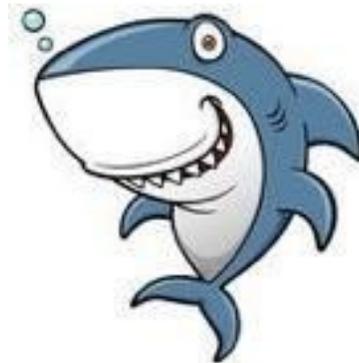


Welcome to Mrs. Harris' "Summer of AP Biology" 2017!

An evolving creation!

This summer you will delve into the world of biology like you never thought you would in those hot months! We will explore many topics to whet your appetite for the coming year of hard work.



This summer assignment has been designed for five purposes:

to get you to think during those summer months to keep your mind sharp, because I will expect a lot out of it come September!

to expand your vocabulary by familiarizing you with terms that we will be using in class.

to introduce you to major concepts from AP Biology through non-classroom methods of learning.

to have you earn grades to help you begin the first quarter with confidence.

to decrease the amount of new material that you will have to learn during the school year.

Due Dates and Deadlines... Yes, there truly are deadlines... You will be penalized for assignments that are not submitted ON TIME.... This applies throughout the school year!

Assignment	Description	Due Date
Assignment #1	Sign up for Class Communications (remind.com , and Google Classroom)	July 15th (sign up)
Assignment #2	Introductory Letter (submitted via Google Classroom)	July 15th (complete letter and submit)
Assignment #3	Graphing, Data Skills, Mathematics Practice, Biology Content Review (Part 1 and Part 2)	First Day of School
Assignment #4	Review of Biology and Tutorial on Evolution	First Day of School

Assignment #1- DUE July 15th

Sign up for Class Communications

Remind: When I need to send out class information quickly or reminders regarding assignments, I will use remind.com which sends automatic texts messages from me. I will generally send 3 per week... If you prefer email, check out the instructions! Feel free to have your parents join as well! Please subscribe by **July 15th**.

Google Classrooms: You MUST log in to google.com using your 6-digit SIF# followed by @aacps.org in the format of 123456@aacps.org. Your password will valid until the end of summer

<https://support.google.com/drive/?hl=en#topic=14940school>, Please follow the instructions and sign up using your ID and password at: <https://support.google.com/edu/classroom/answer/6072456>

*** You may be sent to an intermediate page controlled by Microsoft; the login Procedure is the same. To join the class enter the code **qu2cfl6**

Please read the help guide in its entirety so you know how to manage and submit your work: <https://support.google.com/edu/classroom#topic=6020277>,

Access your Google drive, where you will load and maintain your documents before submitting, and read the following help guide:

<https://support.google.com/drive/?hl=en#topic=14940>



Assignment #2: Introductory Letter (Use your school Google Account)

First, I would like to know a little about who you are so your second assignment is to open up Google Classroom, make sure you are looking at the topic on summer assignments, and open the **Google Docs** template and save it into your Drive as lastname_intro. Create a letter using the prompts below and submit it **Via Google classrooms. Refer to the student tutorials if you need to.**

Yup....that's it! Your first AP Biology grade will be..if only all of the grades were this easy! I will comment and assign you a grade you have electronic record that your assignment was received. Here is what I would like you to submit to me by **July 15th**

Your full name (& nickname that you go by if you have one) & stuff about you!

Who was your last science teacher? What class?

What other science classes have you taken?

What do you like to do (hobbies, sports, music, interests, etc.)?

Do you have a job or plan on getting a job next year?

What are your personal strengths when it comes to learning new material?

What causes you to struggle in a course?

What is the most effective way for you to prepare for a test?

How many AP classes are you taking this year (please list)?

Was there anything that you liked or disliked about your earlier biology class?

What are you looking forward to the most in AP Biology?

What are you most anxious about in AP Biology

Why are you taking AP Biology? What do you hope to accomplish/gain?

Assignment #3: Get your Supplies for the Year!

