Name _____ **Period** _____

Honors Biology – Summer Assignment, 2024

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Welcome to Bishop Eustace and Honors Biology! In order to do well in this course, you need to become fluent in the language of the discipline. Biology includes an extensive set of vocabulary words and phrases that you will most likely be unfamiliar with. However, there are tricks to figuring out new vocabulary words, terms, etc. Often, terms in biology come from a set of root words as well as prefixes and suffixes that give us clues as to what the terms mean.

This Summer Assignment will prepare you for the coming year. It will need to be completed and handed in on the first day of class. It will count as your first grade for the year so make sure you start off the year strong! Good Luck!

Table 1. Biology Prefix and Suffix Reference Sheet

Prefix/Suffix	Definition	Prefix/Suffix	Definition
a-	without	***multi-***	many
ab-	away from	***mut-***	to change
ad-	near	***myco-***	fungi
aero-	air	***neco-***	corpse
alveus	cavity	***neur-***	nerve
arthron-	joint	***nomen-***	name
-ase	enzyme	***niga-***	black
atrium-	entrance room	***oculo-***	eye
auto-	self	***oligo-***	few
bacterio-	bacteria	***-oma***	tumor
bi-	two	***omni-***	all
bio-	life	***oo-***	egg
carnis-	meat	***ovum***	egg
carn-	meat	***-ose***	sugar
chele-	claw	***osteo-***	bone
chloro-	green	***paleo-***	old
chroma-	color	***ped, pod***	foot

-cide	killer	***peri-***	around
con-	of with	***pestis***	plague
cytis-	pouch	***phaeo-***	brown
-cyte, cyto-	cell	***phage-***	to eat
dermis-,	skin	***-phore***	bearer
derm-	skin	***photo-***	light
di-	two	***-phyll***	leaf
ecto-	on the outside	***-phyte,***	plant
endo-	inner, inside	***phyto-pin***	plant
epi-	upon	***o- plankto-***	to drink
eu-	true	***poly-***	drifting
exo-	outside of	***pseudo-***	many
feto-	fetus	***primordis-***	false
gastro-	stomach	***pro-***	original
-gen	producing	***renes-***	first
geo-	earth	***reptilis-***	kidney
gymno-	naked	***rhiza, rhizo-***	crawling
halo-	salt	***rodere***	root
hemato-	blood	***sacchrum***	to gnaw
hemi-	half	***sapros-***	sugar
herb-	plant	***-scopy***	rotten
hetero-	other	***soma-***	observation
histo-	tissue	***sonus-***	body
homo-	same, like	***sperma-***	sound
hydro-	water	***spirare***	seed
hyper-	over	***-stasis***	breathe
hypo-	under	***taxis***	position
inter-	between	***telo-***	arrangement
intra-	within	***thallus***	end
iso-	equal	***therm-***	green shoot
-itis	infection	***thrombos***	heat
karyo-	nucleus	***trans-***	clot
leuco-	white	***tri-***	across
locus	place	***troph-***	three
-logy	study of		feed

lysis	to loosen, break	***umbilicus***	navel
macro-	large	***uni-***	one
maxilla	jaw	***vasculum***	vessel
mensis	month	***vor-***	to eat, devour
meso-me	middle	**xero-**	dry
ta-	between	**zoo-,**	animal
micro-	small	**zoa-**	animal
mono-	one	**zygon-**	yoke
morph-	form		

Part I Instructions: Define the following terms using your prefix-suffix reference sheet. Underline the prefix &/or suffix in each biological term. Use a separate sheet of paper if necessary.

- **Example: <u>THERM</u>O<u>METER</u> –** *<u>therm</u> means heat & <u>meter</u> means measure. Therefore, a thermometer is an instrument used to measure heat.*

1. Biology

2. Osteocyte

3. Pseudopod

4. Epidermis

5. Herbicide

6. Omnivore

7. Protozoa

8. Intracellular

9. Polysaccharide

10. Hypertension

11. Hypodermic

12. Macronucleus

13. Carnivore

14. Intercellular

15. Abiotic

16. Pinocytosis

17. Gymnosperm

18. Bacteriology

19. Endoskeleton

Part II Instructions: Using your prefix-suffix reference, write the biological term for each of the following layman's terms. Use a separate sheet of paper if necessary.

