

Biology Quarter 4 Final Review Sheet 16-17

Scientific Method

Every morning, a kid turns on the lamp to his aquarium so the plants can receive light. He does not turn off the light at the same time every night, so sometimes the plants receive very little light while at other times they receive almost 24 hours of light. The plants are not doing very well and the kid wants to know if it is because of too much light or not enough light. The kid buys 4 identical plants and puts them in 4 different 10-gallon aquariums located in each of the corners of a room. Each tank has 2 comets that are all feed about the same amount of food at the same times during the day. The kid has the same type of lamp on each of the aquariums and turns them on the same time every morning. Each tank receives a different amount of light. The first tank receives 6 hours of light, the second 12 hours, the third 18 hours, and the fourth is never turned off. Every morning, the kid measures the growth of the plants and makes observations of their health. His data is shown below.

| Test Plant | Hours of Light | Results after 21 weeks |
|------------|----------------|------------------------|
| A | 6 | 3 cm of growth |
| B | 12 | 8 cm of growth |
| C | 18 | 10 cm of growth |
| D | 24 | 6 cm of growth |

1. What is a possible hypothesis for the kids experiment?
2. What was the experiments independent variable?
3. What was the experiments dependent variable?
4. What are the experiments control variable?
5. What are some potential difficulties in the experiment?
6. Based on the data, what can you conclude?

A kid hears that fish like protein and decides to test if this is true. The kid buys 20 comets (a type of fish) and places them in a fishpond. The kid also buys four types of fish food that is made from different amounts of protein. The kid places a different fish food in each of the corners and counts how many fish go to that corner. The kid repeats his experiment for three days, placing the same food in the same corner and feeds the fish at same time of day. The data is shown below.

| Area of Pond | Food Type | Number of fish going to corner | | | |
|--------------|-------------------|--------------------------------|-------|-------|---------|
| | | Day 1 | Day 2 | Day 3 | Average |
| Corner 1 | 0% Protein Food | 5 | 8 | 2 | 5 |
| Corner 2 | 5% Protein Food | 5 | 4 | 3 | 4 |
| Corner 3 | 10% Protein Food | 4 | 5 | 6 | 5 |
| Corner 4 | 15 % Protein Food | 3 | 2 | 7 | 4 |

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Macromolecules

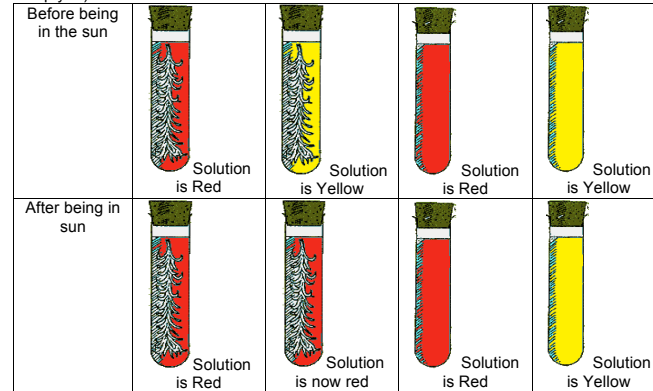
13. Why are carbohydrates an important part of the human diet?
14. What are the functions of fats?
15. Why is it important for mammals to include protein in their diet?
16. What is the function of enzymes? Why is shape important to enzymes?
17. How do low temperatures affect the reaction rate of enzymes? Why does this happen?
18. How do high temperatures affect the reaction rate of enzymes? Why does this happen?
19. How do extremely high temperatures affect enzymes? Why does this happen?
20. How does increasing or decreasing the amount of enzymes affect the reaction rate of enzymes? Why does this happen?

Cells and Cellular Transport

21. What are the functions of the cell membrane?
22. What is the function of ribosomes?
23. What is the function of mitochondria? What cells have lots of mitochondria?
24. What is the function of lysosomes?
25. Explain how diffusion works. Use drawings to aid your explanation.
26. Explain how osmosis works, what happens to cells in the following solutions hypotonic, hypertonic, and isotonic. Draw diagrams to explain.

