Agriscience Practice Midterm C. Kohn, Waterford WI

Name: Hour Date: Score:

A researcher is interested in testing the impact of adrenaline on radishes. She is not certain if adrenaline will affect the radish rate of growth or final average height. She suspects that adrenaline may increase the final average height of the radishes because of its effects on animal bodies. Use this background information to answer the questions below.

1. Which of the following would be her **Research Question**?
	1. I predict that adding adrenaline to my soil will make my radishes grow taller
	2. I think this will happen because adrenaline makes animal hearts pump faster; it might help plants circulate nutrients more quickly in the same way blood is circulated more quickly in the body.
	3. I wondered if adding adrenaline to my soil would make my radishes grow taller.
	4. Adrenaline is a chemical found in animal bodies that increases the heart rate.
2. Which of the following would be her **Hypothesis**?
	1. I predict that adding adrenaline to my soil will make my radishes grow taller
	2. I think this will happen because adrenaline makes animal hearts pump faster; it might help plants circulate nutrients more quickly in the same way blood is circulated more quickly in the body.
	3. I wondered if adding adrenaline to my soil would make my radishes grow taller.
	4. Adrenaline is a chemical found in animal bodies that increases the heart rate.
3. Which of the following would be her **Rationale**?
	1. I predict that adding adrenaline to my soil will make my radishes grow taller
	2. I think this will happen because adrenaline makes animal hearts pump faster; it might help plants circulate nutrients more quickly in the same way blood is circulated more quickly in the body.
	3. I wondered if adding adrenaline to my soil would make my radishes grow taller.
	4. Adrenaline is a chemical found in animal bodies that increases the heart rate.
4. Which of the following would be her **Independent Variable**?
	1. The height of the radishes
	2. The addition of adrenaline to the soil
	3. The plants/soil that have no adrenaline added to them
	4. The plants/soil that were given extra fertilizer AND received adrenaline.
5. Which of the following would be her **Dependent Variable**?
	1. The height of the radishes
	2. The addition of adrenaline to the soil
	3. The plants/soil that have no adrenaline added to them
	4. The plants/soil that were given extra fertilizer AND received adrenaline.
6. Which of the following would be her **Control**?
	1. The height of the radishes
	2. The addition of adrenaline to the soil
	3. The plants/soil that have no adrenaline added to them
	4. The plants/soil that were given extra fertilizer AND received adrenaline.
7. Which of the following is **never** ok to have in an experiment?
	1. Two or more dependent variables (two or more things to measure)
	2. Two or more independent variables (two or more things to change)
	3. Two or more rationales (two or more reasons for making her hypothesis)
	4. Two or more people
8. When listing the **Materials** for an experiment, she should include…
	1. Only the items that will affect the outcome of the experiment
	2. Only the items not used in the control
	3. Only the items that are a part of the independent variable
	4. All items used in the experiment
9. If you have a good **Methods section**, which of the following would be true?
	1. Any person could do the experiment if they read her Methods and it would turn out exactly the same.
	2. A person could probably do her experiment if they read her methods, but only if they saw her conduct the experiment as well.
	3. Only she and her group could do the experiment; this way no one steals her work.