Get yourself ready for class! Below is the list of supplies that **you will need** for class. WOW, it is quite a list, but one thing you can be assured of is that our class is interactive! That being said, you will need the proper tools to engage in project-based, interactive learning, labs and classroom activities. **NOTE:** You may already have many of these materials at home, so look for your supplies here first !



2 Mead/Five Star HEAVY DUTY (plastic cover) 5 subject Notebook College ruled. These will be used daily in class for bell ringers and daily activities and, will be set up as your **Biology Interactive Learning Log (BILL)**

1 package of Blue/Black **pens** (for labs), Red pens (for corrections), and 1 package of #2 **pencils**

1 package of **assorted highlighters** for your interactive BILL reading and activities

5. Crayola colored pencils and colored markers that will not bleed through the pages of your BILL

6. Stapler and/or double sided tape and/or 1 roll of packing tape will be used to secure items in your BILL

7. Post-it notes (various sizes and colors – pack of small, medium, and large post-its) will be used for various BILL activities

8. Pack of divider tabs for your BILL

9. A package of blank, assorted colored notecards and a **pack of notecard rings**. These will be used for BILL activities and vocabulary cards (expect between 500-600 vocabulary words this year)

Bring in your supplies as needed to class beginning on the very first day!

Graphing, Data Skills, and Mathematics Practice

Complete the data analysis and graphing packet attached and have it ready to turn in on **DAY ONE** of the 2017-2018 year. The new AP Biology curriculum stresses the importance of being able to analyze and graph data. So we will begin our year with a tutorial on data analysis graphing, and statistical analysis tools that you will use throughout your AP biology year.

Part 1

Complete the **Graphing** exercises located at the end of this packet.

Part 2

Go to Mr. Anderson's AP Biology Videos (these will be used frequently throughout the year and are excellent for test review!): <http://www.bozemanscience.com/biology/> (this site link and individual videos can also be accessed via our class website)

Watch the **videos** that are linked under "Summer Assignment" located in Google Classrooms.(not all at once, but periodically throughout the summer!)

While watching (or after), complete the **Video Review Guides** located at the end of this packet



Math and Statistics for AP Biology - Research the answer to the following questions

You will need to read the **Statistics Primer** to complete this section of the summer assignment.

In designing an experiment or other scientific study, why do scientists need to sample from a population rather than using an entire population?

Suppose you are designing an experiment to test the effects of nicotine on the heart rate of rats. What are the disadvantages of having too small a sample size (i.e., testing on too few rats)? What are the disadvantages of having too large a sample size (i.e., testing on too many rats)?

What is a null hypothesis?

.

What are some steps that scientists can take in designing an experiment to avoid false negatives?

Introduction

Graphing is an important procedure used by scientists to display the data that is collected during a controlled experiment. Line graphs must be constructed correctly to accurately portray the data collected. Many times the wrong construction of a graph detracts from the acceptance of an individual's hypothesis.

A graph contains five major parts:

Title?

The independent variable?

The dependent variable?

The scales for each variable

A legend

The **TITLE**: depicts what the graph is about. By reading the title, the reader should get an idea about the graph. It should be a concise statement placed above the graph.

The **INDEPENDENT VARIABLE**: is the variable that can be controlled by the experimenter. It usually includes time (dates, minutes, hours, etc.), depth (feet, meters), and temperature (Celsius). This variable is placed on the X axis (horizontal axis).

The **DEPENDENT VARIABLE**: is the variable that is directly affected by the independent variable. It is the result of what happens because of the independent variable. Example: How many oxygen bubbles are produced by a plant located five meters below the surface of the water? The oxygen bubbles are dependent on the depth of the water. This variable is placed on the Y-axis or vertical axis.

The **SCALES** for each Variable: In constructing a graph one needs to know where to plot the points representing the data. In order to do this a scale must be employed to include all the data points. This must also take up a conservative amount of space. It is not suggested to have a run on scale making the graph too hard to manage. The scales should start with 0 and climb based on intervals such as: multiples of 2, 5, 10, 20, 25, 50, or 100. The scale of numbers will be dictated by your data values.