- **Example: A bacteria killer** – *cide means killer so the term is bactericide.*

20. White cell

21. Outside skeleton

22. Middle layer of the leaf

23. Outside of the cell

24. Study of animals

25. A one-celled organism

26. Green leaf

27. A term describing an organism made up of many cells

28. Person that studies cells

29. Study of water

Part III: What Science Is and Is Not

Science is an organized way of gathering and analyzing evidence about the natural world. The goals of science are to provide natural explanations for events in the natural world and to use those explanations to make useful predictions. Science is different from other human works in the following ways:

- Science deals only with the natural world.
- Scientists collect and organize information about the natural world in an orderly way.
- Scientists propose explanations that are based on evidence, not belief.
- They test those explanations with more evidence.

Scientific Methodology: The Heart of Science Methodology for scientific investigation involves:

- Making an observation. Observation involves the act of noticing and describing events or processes in a careful, orderly way. Scientists use their observations to make inferences. An inference is a logical interpretation based on what scientists already know.
- Suggesting hypotheses. A hypothesis is a scientific explanation for a set of observations that can be tested in ways that support or reject it.
- Testing the hypothesis. Testing a hypothesis often involves designing an experiment. Whenever possible, a hypothesis should be tested by a controlled experiment—an experiment in which only one variable (the **independent variable**, or manipulated variable) is changed. The variable that can change in response to the independent variable is called the **dependent variable**, or responding variable. The dependent variable is the data that are collected. The dependent variable depends on the independent variable. The control group is exposed to the same conditions as the experimental group except for one independent variable.
- Collecting, recording, and analyzing data, or information gathered during the experiment.
- Drawing conclusions based on data.

Summarize What Science Is and Is Not

1. What is science?

2. What are two goals of science?

Part IV: Big Ideas in Biology

The study of biology revolves around several interlocking big ideas:

- ✔ *Cellular basis of life.* Living things are made of cells.
- ✔ *Information and heredity.* Living things are based on a universal genetic code written in a molecule called DNA.
- ✔ *Matter and energy.* Life requires matter that provides raw material, nutrients, and energy. The combination of chemical reactions through which an organism builds up or breaks down materials is called metabolism.
- ✔ *Growth, development, and reproduction.* All living things reproduce. In sexual reproduction, cells from two parents unite to form the first cell of a new organism. In asexual reproduction, a single organism produces offspring identical to itself. Organisms grow and develop as they mature.
- ✔ *Homeostasis.* Living things maintain a relatively stable internal environment.
- ✔ *Evolution.* Taken as a group, living things evolve, linked to a common origin.
- ✔ *Structure and function.* Each major group of organisms has evolved structures that make particular functions possible.
- ✔ *Unity and diversity of life.* All living things are fundamentally similar at the molecular level.
- ✔ *Interdependence in nature.* All forms of life on Earth are connected into a biosphere—a living planet.
- ✔ *Science as a way of knowing.* Science is not a list of facts but "a way of knowing."

Pick two of the big ideas from the chart and describe how the ideas connect.

Part V: Science and the Scientific Method

The scientific method is the problem solving method that all scientists use to solve questions related to our world. Experimentation is a key component of the scientific method and the foundation of upon which all science rests. To better your understanding of the scientific method, define the following terms:

Scientific Method	
Quantitative Data	
Qualitative Data	
Hypothesis	
Independent/Manipulated Variable	
Dependent/Responding Variable	
Control	
Observation	
Analysis	
Inference	
Conclusion	

Prediction	

Read the paragraph below and answer the following questions.

Chris wanted to test the effect of diet pills on how tall the tomato plants in his garden would grow. He took two pots, filled them with dirt from the same bag, and planted four tomato plants in each. He watered one planter with tap water, and he watered the other planter with tap water mixed with dissolved diet pills. The plants were in the same location to ensure that they got the same amount of sunlight, and the water was measured so that each pot received the same amount of water. He measured their height at the end of each week for eight weeks, and averaged the height of the four plants in each pot. He then graphed the results to show how the diet pills affected the height of the plants.

