AP Bio Station Review

STATION 1: OPERONS

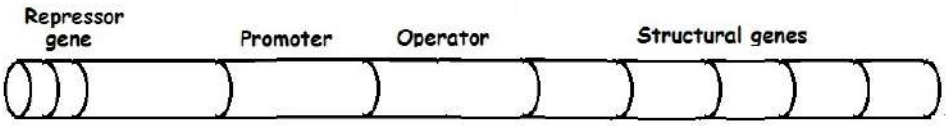
Use the pool noodles to review *trp* and *lac* operons.

1. What do the terms repressible and inducible mean?

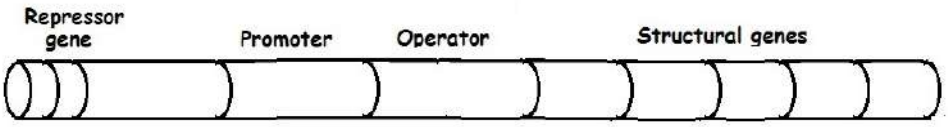
OPERON	INDUCIBLE/REPRESSIBLE
lac operon	
trp operon	

2. What environmental conditions make the repressor in each of these "active"?

3. DRAW A PICTURE OF the *trp* operon when tryptophan is available to cell.
Be sure to include RNA POLYMERASE, REPRESSOR protein, tryptophan,



4. DRAW A PICTURE of the *lac* operon when GLUCOSE is LOW and LACTOSE is PRESENT.
Be sure to include cAMP, CAP, LACTOSE, RNA POLYMERASE, REPRESSOR protein, etc



STATION 2: ACTIVE/PASSIVE TRANSPORT

Use the cards provided to build a concept map on the desktop.

Use the chart in your BILL to check your map.

5. EXPLAIN how ACTIVE TRANSPORT and PASSIVE TRANSPORT work together to do the following: BE SURE TO IDENTIFY the type of transporter used (ion channel, proton pump, endocytosis, etc.) and whether each is ACTIVE or PASSVIVE.

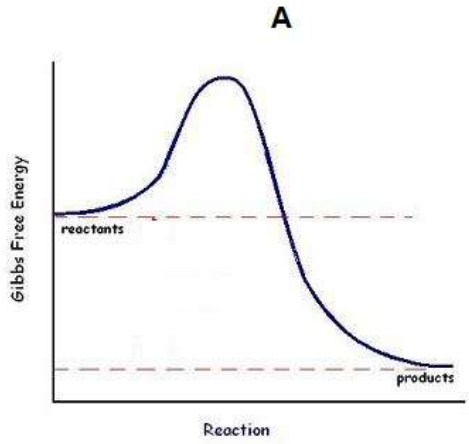
a. Set potential on a nerve cell and depolarize cell when a signal is received

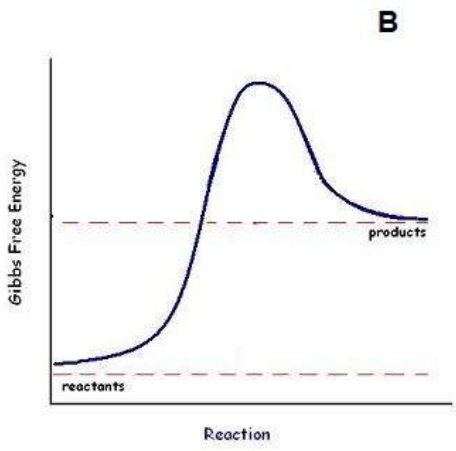
b. Photophosphorylation in thylakoids during the light dependent reactions

STATION 3:

Identify the graphs as NEGATIVE DELTA G or POSITIVE DELTA G reactions.