	4. Enough detail is provided for someone to understand her experiment, but not so much that they could steal it
10. If she changed more than one thing in your experiment, what would most likely happen?
	1. She would have a more valuable experiment.
	2. She would see more results compared to if she only changed one thing.
	3. She would not be able to tell what was responsible for the changes she observed.
	4. Her experiment would be more likely to work.
11. This is formed when elements are bonded to each other.
	1. Atom b. Molecule c. Cell d. Carbon Cycle
12. This is the smallest indivisible unit of matter.
	1. Atom b. Molecule c. Cell d. Carbon Cycle
13. Which of the following is an example of an **element**?
	1. Carbon dioxide b. Carbon c. Methane c. Cellulose
14. Which of the following is an example of a **molecule**?
	1. Respiration b. Hydrogen c. Water d. Decomposition
15. Why is carbon the most common element in living organisms?
	1. It can form four bonds with other atoms, which is high for an atom.
	2. It is small, allowing it to form strong bonds.
	3. All of the above.
	4. None of the above.
16. Which of the following best describes the **carbon cycle**?
	1. The creation and destruction of carbon atoms through photosynthesis and respiration.
	2. The prevention of decomposition through respiration and photosynthesis.
	3. The creation of energy through the breakdown of carbon dioxide.
	4. The movement of carbon atoms between different kinds of molecules.
17. Which of the following describes how a plant makes glucose?
	1. Water and oxygen are absorbed from the air to make glucose and carbon dioxide.
	2. Water is absorbed from the soil and carbon dioxide is absorbed from the air to make glucose and oxygen.
	3. Carbon dioxide is absorbed from the air to make glucose, water, and oxygen.
	4. A plant breaks down cellulose and combines it with water to make glucose.
18. This is a **carbohydrate**.
	1. An organic carbon molecule made of carbon, oxygen, and hydrogen produced through photosynthesis.
	2. The source of chemical energy for plants.
	3. The source of chemical energy for animals.
	4. Sugars, starches, fiber, or cellulose.
	5. All of the above.
19. This is the simplest carbohydrate.
	1. Cellulose b. Starch c. Glucose d. Fiber
20. This is the process in which carbohydrate is broken down to provide cellular energy to plants or animals.
	1. Photosynthesis b. Respiration c. Decomposition d. All of the above e. B and C only
21. This is the process in which carbohydrate is created using water, carbon dioxide, and the energy of the sun.
	1. Photosynthesis b. Respiration c. Decomposition d. All of the above e. B and C only
22. This is the process that adds carbon dioxide to the air.
	1. Photosynthesis b. Respiration c. Decomposition d. All of the above e. B and C only
23. This is the process that removes carbon dioxide from the air.
	1. Photosynthesis b. Respiration c. Decomposition d. All of the above e. B and C only
24. This is the process in which organic carbon molecules are converted into inorganic carbon molecules by organisms such as fungi and bacteria.
	1. Photosynthesis b. Respiration c. Decomposition d. All of the above e. B and C only
25. When a log is burned in a fire it seems like it loses weight; what actually happens to its physical mass?
	1. The matter of the log disappears.
	2. It is converted and released into the air as CO2 and H2O.
	3. The matter of the log is transformed into energy.
	4. The log does not change weight or size.
26. From where does a plant primarily obtain its physical mass when it is growing (*not including water weight*)?
	1. From the soil b. From the sunlight c. From CO2 in the air d. From the seed
27. When a human or animal consumes food, the carbon in that food is most likely to be converted into which of the following?
