**BIOLOGY: UNIT 1 EXAM REVIEW & STUDY GUIDE**

**Text Readings:**

* *Modern Biology:* 1.1 & 1.3
* Francis Bacon’s *Novum organum*
* Tyrone Hayes peer-reviewed article
* Charles Darwin *On the Voyage of the Beagle* excerpt
* High School Safety Contract

**Labs:**

* Brain Tumor Lab

**Vocabulary:**

Use your notes, handouts, book, and other sources to study the definitions of the following words. Although there are several provided words in this list, the list is NOT comprehensive. Add vocabulary to the list if appropriate.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Cell | Homeostasis | Response to stimuli | Growth | Development |
| Metabolism | Reproduction | Scientific method | Controlled | Comparative |
| Qualitative observation | Quantitative observation | Hypothesis | Prediction | Experiment |
| Control group | Experimental group | Independent variable | Dependent variable | Operational definition |
| Theory |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Practice Questions from *Modern Biology Textbook*.** *Answer on a separate sheet of paper.*

* pg 26 #2, 5-10, 14-21

**Multiple Choice Sample. Answer the following on a separate sheet of lined paper. Include your reasoning for the answer you choose.**

1. An experiment was conducted to test a hypothesis about mimicry: Nonpoisonous kingsnakes benefit from mimicking the warning coloration of poisonous coral snakes. The researchers fashioned artificial snakes from plasticine and placed equal numbers of artificial kingsnakes along with artificial brown snakes at 14 field sites in North Carolina. Half the snakes were placed in an area that coral snakes inhabit, and half of the snakes were placed where coral snakes are absent. The researchers recovered both sets of artificial snakes after four weeks and recorded predation attempts by observing teeth imprints left in the plasticine of the artificial snakes. The results of the experiment are recorded in this graph:



After analyzing the results of the experiments, choose the statement that best describes a conclusion that can be made from this experiment.

* 1. Kingsnakes, which are nonpoisonous snakes, benefit from mimicking the warning coloration of poisonous coral snakes but only where coral snakes are present.
	2. Kingsnakes, which are nonpoisonous snakes, benefit from mimicking the warning coloration of poisonous coral snakes but only where coral snakes are absent.
	3. Kingsnakes, which are nonpoisonous snakes, benefit from mimicking the warning coloration of poisonous coral snakes whether or not the poisonous coral snakes are present.
	4. Brown snakes, which are nonpoisonous snakes, benefit from the presence of nonpoisonous snakes that mimic poisonous ones, whether or not the poisonous coral snakes are present.
1. A controlled experiment is one that
	1. proceeds slowly enough that a scientist can make careful records of the results.
	2. tests experimental and control groups in parallel.
	3. is repeated many times to make sure the results are accurate.
	4. keeps all variables constant.
	5. is supervised by an experienced scientist.
2. Which of the following statements best distinguishes hypotheses from theories in science?
	1. Theories are hypotheses that have been proven.
	2. Hypotheses are guesses; theories are correct answers.
	3. Hypotheses usually are relatively narrow in scope; theories have broad explanatory power.
	4. Hypotheses and theories are essentially the same thing.
	5. Theories are proven true; hypotheses are often falsified.
3. Which of the following is an example of qualitative data?
	1. The temperature decreased from 20 degrees C to 15 degrees C.
	2. The plant’s height is 25 centimeters (cm).
	3. The fish swam in a zigzag motion.
	4. The six pairs of robins hatched an average of three chicks.
	5. The contents of the stomach are mixed every 20 seconds.
4. Which of the following best describes the logic of scientific inquiry?
	1. If I generate a testable hypothesis, tests and observations will support it.
	2. If my prediction is correct, it will lead to a testable hypothesis.
	3. If my observations are accurate, they will support my hypothesis.
	4. If my hypothesis is correct, I can expect certain test results.
	5. If my experiments are set up right, they will lead to a testable hypothesis.

**Short Answer Sample.**

*For each of the following, identify the independent and dependent variables.*

1. **Hypothesis**: Ultra Violet radiation activates pigments in plastic beads and turns beads purple.

 IV: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DV: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **Hypothesis**: Higher sulfuric acid concentrations will cause aquatic plants to lose mass.

 IV: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DV: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **Hypothesis**: Higher doses of a certain cancer drug will reduce tumor size in rats.

 IV: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DV: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Answer the following in complete sentences on a separate piece of lined paper.**

1. In the process of preparing for childbirth, a human woman’s body releases a hormone called oxytocin. Oxytocin strengthens uterine contractions during labor and helps to control bleeding after childbirth. Release of oxytocin stimulates more and more oxytocin to be released.
	1. Does this example exhibit positive or negative feedback? Why?
	2. Does this mechanism help to maintain homeostasis? Why or why not?
2. According to Francis Bacon, “the branches of knowledge may not be severed and cut off from the stem.” What does he mean by this?
3. Use inductive reasoning to come up with a hypothesis based on the observations that follow.
	1. You read the label on a bottle of Miracle Grow and you notice it has nitrogen, ammonium, and various minerals.
	2. A chimpanzee is eating a leaf from a tree after it just rained.
	3. The Aye Aye has very large, yellow eyes, hair, opposable digits and mammary glands.
4. Describe the difference between a comparative (correlational) study and a controlled experiment. Be able to distinguish between the two types of studies and identify variables if given a scenario.
5. Distinguish between a control group and control variables (constants).
6. What are the characteristics common to all living things?
7. What characteristics of life rely on the presence of genetic material?
8. What should you do if you accidentally splash acid on your arm during a lab activity?