LABEL the graphs as EXERGONIC or ENDERGONIC





_____ _____

_____ _____

6. EXPLAIN how you can tell which is which?

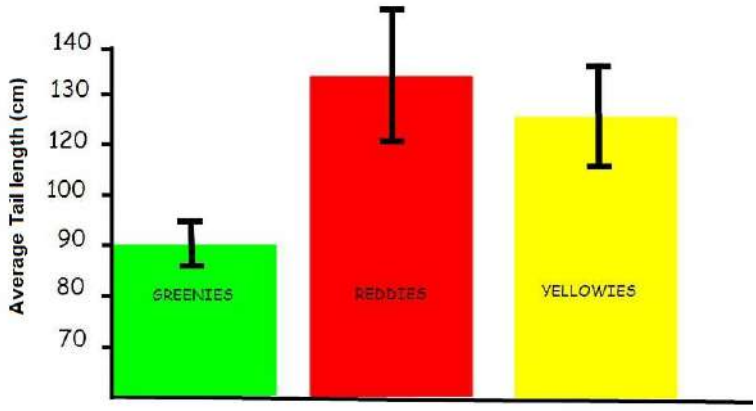
7. Which of these requires energy to get started?

8. How does adding an enzyme affect the DELTA G of these reactions?

9. Which of these diagrams would represent the HYDROLYSIS OF ATP?

STATION 4:

The following graph shows data collected on the average tail length of 3 different types of aliens. Error bars show 95% confidence levels (2 SEM).



10. What conclusion(s) can be drawn from this about the differences in tail lengths between the 3 types of aliens? EXPLAIN YOUR ANSWER

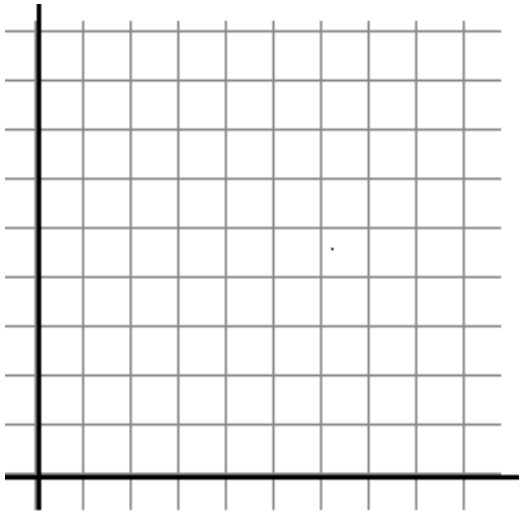
STATION 5:

Water potential in potato cells was determined in the following manner. The initial masses of six groups of potato cores were measured. The potato cores were placed in sucrose solutions of various molarities. The masses of the cores were measured again after 24 hours. Percent changes in mass were calculated. The results are shown below. Graph these data shown.

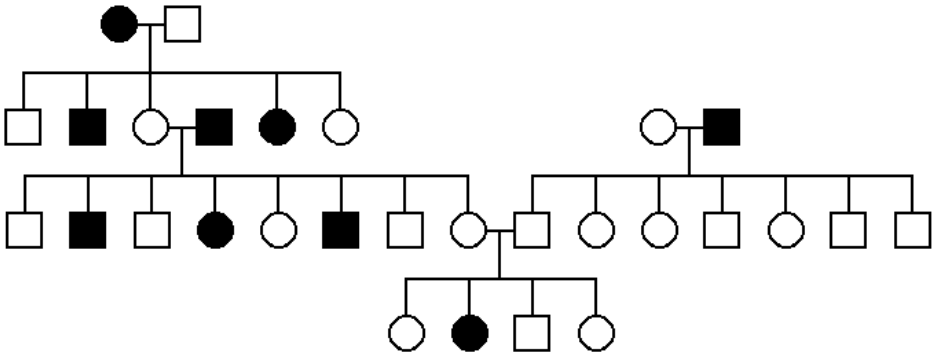
11. From your graph, label where the cells were
HYPOTONIC and the solution was HYPERTONIC, and VICE VERSA.

12. Determine the apparent molar concentration (osmolarity) of the potato core cells.

Molarity of Sucrose in Beaker	Percent Change in Mass
0.0 M	18.0
0.2	5.0
0.4	-8.0
0.6	-16.0
0.8	-23.5
1.0	-24.0