	1. Oxygen b. Hydrogen c. Nitrogen d. CO2 and H2O
28. Plants would be an example of this.
	1. Decomposers b. Producers c. Consumers d. All of the above
29. Fungi and bacteria would be an example of this.
	1. Decomposers b. Producers c. Consumers d. All of the above
30. A cow would be an example of this.
	1. Decomposers b. Producers c. Consumers d. All of the above
31. These give off CO2.
	1. Decomposers b. Producers c. Consumers d. All of the above
32. These absorb CO2.
	1. Decomposers b. Producers c. Consumers d. All of the above
33. This is an example of an organic carbon molecule.
	1. CO2 b. Glucose c. Water d. All of the above e. None of the above
34. This is an example of an inorganic carbon molecule.
	1. CO2 b. Glucose c. Water d. All of the above e. None of the above
35. This is the primary reason why the carbon cycle is out of balance.
	1. Too much photosynthesis due to agriculture.
	2. Too much respiration due to human activity.
	3. Too much decomposition due to landfills.
	4. Too much burning due to the use of fossil fuels.
	5. All of the above.
36. Why are scientists concerned about the excess amount of carbon dioxide in the atmosphere?
	1. Too much carbon dioxide causes an insulating effect, slowing the loss of heat from the surface of the earth.
	2. Too much carbon dioxide in the atmosphere can increase the risk of flooding.
	3. Too much carbon dioxide in the atmosphere can increase the risk of droughts.
	4. Agriculture may be adversely affected by unpredictable weather patterns created by a changing climate.
	5. All of the above.
37. Increased CO2 levels have this kind of impact on the atmosphere.
	1. Increased CO2 levels have a heating effect; it causes the atmosphere to heat up when CO2 breaks down.
	2. Increased CO2 levels have an insulating effect. It causes the atmosphere to retain energy, causing it to cool off more slowly.
	3. Increased CO2 levels have a cooling effect by increasing the likelihood of flooding.
	4. Increased CO2 levels have no effect on the atmosphere.
38. Why are fossil fuels suspected to be a leading cause of an imbalance in the carbon cycle?
	1. Fossil fuels are dirty fuels; the smoke that is emitted when they are burned absorbs sunlight, heating the atmosphere.
	2. Fossil fuels are a carbon-based fuel; any carbon-based fuel (including fossil fuels, wood, and ethanol) will create an imbalance in the carbon cycle.
	3. Fossil fuels, when combusted, release more CO2 into the atmosphere than can be reabsorbed through photosynthesis.
	4. Fossil fuel use is not associated with an increase in the CO­2 in the atmosphere.
39. How do we know that the increase in flooding, droughts, and extreme temperatures are because of excess CO2 and are not part of a natural cycle?
	1. The rate of change of today’s climate is hundreds of times greater than the normal rate of change that result from natural cycles.
	2. The changes we are observing coincide with the start of the Industrial Revolution and the use of fossil fuels.
	3. CO2 is above 400 ppm; this has never happened in modern history.
	4. All of the above.
	5. None of the above.
40. How could the levels of CO2 in the atmosphere be reduced?
	1. By decreasing the amount of fossil fuels we burn.
	2. By increasing the amount of photosynthesis that occurs.
	3. All of the above.
	4. None of the above.
41. Which of the following is NOT a requirement for something to be alive.
	1. It must have a cell with a membrane that allows for homeostasis
	2. It must have genetic material that it can pass on
	3. It must have organelles
	4. It must use energy to grow and change
42. The smallest indivisible unit of matter is the…
	1. Electron b. Atom c. Molecule d. Cell
43. The smallest unit of life is the…