1. What is the independent variable of this experiment? _____
2. What is the dependent variable of this experiment? _____
3. What is the control? _____
4. How many trials were included in this experiment? _____
5. Write a hypothesis for this experiment in the "If..., then...." format.

_____
_____
_____

_____
_____

Read the paragraph below and answer the following questions.

During gym class Sally noticed that her friend Melissa always ran faster than she could run. Sally knew that they exercised equally, so she wondered what could cause Melissa to run so fast. Sally began to compare herself and Melissa to see what could cause the difference in speeds. She noticed that Melissa was taller and wondered if height affected speed. Sally predicted that taller people were able to run faster, but wanted to check her prediction. She asked her gym teacher if she could test her idea because the class consisted of only girls and she thought this would help her get accurate results. Sally measured all of her classmates' height in centimeters and recorded it in her chart. Each classmate then ran one mile while Sally timed them with a stopwatch and recorded the data in seconds. She then began to review her data and look for the answer to her question.

1. What question is Sally trying to answer?

_____
_____

2. What made her want to answer this question?

_____
_____

3. What is the dependent variable in this experiment?

4. Are the observations qualitative or quantitative?

5. What factors does Sally think might cause the measurement to change?

6. Is there a control group used in this experiment? If so, what is it?

_____
_____

Read the paragraph below and answer the following questions.

The Strange Case of Beriberi In 1887, a strange nerve disease attacked the people in the Dutch East Indies. The disease was Beriberi. Symptoms of the disease include weakness, loss of appetite, and heart failure. Scientists thought the disease might be caused by bacteria. They injected chickens with bacteria from the blood of patients with Beriberi. The injected chickens became sick. However, a group of chickens that were not injected with bacteria also became sick.

1. What was the problem presented in this case?

   _____

   _____

2. What was the hypothesis?

   _____

   _____

3. How was the hypothesis tested?

   _____

   _____

4. Should the hypothesis be rejected or accepted based on the experiment? Why?

   _____

   _____

One of the scientists, Dr. Eijkman, made an important observation. Before the experiment, all of the chickens had eaten whole-grain rice, but during the experiment, the chickens were fed polished rice. Dr. Eijkman researched this interesting case. He found that polished rice lacked thiamine, a vitamin necessary for good health.