The **LEGEND**: is a short descriptive narrative concerning the graph's data. It should be short and concise and placed under the graph.

The **MEAN** for a group of variables: To determine the mean for a group of variables, divide the sum of the variables by the total number of variables to get an average.

The **MEDIAN** for a group of variables: To determine median or “middle” for an even number of values, put the values in ascending order and take the average of the two middle values. e.g. 2, 3, 4, 5, 9, 10 Add 4+5 (2 middle values) and divide by 2 to get 4.5.

The **MODE** for a group of variables: The mode for a group of values is the number that occurs most frequently. e.g. 2, 5, 8, 2, 6, 11 The number 2 is the mode because it occurred most often (twice).

Problem A: Using the following data, answer the questions below and then construct a line graph.

Depth in meters	Plant A Number of Bubbles/Minute	Plant B Number of Bubbles/Minute
2	29	21
5	36	27
10	45	40
16	32	50
25	20	34
30	10	20

What is the dependent variable and why?

What is the independent variable and why?

What title would you give the graph?

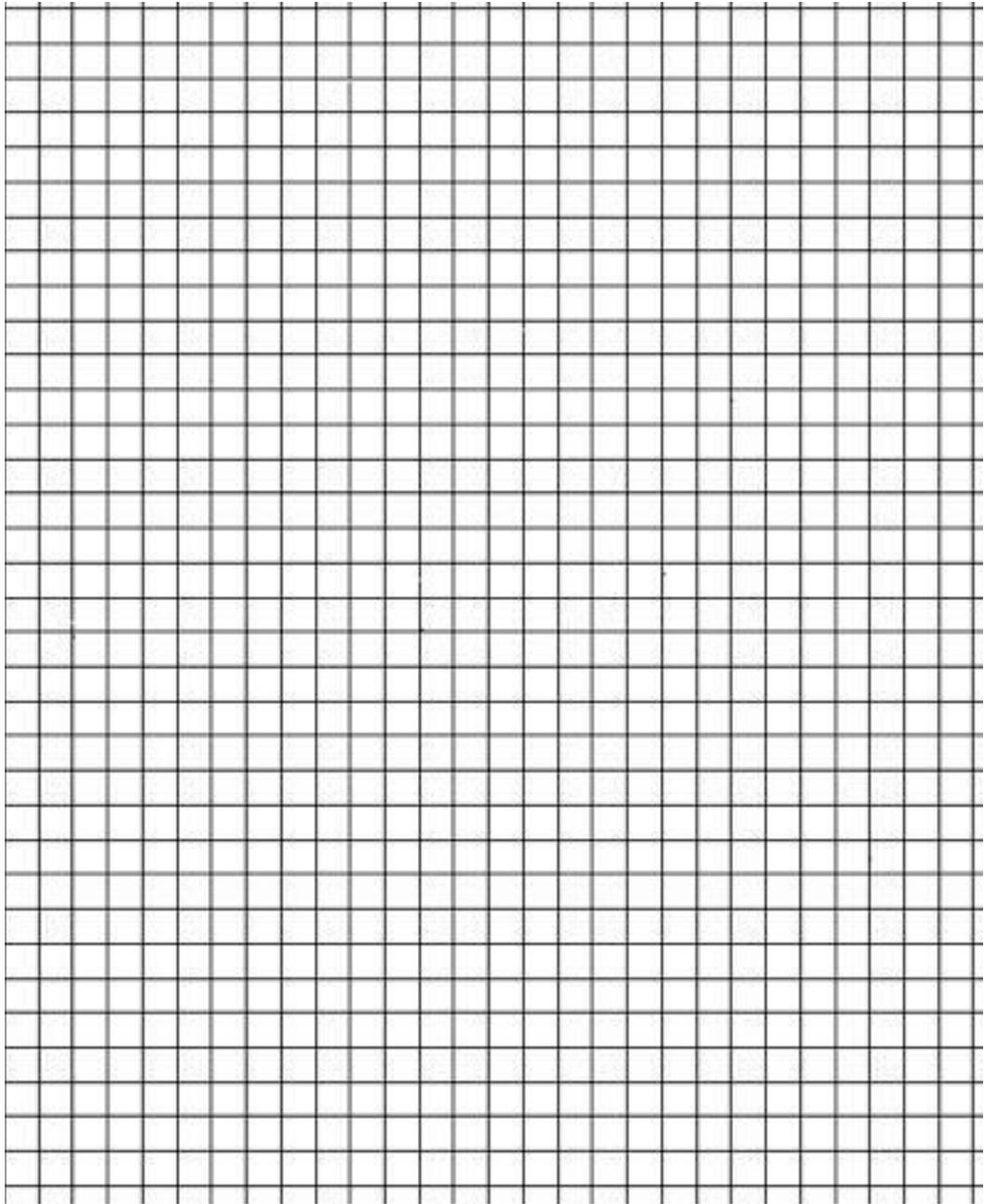
What are the mean, median, and mode of all 3 columns of data?