	1. Electron b. Atom c. Molecule d. Cell
44. A group of atoms bonded together is a…
	1. Electron b. Atom c. Molecule d. Cell
45. Opposite charges of atoms \_\_\_\_\_\_ while similar charges \_\_\_\_\_\_\_\_\_\_
	1. Attract; Attract b. Repel; Repel c. Repel; Attract d. Attract; Repel
46. This atomic particle has a negative charge
	1. Proton b. Neutron c. Electron d. Nucleus
47. An example of a macromolecule is…
	1. Water b. CO2 c. a cell d. a protein
48. This organelle houses and protects DNA
	1. Nucleus b. Mitochondria c. Membrane d. Ribosomes e. Cytosol
49. This organelle produces proteins in the cell
	1. Nucleus b. Mitochondria c. Membrane d. Ribosomes e. Cytosol
50. This organelle produces ATP
	1. Nucleus b. Mitochondria c. Membrane d. Ribosomes e. Cytosol
51. This organelle is the outer lining and protects the inside of the cell
	1. Nucleus b. Mitochondria c. Membrane d. Ribosomes e. Cytosol
52. A group of cells all performing the same function is known as…
	1. An organ b. Tissue c. A system d. ATP Synthase
53. A group of different kinds of tissue with coordinated action and a main function is…
	1. An organ b. Tissue c. A system d. ATP Synthase
54. A group of organs all performing the same function is known as…
	1. An organ b. Tissue c. A system d. ATP Synthase
55. The energy of all living cells is…
	1. ATP b. ADP c. Glucose d. ATP Synthase
56. The uncharged version of this molecule is…
	1. ATP b. ADP c. Glucose d. ATP Synthase
57. The structure that produces the energy molecule of a cell is…
	1. ATP b. ADP c. Glucose d. ATP Synthase
58. ATP Synthase is primarily found in…
	1. The nucleus b. The membrane c. The ribosome d. The mitochondria
59. ATP Synthase is like …
	1. A battery b. A train c. A tiny wheel d. A mousetrap
60. What turns the ATP Synthase wheel?
	1. Water b. Oxygen c. Hydrogen d. ATP
61. From where does a cell acquire the substance that turns ATP Synthase?
	1. Oxygen from the air we breathe
	2. Water from the food we eat
	3. Hydrogen from the food we eat
	4. Carbon from the food we eat
62. How is ADP reformed back into ATP?
	1. A third phosphate is added by ATP Synthase as it is turned by flowing hydrogen
	2. A third phosphate turns ATP Synthase, adding hydrogen to ATP
	3. A third phosphate turns ADP Synthase, adding hydrogen to ADP
	4. The cellular membrane move hydrogen back and forth, creating an electrical charge
63. What removes the leftover hydrogen from the mitochondria after ATP is created by ATP Synthase?
	1. Oxygen from the air we breathe
	2. Water from the food we eat
	3. Hydrogen from the food we eat
	4. Carbon from the food we eat
64. What are the waste products that are breathed out after ATP production by ATP Synthase?
	1. CO2 and H­2O b. CO2 and hydrogen c. CO2 and oxygen d. H­2O and carbon
65. This is the intermembrane space.
	1. b. c. d.
66. This is the matrix.
	1. b. c. d.
67. This is the inner membrane.
	1. b. c. d.
68. This is the outer membrane.
	1. b. c. d.
69. This is where we would find ATP Synthase
	1. b. c. d.
70. This is where hydrogen is stored before it powers ATP Synthase
	1. b. c. d.
71. This is where pyruvate is broken down completely and where its hydrogen atoms are removed.
	1. b. c. d.
72. This process creates ATP from ADP and Pi
	1. Substrate-level phosphorylation b. Oxidative Phosphorylation c. Both A & B d. None of the above
73. This process uses hydrogen to turn ATP Synthase to make ATP
	1. Substrate-level phosphorylation b. Oxidative Phosphorylation c. Both A & B d. None of the above
74. This process uses pyruvate and an enzyme in the cytosol to create ATP
	1. Substrate-level phosphorylation b. Oxidative Phosphorylation c. Both A & B d. None of the above
75. This process creates ATP from oxygen and hydrogen.