STATION 6- PEDIGREES



13. Is it possible that this trait inherited as AUTOSOMAL DOMINANT? YES NO
EXPLAIN YOUR ANSWER

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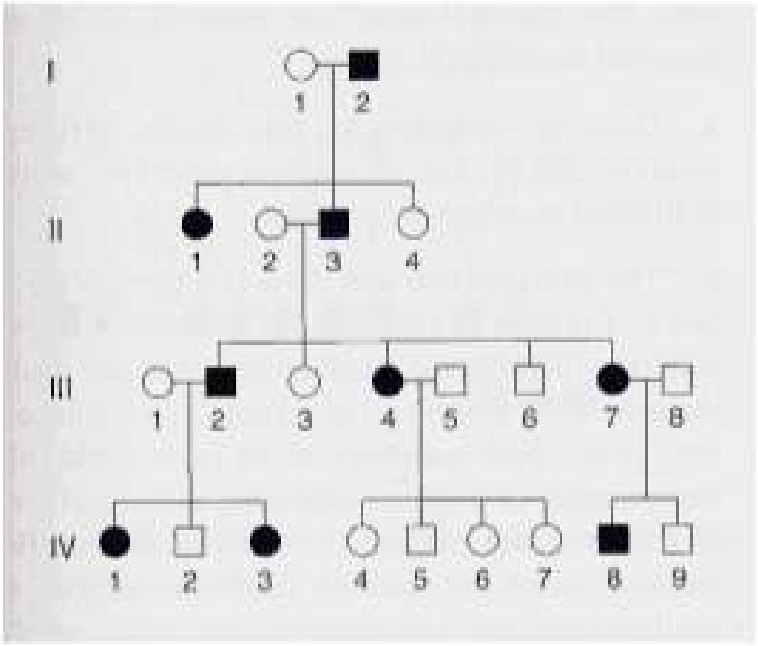
14. The inheritance of the disorder in II-3 from his father rules out what form of inheritance?
EXPLAIN YOUR ANSWER.



STATION 7: CHI SQUARE ANALYSIS

15. WHAT IS ALWAYS THE **NULL HYPOTHESIS** FOR A CHI SQUARE ANALYSIS?

In corn, purple kernels (P) are dominant over yellow (p) and smooth kernels (S) are dominant over shrunken (s). AN ear of corn has 381 kernels,
purple, smooth = 216
purple, shrunken = 79
yellow, smooth = 65
yellow, shrunken = 21

16. Use Chi square analysis to determine if the data fits the predicted phenotypic ratio if this is a double heterozygous dihybrid cross?

Observed Phenotypes (o)	Expected (e)	(o-e)	$(o-e)^2$	$\frac{(o-e)^2}{e}$
			$X^2 =$	

How many degrees of freedom? _____

CONCLUSION

STATION 8: GENETICS- FRUIT FLY DATA

Results of a cross between homozygous WT (red eyed) male flies and homozygous sepia eyed females are shown below.

	WT eyed male	WT eyed female	Sepia eyed male	Sepia eyed female
F_1	4916	5010	0	0

	WT eyed male	WT eyed female	Sepia eyed male	Sepia eyed female
F_2	3764	3717	1195	1251

17. How is this trait inherited?

dominant recessive autosomal X-linked

18. EXPLAIN HOW YOU KNOW

19. Draw a Punnett showing the parents & offspring in the F_2 cross.

STATION 9:

A new species of fly was discovered on an island in the South Pacific. Several different crosses were performed, each using 100 females and 100 males. The phenotypes of the parents and the resulting offspring were recorded.

Cross I: True-breeding bronze-eyed males were crossed with true-breeding red-eyed females. All the F_1 offspring had bronze eyes. F_1 flies were crossed, and the data for the resulting F_2 flies are given in the table below.

F_2 Phenotype	Male	Female
Bronze eyes	3,720	3,800
Red eyes	1,260	1,320

Cross II: True-breeding normal-winged males were crossed with true-breeding stunted-winged females. All the F_1 offspring had stunted wings. F_1 flies were crossed, and the data for the resulting F_2 flies are given in the table below.

F_2 Phenotype	Male	Female
Normal wings	1,160	1,320
Stunted wings	3,600	3,820

Cross III: True-breeding bronze-eyed, stunted-winged males were crossed with true-breeding red eyed, normal winged females. All the F_1 offspring had bronze eyes and stunted wings. The F_1 flies were crossed with true breeding red-eyed, normal-winged flies, and the results are shown in the table below.