Depth: Mean _____ Median _____ Mode _____

Plant A: Mean _____ Median _____ Mode _____

Plant B: Mean _____ Median _____ Mode _____

Title: _____



LEGEND:

Problem B:

Diabetes is a disease affecting the insulin producing glands of the pancreas. If there is not enough insulin being produced by these cells, the amount of glucose in the blood will remain high. A blood glucose level above 140 for an extended period of time is not considered normal. This disease, if not brought under control, can lead to severe complications and even death.

Answer the following questions concerning the data below and then graph it.

Time After Eating (hours)	Patient A Glucose ($\mu\text{g/L}$ blood)	Patient B Glucose ($\mu\text{g/L}$ blood)
0.5	170	180
1	155	195
1.5	140	230
2	135	245
2.5	140	235
3.0	135	225
4.0	130	200

What is the dependent variable and why?

What is the independent variable and why?

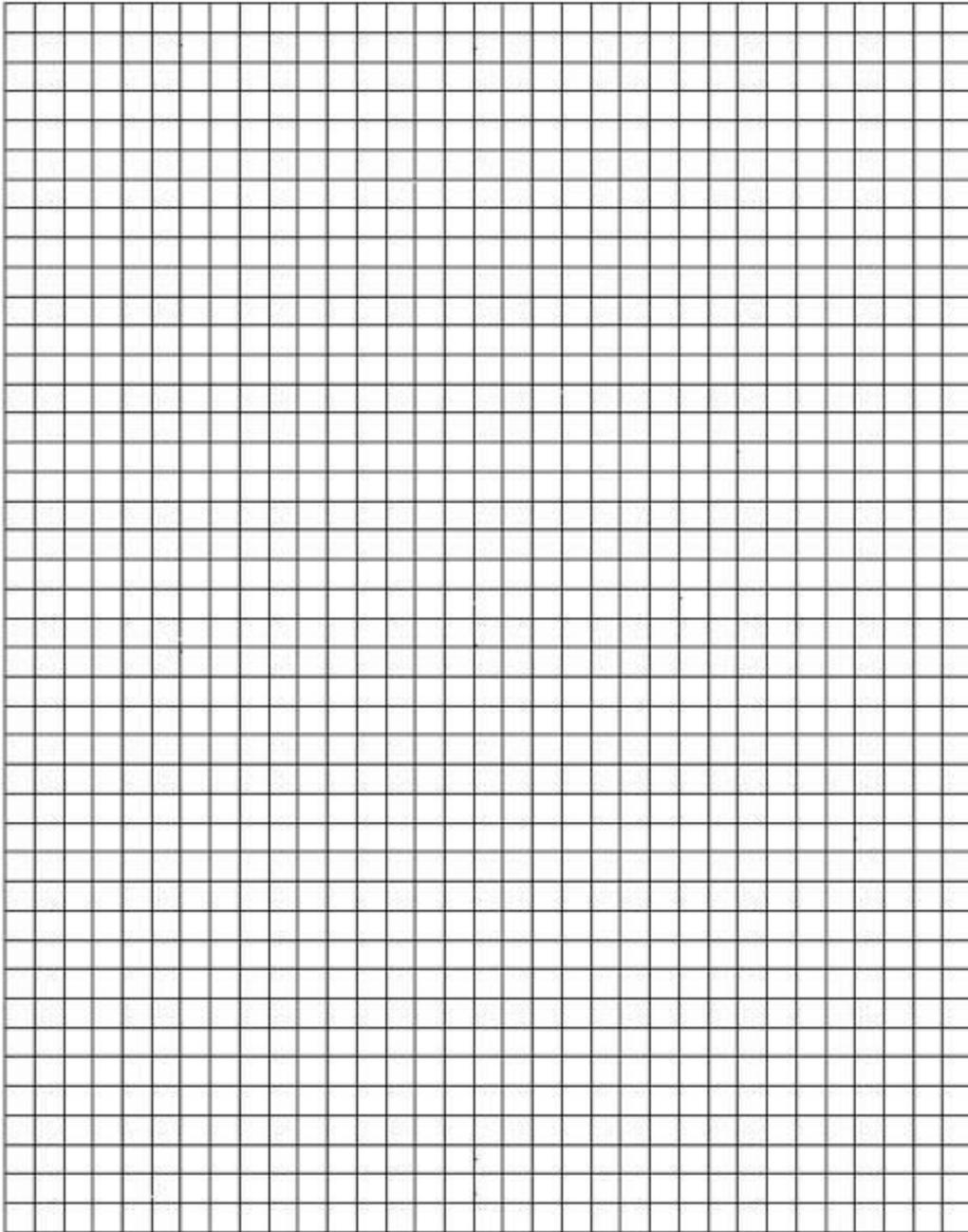
What title would you give the graph?

