 Which specimen is the mystery peanut? Give evidence to support your answer.

Materials: 6 shelled peanuts which have not been opened (Only the shells are visible).

List 1 – Observations vs. Inferences   **List 2 – Mystery Peanut**

A. The shell will crack easily   Shell is triple lobed.

B. The peanuts have skins around them.   Shell is 6 cm. long.

C. The shell has a rough surface.   Shell lobes are uneven.

D. The shells have one, two, or three lobes.   One lobe is bent.

E. The shells have rows of surface markings.   Shell color is not uniform.

F. There are peanuts in the lobes of the shell.

G. The shells are not all evenly colored.

Peanuts 1 – 6

Peanut 1 has all shell lobes straight.

Peanut 2 has a uniform colored shell.

Peanut 3 has a triple lobed shell.

Peanut 4 is 4.5 cm. long

Peanut 5 has 2 lobes.

Peanut 6 is a single lobe.

Station H: Experimental Design & Analysis

Examine the four photosynthesis experimental setups and answer the following questions.

36. What is experiment A attempting to determine?

37. Which indicator is being used in experiments B & C?
      A. iodine   B. methyl red   C. bromthymol blue   D. glucose test-strip

38. What is experiment B attempting to determine?

39. Which indicator is being used in experiment D?
      A. iodine   B. methyl red   C. bromthymol blue   D. glucose test-strip

40. Based upon the results of the <u>four</u> experiments what can you conclude about photosynthesis, its requirements and its products.
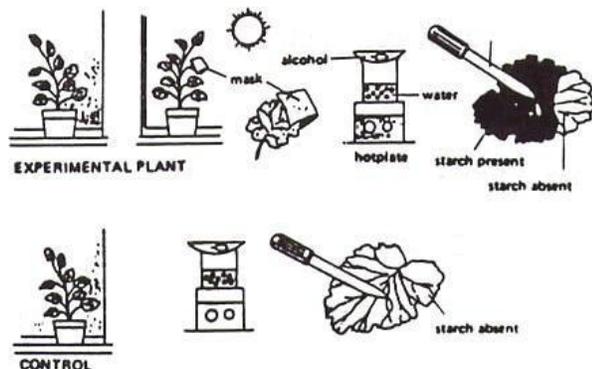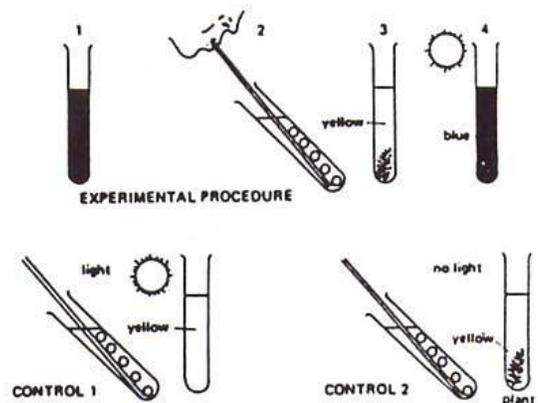
Experiment A
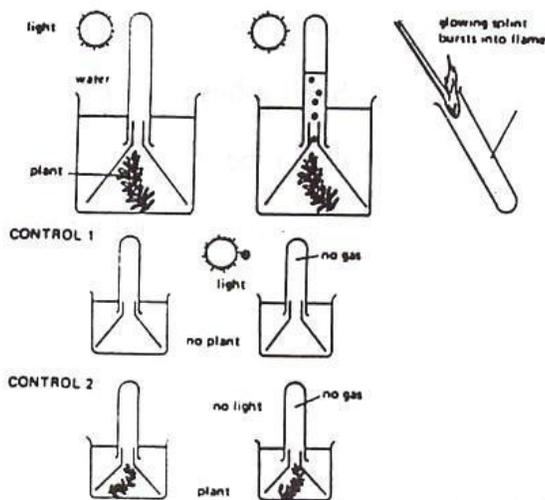
Experiment B
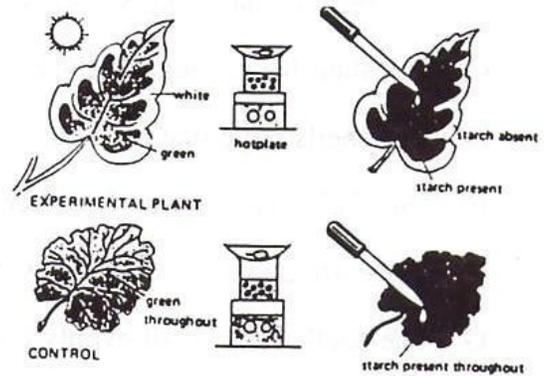
Experiment C

Experiment D

Station I: Food Label Analysis

41.   Food must provide a source of energy, raw materials, vitamins, and minerals.
Which unit on the food label gives the amount of stored energy for this food?
How much stored energy is there per serving?

42.   The raw materials on the food label are protein, carbohydrates, and fats.
How many grams of protein per serving are in this food? What percent of
of a single serving of salmon is protein?