	1. Substrate-level phosphorylation b. Oxidative Phosphorylation c. Both A & B d. None of the above
76. This enzyme moves hydrogen to the inner membrane.
	1. Pyruvate b. Glucose c. NAD+/FAD+ d. Electron Transport System
77. This is half of a sugar molecule
	1. Pyruvate b. Glucose c. NAD+/FAD+ d. Electron Transport System
78. This is what the cell absorbs in order to acquire most of its hydrogen.
	1. Pyruvate b. Glucose c. NAD+/FAD+ d. Electron Transport System
79. This is the set of pumps that move hydrogen into the intermembrane space from the matrix
	1. Pyruvate b. Glucose c. NAD+/FAD+ d. Electron Transport System
80. Which of the following would NOT increase ATP production?
	1. Increasing the concentration of hydrogen in the intermembrane space
	2. Increasing the concentration of hydrogen in the matrix
	3. Increasing the number of ATP Synthase in the mitochondria
	4. Increasing the number of mitochondria in the cell
81. Cellular respiration is the process in which…
	1. Oxygen is turned into ATP
	2. Hydrogen is turned into ATP
	3. Hydrogen is removed from food to power ATP production
	4. ATP is converted into ADP and Pi­
82. The simplest carbohydrate is…
	1. Starch b. Fiber c. Cellulose d. Glucose
83. Before a carbohydrate can be absorbed by the blood and cells, it must be broken down into…
	1. Glucose b. ATP c. ADP d. Hydrogen
84. The first step of respiration is Glycolysis. In this process…
	1. Hydrogen turns ATP Synthase, powering the production of ATP
	2. A pyruvate molecule is completely broken down, and FAD+ and NAD+ remove hydrogen.
	3. Sugar is split into two pyruvates; some ATP is made by substrate-level phosphorylation.
	4. Electron-powered protein pumps move hydrogen into the intermembrane space.
85. In the TCA Cycle…
	1. Hydrogen turns ATP Synthase, powering the production of ATP
	2. A pyruvate molecule is completely broken down, and FAD+ and NAD+ remove hydrogen.
	3. Sugar is split into two pyruvates; some ATP is made by substrate-level phosphorylation.
	4. Electron-powered protein pumps move hydrogen into the intermembrane space.
86. In the Electron Transport System, …
	1. Hydrogen turns ATP Synthase, powering the production of ATP
	2. A pyruvate molecule is completely broken down, and FAD+ and NAD+ remove hydrogen.
	3. Sugar is split into two pyruvates; some ATP is made by substrate-level phosphorylation.
	4. Electron-powered protein pumps move hydrogen into the intermembrane space.
87. In Oxidative Phosphorylation…
	1. Hydrogen turns ATP Synthase, powering the production of ATP
	2. A pyruvate molecule is completely broken down, and FAD+ and NAD+ remove hydrogen.
	3. Sugar is split into two pyruvates; some ATP is made by substrate-level phosphorylation.
	4. Electron-powered protein pumps move hydrogen into the intermembrane space.
88. This is a measurement of accuracy of data that included variability and sample size.
	1. Mean b. Standard Deviation c. Standard Error d. Error Bars
89. This is a measurement of variability only.
	1. Mean b. Standard Deviation c. Standard Error d. Error Bars
90. This is the average of the data
	1. Mean b. Standard Deviation c. Standard Error d. Error Bars
91. This visually shows the margin of error.
	1. Mean b. Standard Deviation c. Standard Error d. Error Bars
92. If the standard deviation and standard error values are SMALL, this indicates that the mean of that data is…
	1. More reliable b. Less reliable c. Lower in value d. Greater in value
93. When it comes to data & accuracy, we want \_\_\_\_\_\_ variability and a \_\_\_\_\_\_\_ population size.
	1. Maximum Maximum b. Maximum Minimum
	c. Minimum Minimum d. Minimum Maximum
94. The \_\_\_\_\_ our data varies, the more reliable it is.
	1. Less b. More
95. The \_\_\_\_\_ data we have, the more reliable it is.
	1. Less b. More