5. What is the new hypothesis in this scenario?

   _____

   _____

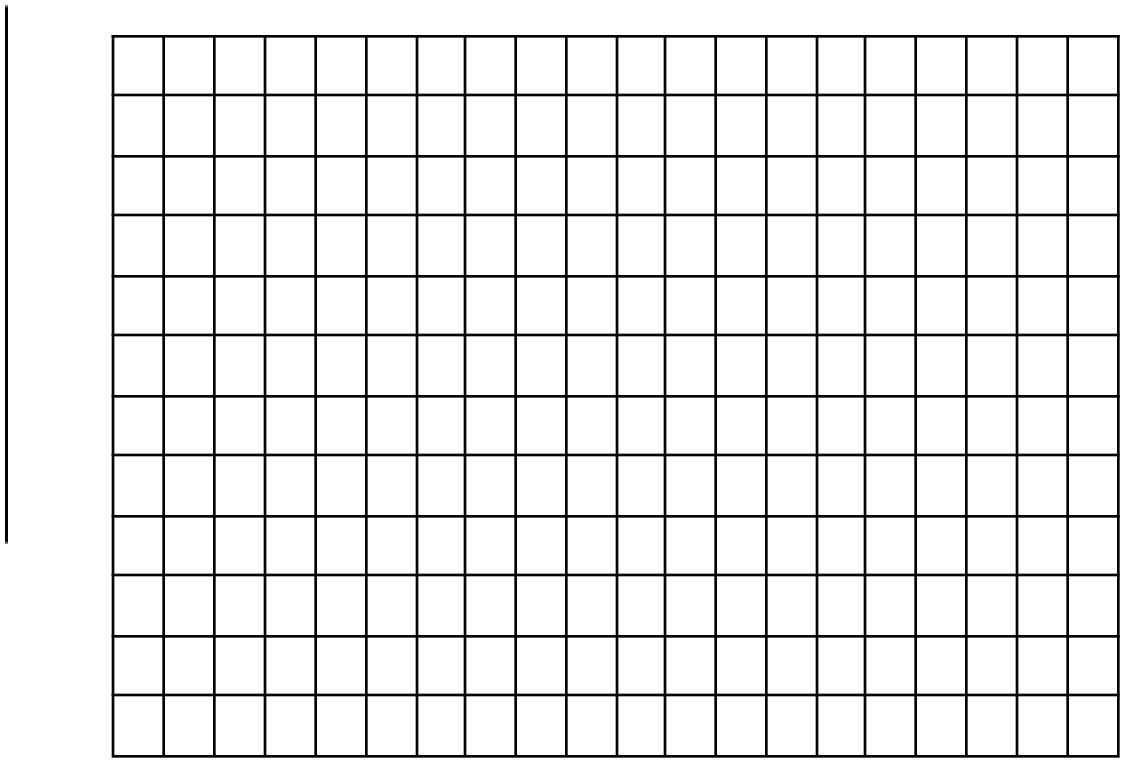
Part VI: How to Create a Good Graph

1. Graphs need a title above the graph that summarizes the information that it is showing.
2. Both the X and Y axis need labeled (this means that you need to write what the numbers mean, for example: days, years, degrees Celcius, etc).
3. If you used any kind of symbol or colors then you have to include a key or legend to explain what they mean.
4. Your graph is designed to be visually pleasing and serve as a visual representation of numbers, so make it as large as possible (make it take up as much space as possible on the graph paper).
5. A graph is a visual representation of numbers so it needs to be very nice and neat (use rulers if need be).

Experiment 1: Use the following data to create an appropriate graph and answer the questions. *Diabetes is a disease affecting 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 normal. This disease, if not brought under control, can lead to severe complications and even death.*

Table 1. Time vs. Glucose Amounts in Two People

Time after eating (in hours)	Glucose in mg/dL Person A	Glucose in mg/dL Person B
0.5	170	180
1	155	195
1.5	140	230
2	135	245
2.5	140	235
3	135	225
4	130	200

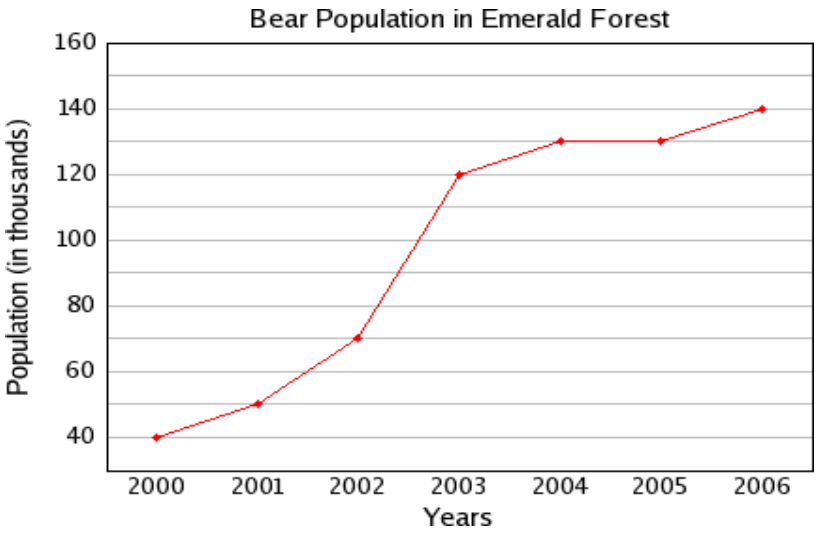


1. Which individual would you potentially diagnose as a diabetic?

2. What evidence do you have that supports your answer?

Part VII: Graph Interpretation

Use the graph below to answer the following questions.



1. What type of graph is shown above? Why is this graph appropriate to display this type of data?

2. What is the **independent variable** (manipulated variable)?

3. What is the **dependent variable** (responding variable)?

4. How many bears were in the Emerald Forest in 2001?

5. Based on the graph above, when did the greatest increase in the bear population occur?