Which, if any, of the above individuals (A or B) has diabetes?

What data do you have to support your hypothesis?

If the time period were extended to 6 hours, what would the expected blood glucose level for Person B?

Title: _____



LEGEND:

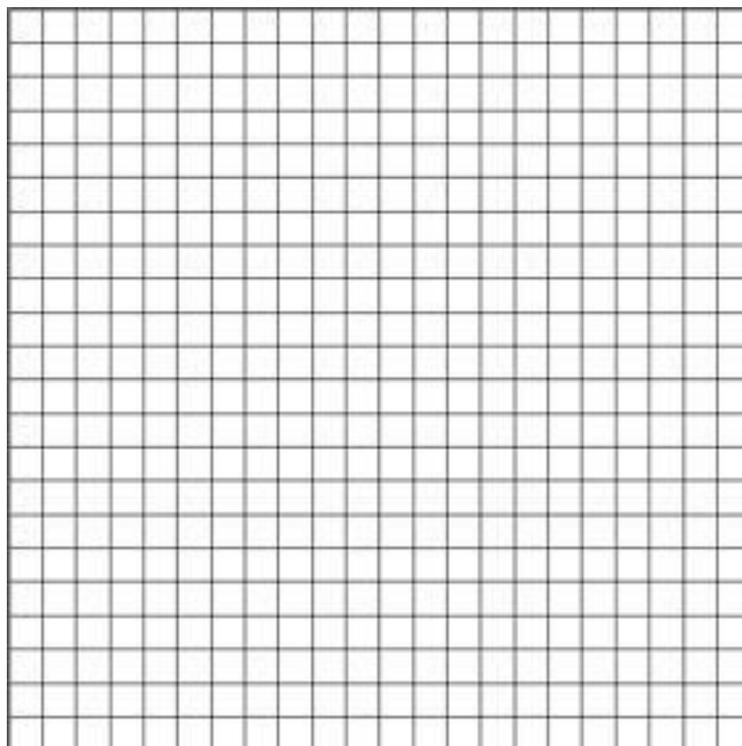
Problem C

Temperatures were obtained in November in a fairly arid area of Nevada. At two different sites, temperature readings were taken at a number of heights above and below the soil surface. One site was shaded by a juniper (a plant) whereas the other was not.