Phenotype	Male	Female
Bronze eyes, stunted wings	2,360	2,220
Bronze eyes, normal wings	220	300
Red eyes, stunted wings	260	220
Red eyes, normal wings	2,240	2,180

20 a) What conclusions can be drawn from cross I and cross II?
Explain how the data support your conclusions for each cross.

(b) What conclusions can be drawn from the data from cross III?
Explain how the data support your conclusions.

STATION 10.

In fruit flies, the phenotype for eye color is determined by a certain locus. E indicates the dominant allele and e indicates the recessive allele. The cross between a male wild-type fruit fly and a female white-eyed fruit fly produced the following offspring.

	Wild-type males	Wild-type females	White-eyed males	White-eyed females
F_1	**0**	**45**	**55**	**0**

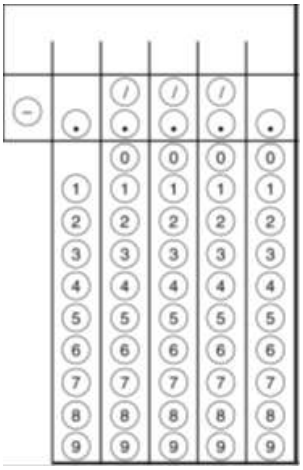
The wild type and white-eyed individuals from the F_1 generation were crossed to produce the following;

	Wild-type males	Wild-type females	White-eyed males	White-eyed females
F_2	**25**	**31**	**22**	**24**

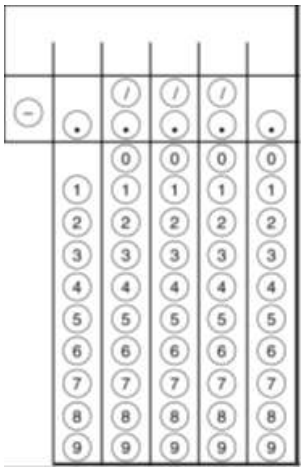
a) DETERMINE the genotypes of the original parents (P_1 generation) and EXPLAIN your reasoning. You may use Punnett squares to enhance your description, but the results from the Punnett squares must be discussed in your answer.

STATION 11 : MATH PRACTICE

There are 252 deer in a population. There is no net immigration or emigration. If 47 deer die and 32 deer are born in one month, what is the population size at the end of the month? Round to the nearest whole number.

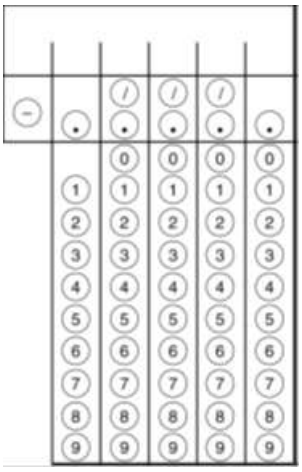


If 250 people out of a population of 1,000 are born with sickle-cell anemia, what is the frequency of the population that will be more resistant to malaria because they are heterozygous for the sickle-cell gene? Give your answer as a decimal to 2 places.

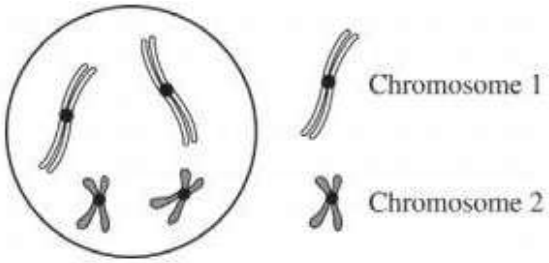


If parents have the following genotypes:
AaBbCcDd X AaBbCcDd

What is the probability of producing a offspring with this gene combination AaBBccDD ? Give your answer as a fraction.



STATION 12:



In a certain species of plant, the diploid number of chromosomes is 4 (2n = 4). Flower color is controlled by a single gene in which the green allele (*G*) is dominant to the purple allele (*g*). Plant height is controlled by a different gene in which the dwarf allele (*D*) is dominant to the tall allele (*d*). Individuals of the parental (P) generation with the genotypes *GGDD* and *ggdd* were crossed to produce F_1 progeny.

(a) **Construct** a diagram below to depict the four possible normal products of meiosis that would be produced by the F_1 progeny. Show the chromosomes and the allele(s) they carry. Assume the genes are located on different chromosomes and the gene for flower color is on chromosome 1.