Two graphs are shown below. Use these graphs to answer the following questions.

1. In which graph are the two sets of data statistically different from each other?
	1. Left b. Right
2. In which graph do the error bars overlap?
	1. Left b. Right
3. In which graph will the control always be greater than the experimental average?
	1. Left b. Right
4. This is the null hypothesis.
	1. The measurement that determines whether or not an experiment supports the researcher’s initial expectations.
	2. The statement we are trying to disprove.
	3. The statement we are attempting to prove or demonstrate.
5. This is the P-value.
	1. The measurement that determines whether or not an experiment supports the researcher’s initial expectations.
	2. The statement we are trying to disprove.
	3. The statement we are attempting to prove or demonstrate.
6. This is the alternative hypothesis.
	1. The measurement that determines whether or not an experiment supports the researcher’s initial expectations.
	2. The statement we are trying to disprove.
	3. The statement we are attempting to prove or demonstrate.

A researcher is trying to determine if the addition of linseed oil reduces the methane production from livestock. The researcher believes that methane emissions from cattle could be reduced if linseed oil has been added to their feed. Use this information to answer the questions below.

1. Which of the following would be the **null hypothesis** of this researcher?
	1. Cattle will have a **faster** rate of weight gain if linseed oil is added to their feed.
	2. Cattle will have a *slower* rate of weight gain if linseed oil is added to their feed.
	3. Addition of linseed oil will **reduce** the methane emissions from livestock.
	4. Addition of linseed oil will **not affect** the amount of methane emissions from livestock.
	5. None of the above.
2. Which of the following would be the **alternative hypothesis** of this researcher?
	1. Cattle will have a **faster** rate of weight gain if linseed oil is added to their feed.
	2. Cattle will have a *slower* rate of weight gain if linseed oil is added to their feed.
	3. Addition of linseed oil will **reduce** the methane emissions from livestock.
	4. Addition of linseed oil will **not affect** the amount of methane emissions from livestock.
	5. None of the above.
3. If the P-value for this experiment was 0.02, what would this indicate?
	1. The researcher can reject the null hypothesis and accept the alternative hypothesis that linseed oil reduces the methane emissions of livestock.
	2. The researcher *cannot* reject the null hypothesis; the alternative hypothesis must be incorrect.
	3. All of the above.
	4. None of the above.
4. If the P-value for this experiment was 0.19, what would this indicate?
	1. The researcher can reject the null hypothesis and accept the alternative hypothesis that linseed oil reduces the methane emissions of livestock.
	2. The researcher *cannot* reject the null hypothesis; the alternative hypothesis must be incorrect.
	3. All of the above.
	4. None of the above.
5. What can best be determined from the graph at the right?
	1. The control radishes are significantly taller than the Gatorade radishes.
	2. The Gatorade radishes are significantly taller than
	the control radishes.
	3. There is no significant difference between the control
	and Gatorade radishes.
	4. None of the above are reflective of this graph.
6. Which of the following are closest to the margin of error for
the Gatorade radishes?
	1. 6 cm
	2. 8 cm
	3. 4.26 to 7.74 cm
	4. 5.45 to 13.45 cm
	5. None of the above
7. Which of the following are closest to the margin of error for
the control radishes?
	1. 6 cm
	2. 8 cm
	3. 4.26 to 7.74 cm
	4. 5.45 to 13.45 cm
	5. None of the above

**Addition of Jell-O Powder to Ground Corn May Increase Pig Rate of Gain of Weight**

W. Wolverine, 6th Hour Agriscience

Waterford Union High School, Waterford, WI

**Introduction: (1)** The rate at which a pig gains weight is a major concern for swine producers. The faster a pig can gain weight, and the more efficiently they can gain weight, the more profitable a pig is for a producer (Peehg, et. al, 2007). **(2)** From previous experience, I wondered if adding a sweetener like Jell-O mix to the ground corn that pigs ate would increase their rate of gain. **(3)** I predicted that pigs fed corn mixed with the Jell-O powder would have a greater rate of gain. **(4)** This makes sense to me because I personally will eat more of something if it tastes better to me. I also know that pigs like the taste of Jell-O due to accidentally spilling it into their pen on one occasion. **(5)** To test this hypothesis, I fed a group of a half-dozen pigs standard ground corn, filling their feeders as needed. I did the same for the six experimental pigs, except that every time I add a 50 lb. bag of corn to their feeder, I simultaneously added a 6 oz. box of Jell-O mix. The pigs were weighed periodically and the data was graphed and analyzed to see if it was significantly different. After 3 months of growth, I averaged the weights of each group and compared them to each other.

1. What is **Independent Variable** in this experiment?
	1. Pigs b. The addition of Jell-O to pig feed c. Corn d. Rate of Weight Gain
2. What is the **Dependent Variable** is this experiment?
	1. Pigs b. The addition of Jell-O to pig feed c. Corn d. Rate of Weight Gain
3. Which sentence contains the **Hypothesis**?
	1. 1 b. 2 c. 3 d. 4 e. 5
4. Which sentence contains the **Research Question**?
	1. 1 b. 2 c. 3 d. 4 e. 5
5. Which sentence contains the **Rationale**?
	1. 1 b. 2 c. 3 d. 4 e. 5
6. Which sentence contains the **Background Information**?
	1. 1 b. 2 c. 3 d. 4 e. 5
7. In what section would we include a graph of our data?
	1. Introduction b. Methods c. Results d. Discussion
8. In what section should we discuss the meaning of our data in relationship to the hypothesis?
	1. Introduction b. Methods c. Results d. Discussion
9. In what section would we find detailed steps for how we conducted this experiment?
	1. Introduction b. Methods c. Results d. Discussion
10. The sources of the facts in this introduction are cited in parentheses. Because of this…
	1. We don’t need a bibliography
	2. We also need to cite these sources in the bibliography
	3. We need a bibliography, but only for sources not cited in parentheses.
11. Which of the following is the correct way to site a source when using parentheses?
	1. (Date, Author) b. (Title, Date) c. (Author, Date) d. (Title, Author)