Table 1

Condition	Height (cm) from soil surface	Temperature (Beneath Forest Cover	Temperature (Unshaded Field
Air	150	18	20
Air	90	18	21
Air	60	18	20
Air	30	18	21
Soil Surface	0	16	33
Humus	-6	12	19
Mineral	-15	9	15
Mineral	-30	7	12

Construct a line graph of the plotted data (remember to include all five components!)



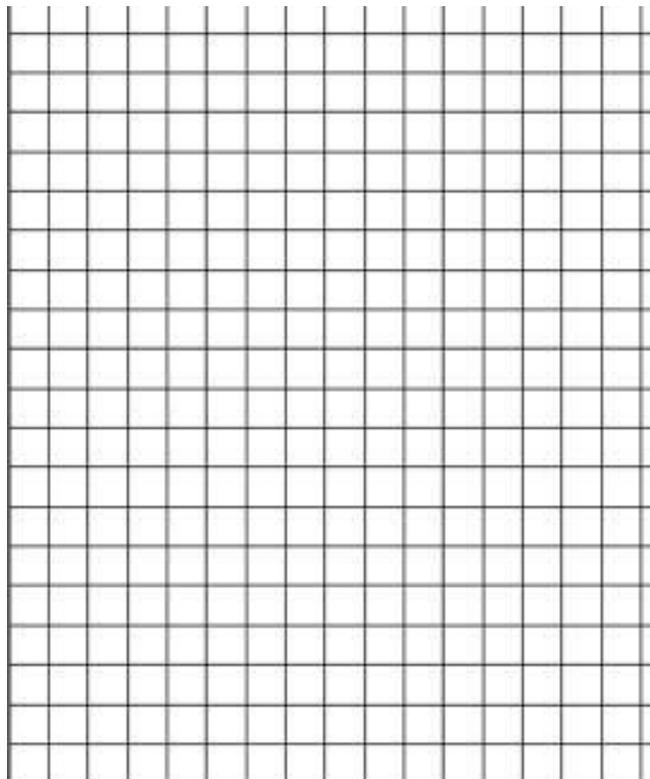
Problem D

A researcher interested in the disappearance of fallen leaves in a deciduous forest carried out a field experiment that lasted nearly a year. She collected all the leaves from 100 plots scattered throughout the forest. She measured the amount of leaves present in November, May and August. The percentages reflect the number of leaves found, using the November values as 100 percent.

Table 2

Collection Date	Ash	Beech	Elm	Hazelnut	Oak	Willow
November	4271g 100%	3220g 100%	3481g 100%	1723g 100%	5317g 100%	3430g 100%
May	2431g 57%	3190g 91%	1739g _____%	501g _____%	4401g 83%	1201g 35%
August	1376g 32%	2285g 71%	35g _____%	62g _____%	1759g 33%	4g 0.1%

Complete the table by calculating the missing percentages Construct a line graph for the ash and elm leaves (remember the five components)



PART 2: TOPICS REVIEW

During the first week of class, you will have a review quiz so that we can assess where you are in your biological knowledge. The quiz will not be on new material-rather it will cover information that you are expected to know from your first biology course your freshman or sophomore year. This will include information on the following topics:

BIOCHEMISTRY
EVOLUTION
CLADOGRAMS
CELLS
CELL CYCLE/MITOSIS/MEIOSIS (Under Genetics)
PHOTOSYNTHESIS/CELL RESPIRATION
GENETICS
DNA/RNA PARTS 1 AND 2

If you feel like you need to review, I would encourage you to purchase a study guide review book **THIS SUMMER**. Look for one with the most current publishing date (Barron's, Cliff's Notes, Princeton Review, etc). AACPS will not provide a review guide for this course

In order to review and prepare for the topics that will be covered during the course, please fill out the enclosed worksheets as you watch the videos. Expect a quiz the first week to assess where you are with your biology content knowledge:

You can access the videos at this URL.

<http://www.bozemanscience.com/biology-main-page/>

Biological Molecules Video

What are the four categories of macromolecules?