43.   What is the most abundant mineral excluding sodium is in this food?
What % USDA does it represent?

44.   How many calorie diet is this label based upon?

45.   How many grams of salmon are in this can? How many grams are in an ounce
of salmon?

Alaska Red Sockeye Salmon

Net Wt. 7 1/2 oz   212 grams

Nutritional Facts:	**Amount/serving**		**% DV***
Serving size: 1/4 cup (63g)	**Total Fat**	7g	10 %
Servings per container: 3.5	Sat. Fat	1.5 g	8 %
Calories 110	**Cholesterol**	40 mg	13 %
Fat Calories 60	**Sodium**	270 mg	11 %
	Total Carbohydrates	0 g	0 %
	Fiber	0 g	0 %
	Sugars	0 g	
	Protein	13 g	

Vitamin A - 2% * Vitamin C - 0% * Calcium - 10% * Iron - 2%

Ingredients: Red Sockeye Salmon and salt

* Percent Daily Values (DV) are based upon a 2000 calorie diet.

Station J: Pedigree Analysis

Examine the pedigree concerning earlobes and answer the following questions.
Assume that all couples are married.
Genotype is the gene combination and phenotype is the appearance of the trait.
Free earlobes are dominant and attached are recessive.

Use" F" for a dominant gene and" f" for a recessive gene.

46. What do the Roman Numerals represent?

47. Who are their individuals in II and III without a number ?

48. What is the relationship between II-1 and IV-3?

49. How many offspring of the original parents are represented in all generations of this pedigree ?

50. What is the genotype of individual III - 2? What is the phenotype of individual IV-3?

Pedigree – Earlobes
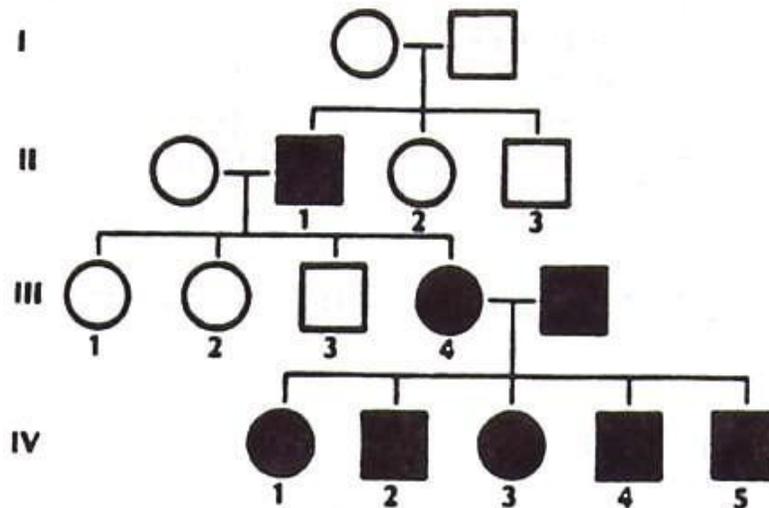
BIO-PROCESS LAB
SAMPLE TOURNAMENT # 1

SCHOOL NUMBER _____
SCHOOL _____
STATE _____

STUDENT NAMES: (PLEASE PRINT)
1. _____
2. _____

RAW SCORE _____
RANK _____
POINTS _____

BE SURE TO INCLUDE APPROPRIATE UNITS WITH ALL ANSWERS!!!

STATION A:
1. _____ 50 X to 400 X _____
2. ~ 1.5 mm   ~ 1500 mcm
3. _____ ~ 600 mcm _____
4. _B - fine adjustment knob_
5. larger, more detail, darker

STATION F:
26. _____ .01 g _____
27. _____ 400 g _____
28. _____ 2610 g   2.61 kg
29. error - beyond capacity
30. _____ 135.2 g _____

STATION B:
6. _____ fire or flame _____
7. _____ eye _____
8. _____ E _____
9. _____ A   B   C   D _____
10. Flush with H_2O + tell teacher

STATION G:
31. _____ C   D   E   G _____
32. _____ A   B   F _____
33. _____ 3 _____ Inference _____
34. ~ 2 cm It is 6cm & 3 lobes
35. peanut 3=only one that fits

STATION C:
11. _____ C _____
12. _____ B _____
13. _____ D _____
14. _____ A _____
15. _____ C _____

STATION H:
36. Is light & chlorophyll needed
37. _____ A - iodine _____
38. Is chlorophyll needed
39. _C - bromythmyol blue_
40. _____ needs chlorophyll & light _____
        & CO_2 - makes O_2 + starch

STATION D:
16. _____ O _____
17. _____ P _____
18. A   G   I   M
19. _____ F _____
20. B   D   J   C

STATION I:
41. calories   110 cal
42. 13g,%protein = 13g/63g = 21%
43. calcium - 10%
44. 2000 calorie diet
45. 212 g - g/oz = 212g/7.5oz
                = ~ 28g/oz

STATION E:
21. _____ 35.0 mm   3.50 cm
22. NI = 1 ° C   UN = 0.2 ° C
23. _____ 26.5 ° C _____
24. NI = 10 mL   UN = 1 mL
25. _____ 56.5 mL _____

STATION J:
46. _____ generations _____
47. _spouses (not offspring)_
48. grandfather/granddaughter
49. _____ 12 _____
50. _____ Ff   female attached