Photosynthesis

Phenol is a chemical that turns yellow when in the presence of acid, and turns red when in the presence of a base. Carbon Dioxide (CO₂) is acidic, while Oxygen (O₂) is basic. When a person breathes into phenol it turns yellow. Use this information and the charts below to answer the following questions. (the equation for photosynthesis will help you)



27. Why does phenol turn yellow when someone breathes into it?
28. Why does the reacted (yellow) solution with the plant turn to red after being in the sun?
29. If the test tube with the reacted (yellow) solution with the plant was placed in the dark instead of the sun, would it change to red or stay yellow? Explain why or why not.

30. What plant cell organelle is responsible for photosynthesis?
31. What is the purpose of chlorophyll?
32. What is the chemical equation for photosynthesis? Write both versions.

Cellular Respiration

33. What organelle is responsible for releasing energy stored in glucose?
34. What is the chemical equation for cellular respiration? Write out both versions.
35. What is the major difference between aerobic and anaerobic respiration?
36. How is lactic acid fermentation responsible for making muscles fatigued and sore?
37. What type of fermentation is used to make yogurt?

Mitosis and Meiosis

38. What is asexual reproduction? Describe an example of asexual reproduction.
39. What is sexual reproduction?
40. What are the differences between somatic and reproductive cells?
41. What is mitosis?
42. What is a diploid cell? Provide an example.
43. What is a haploid cell? Provide an example.
44. What are gametes?
45. What is meiosis?
46. What are homologous chromosomes?
47. How many chromosomes are in human gametes?
48. How many chromosomes are in the gametes of an organisms with 2n=100?
49. How many chromosomes are in the somatic cells of an organism with n=35?

Genetics

50. What are genes and where are genes located?
51. What are alleles?

Genetics Continued...

52. What is a dominant gene and how are dominant genes represented?
53. What is a recessive gene and how are recessive genes represented?
54. What does heterozygous mean? Provide an example.
55. What does homozygous mean? Provide an example.
56. What does genotype mean? Provide an example.
57. What does phenotype mean? Provide an example?

Rabbits have two alleles for fur color and having a floppy ear.

Rabbit fur color: B = brown fur b = white fur
Rabbit ear shape: F = floppy ears f = straight ears

Two heterozygous brown fur rabbits mate:

58. What is the probability of forming a white rabbit?
59. What is the probability of a heterozygous baby forming?

Two brown fur floppy ear rabbit [BbFf] mate:

60. What is the probability of producing a rabbit with brown fur and floppy ears?
61. What is the probability of producing a rabbit with white fur and straight ears?
62. What is the probability of forming a rabbit with the genotype bbFf ?
63. What is the probability of forming a rabbit heterozygous for both traits?

DNA and mRNA

64. What is the structure and function of DNA?
65. What is transcription and where does it occur?
66. What is translation and where does it occur?
67. How does DNA become a protein? (hint: transcription and translation)
68. What is the mRNA sequence of the given DNA strand: ACGTGCAATGATCGA
69. What is the amino acid sequence obtained from the following mRNA strand: UGCAUTCCGUCAACU

Mutations

70. What are mutations?
71. How are mutations both good and bad?
72. What causes mutations?
73. What are some examples of mutations?

Natural Selection and Evolution

74. What are adaptations in regards to organisms?
75. What is natural selection ("Survival of the Fittest")? Provide an example.
76. How does evolution occur? (use an example in your explanation)

Classification

77. What are the 7 levels of classification, starting with the broadest to the most specific?
78. What are the three domains all organisms are categorized in? What are some of the characteristics for each of these domains?
79. What are the six kingdoms all organisms are categorized in? What are some of the characteristics for each of these kingdoms?
80. What is the scientific name of an organism, and what is the proper way to write out scientific names?
81. What do the scientific names of organisms tell you?

Ecology

82. What are the 3 ecological pyramids? What do these pyramids tell you?
83. What is the difference between a food chain and a food web?
84. Define the following terms: producer, primary consumer, secondary consumer, tertiary consumer
85. How is a food web arranged? What does the direction of the arrows show? Who is at the bottom?
86. Describe the following terms, including their relationship to each other: autotroph, heterotroph, herbivore, carnivore, detritivore.

Engineering Design Process

87. What are the steps of the EDP process we followed to create your hydroponic planters?