What is a monomer?

Lipids are unique because they don't have a single type of monomer. Name two reasons why lipids are important.

Lipids are generally polar molecules. T/F circle one

Nucleic acid monomers are _____ and are made up of _____

What are the functions of nucleic acids?

Protein monomers are:

What differentiates one amino acid from another?

Carbohydrate monomers are

The significance of "directionality" of the monomers in a polymer is that when you put the monomers together in a certain sequence/order they have

The process of "putting monomers together" is called

What is lost during the process of #11?

What kind of bond is formed generally? Specifically between amino acids of a protein?

What must be added to break the bonds?

What is the name of that process?

molecules indicated?

What determines directionality in carbohydrates?

Natural Selection Video

What did Charles.... Darwin do? He gave us a:

Evolution is:

Gene Pool: all

Natural Selection: when you live or die based on..

As the environment changes you are:

Enough fitness (survive and reproduce) over time that can lead to:

Smallest unit that can evolve is a:

Two ways to get variety in a population: novel characteristics: _____

another way to get variety is _____.

What is the genotype of a light moth _____ for a dark moth _____

Why did the light moth survive?

Why did the dark moth population increase?

Write the Hardy-Weinberg equation out:

Adaptation is a _____

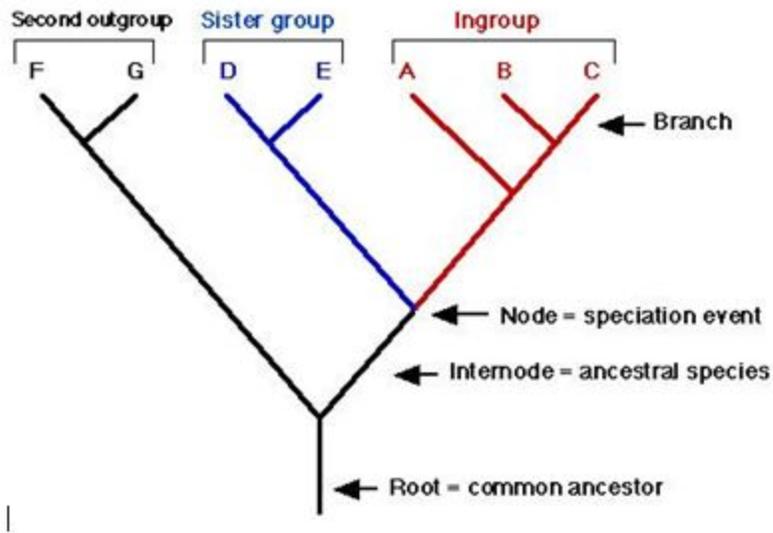
Cladograms Video

What is a cladogram?

What do branching points on a cladogram represent?

What is parsimony?

Answer the following questions using the cladogram below:



Is species B more closely related to species C or species A? How do you know?

Is species E more closely related to species C or species G? How do you know?

A Tour of the Cell Video

What is the reason why cells are small? Explain in your own words!

What did the microscope allow scientists to do?

What's a difference between looking at subjects through an optical microscope and a TEM/SEM microscope? (hint: something OTHER than magnification power!)

Which kingdoms are mainly **prokaryotic**? Which kingdoms are mainly **eukaryotic**?

- a. What are the **differences** between prokaryotic and eukaryotic cells?

- b. What are the **similarities** between prokaryotic and eukaryotic cells?

Fill out the table below!

Eukaryotic Organelles

ORGANELLE	Location	FUNCTION
Nucleolus		
Nucleus		

Ribosome		
Vesicle		
Rough ER		
Golgi Body		
Cytoskeleton		
Smooth ER		
Vacuole		
Mitochondria		
Ctyosol		
Lysosome		
Centriole		

Cell Cycle, Mitosis and Meiosis Video

How many cells in our bodies?

What does $2n$ mean?

What is the goal of the cell cycle in mitosis?

What is the goal of the cell cycle in meiosis?

Describe the two parts of cell division:

- a. Mitosis:
- b. Cytokinesis:

Interphase has three parts, describe each:

- a. G_1 :
- b. S:
- c. G_2 :

A cell spends most of its time in

How many cells will you have after mitosis? _____ after meiosis _____?

What are three reasons why you would do mitosis? (look at yellow area, top left of video)

What is meiosis getting ready for?

What happens during crossing over? Parts of one chromosome will

Photosynthesis and Respiration Video

What is the goal of life?

Name and describe and give an example of the two life strategies.

What are the two types of autotrophs?

What are the two types of heterotrophs?

Who are the autotrophs making the food for?

Where does chemosynthesis occur?

Tubeworms contain what type of chemosynthetic organism?

Yeast can do alcoholic fermentation. Lactic acid fermentation, that we do, also does not require:

Write the equation for photosynthesis (reverse is cellular respiration):

What are you storing in the glucose molecule?

Where does the Calvin Cycle take place specifically?

Make a summary statement about what photosynthesis is:

What is chlorophyll and what does it do?

Where did the electron come from that formed NADPH?

The process stores the energy of _____ in _____ and _____

Make a simple diagram of a mitochondrion:

In glycolysis, you start with one glucose and produce two:

In the Krebs' cycle we store energy from the pyruvate in _____ so we can finally use that in the:

Mendelian Genetics Video

What did Mendel work with?

What is the P Cross?

What is the F1 cross?

Describe the incorrect idea of “Blending”?

The F1 was a “hybrid” – what does that mean?

Diagram the first Punnett square that he created below and explain how white flower could come from two purple flowers:

a. Law of Segregation: like a _____ flip. It is a _____ of those two alleles. Random _____

b. Independent Assortment: Traits on different chromosomes don't _____ each other. Sometimes things do travel together, but that is because those two genes are found on the same:

Pause the video at the Sample Problems and try and work them out.

Coin flip:

Heterozygous means:

Homozygous means:

What is an organism's genotype? What is an organism's phenotype?

What is the probability of homozygous recessive (rr)?

Why is there a greater chance of green seeds in problem 5 than wrinkled seeds (rr) in problem 4 above?

wo Punnett squares because you need to multiply the _____ together.

DNA & RNA (Part 1) Video

What two things did he want to show you with the peanut plant?

No matter... what you are

Humans... can

History of DNA:

Griffith's experiment:

Used "what" in his experiment?

Big thing...he learned: there was a

Avery, McCarty, MacLeod:

Looked at Griffith's... experiment and tried to find out

Used _____ that broke down DNA, protein and DNA

What did they figure out?

Hershey and Chase:

What did most people think the transforming agent was?

What did they work with?

What did they show?

Watson, Crick, Wilkins, Franklin and Chargaff:

Wilkins and Franklins were doing experiments with:

Chargaff: found out.... that the amount of

Watson and Crick

Watson sat in one of _____ secret meetings

Used the information from _____ to help build models to figure out the structure of DNA

Structure of DNA:

DNA is....wrapped around

Prokaryotic chromosome:

They have a _____ not a linear shape like eukaryotic chromosome

Have extra DNA called:

Prokaryotic cells do not have _____ DNA

DNA & RNA (Part 2) Video Review Sheet

Structure of DNA and RNA

RNA is a ... whereas DNA is

What three parts do they have in common?

What sugar is in place of deoxyribose in RNA?

What base is in place of thymine in RNA?

DNA replication:

First step: ____zip it

Can only add new bases on the ____prime end.

Lagging strand has to _____ stitch

Central Dogma:

Who coined the term?

It explains how DNA à RNA à

First step:

The copy of DNA is called:

DNA stays within the

mRNA will feed through a (big green structure):

tRNA brings in

amino acids are the building blocks of

Translation: mRNA

Phenotypes: what you physically....

Changes to the DNA will ultimately cause changes in the

The extended phenotype: an _____ of genes and selected for. The behavior is selected for.

Genetic Engineering:

Since DNA is _____ you can insert genes from humans into:

You can even insert human genes into:

