Scientific Method WebQuest

Name:_____

Task 1: Scientific Theory and Law

Use the link below to watch the "What's the difference between scientific law and theory?" Ted Ed video and then read the statements below. For each statement, write "theory" if it applies to theories or "law" if the statement applies to a law.
Full URL: https://www.youtube.com/watch?v=GyN2RhbhiEU Tiny URL: https://tinyurl.com/hqbdmgs

1. Predicts the results of certain initial conditions. _____
2. Tries to provide the most logical explanation about why things happen as they do. _____
3. Predicts what will happen. _____
4. Explains why something happens. _____
5. Have observed years of experimental confirmation before earning acceptance. _____

Task 2: The Scientific Method

Watch the "Scientific Method" video by Teacher's Pet. As you watch, answer the questions below.
Full URL: https://www.youtube.com/watch?v=SMGRe824kak Tiny URL: https://tinyurl.com/px54aod

6. List the steps of the scientific method.
   - _____
   - _____
   - _____
   - _____
   - _____
   - _____

7. What two steps of the scientific method are going on the entire time?_____
8. Describe a hypothesis. _____
9. Read the statement below. Highlight the qualitative data and underline the quantitative data.

   Khloe has harvested ten white daisies from her flower garden. They smell like perfume and each flower has five petals. The stems are eight inches long, green, and feel smooth.

10. Describe the difference between an independent variable and a dependent variable. _____
_____
11. What is the difference between an experimental group and a control group?_____
_____
_____
12. Which group contains the independent variable and dependent variable?_____

Task 3: Cricket Virtual Lab

Use the link below to access the "Cricket Virtual Lab". Follow the directions below to complete the lab.
Full URL: http://webapp.gccaz.edu/academic/biology/scientific_method/ Tiny URL: https://tinyurl.com/o9p9nup

Click *Begin* and then *TUTORIAL.* Press *Next* to move through the screens as you answer the questions below.

13. How many different scientific methods are there?_____
14. Which flower box is the most useful to open first? _____
15. What are three important points to remember when stating or defining a problem?
    - _____
    - _____
    - _____
16. Why is collecting information important? _____
17. Do they have a 4th of July in Mexico?_____
18. How many sheep are still alive?_____

19. As scientists collect data, what are they able to modify and refine?_____

20. What was the problem with Michael's experiment?_____

21. How many independent variables should be in one experiment?_____

22. What are controlled factors?_____

23. Fill in the blank: The simplest solution is probably the _____ one.

Task 4: Accuracy and Precision

Use the link below to watch the "Accuracy and Precision" video by Ted Ed. Then, read the statements below and write "precision" if it applies to precision or "accuracy" if the statement applies to accuracy.
Long URL: https://www.youtube.com/watch?v=hRAFPdDppzs Short URL: https://tinyurl.com/z737uuc

30. After ten attempts to hit the bullseye, an archer hits the same place on a tree next to the target. _____

31. An archer hits the bullseye on a target. _____

32. A pitcher repeatedly throws his ball past the batter and hits the catcher. _____

33. A pitcher throws his ball perfectly to the batter. _____

Use the link below to complete the "Accuracy vs Precision Dart Game". Then, answer the questions below.
Full URL: http://interactagram.com/physics/PrecisionAndAccuracy/ Tiny URL: https://tinyurl.com/y8mux3r9

34. What is the difference between precision and accuracy? _____

_____

35. Play the dart game a few times. What was your best accuracy?_____ Best precision?_____

Task 5: A Closer Look at Variables

Use the link below to watch the "Identify the Independent and Dependent Variables with the MythBusters!" video. During the video you will be directed to click to watch a Mythbuster's video clip. Follow the directions in the video to do that. After, it will tell you to go back to the original video. Do that too. After you watch the videos, answer the following questions.
Full URL: https://www.youtube.com/watch?v=IA_c39ur9ho Tiny URL: https://tinyurl.com/y7walnkz

49. Which type of variable is changed by a scientist to test the experiment's hypothesis?_____

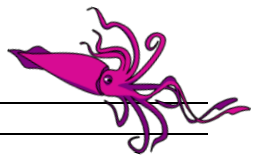
50. Which variable is measured during an experiment?_____

51. What was the independent variable of the car experiment? _____

52. What was the dependent variable of the car experiment?_____

Task 6: Scientific Method Game

Use the link below to play the Inky the Squid Scientific Method game from BioMan Bio. Choose infinite lives and complete all the levels. Tiny URL: https://tinyurl.com/z9fawob
Full URL: https://biomanbio.com/HTML5GamesandLabs/SciMethodGames/inkysmhtml5page.html



66. Write 3 Facts you learned or encountered during this game.
    1. _____
    2. _____
    3. _____

Task 7: Replication of Results

Use the link below to read about the importance of replicating scientific experiments. After you read, answer the questions below. Long URL: https://www.ck12.org/c/physical-science/replication-in-science/lesson/Replication-in-Science-MS-PS/?referrer=concept_details
Short URL: https://tinyurl.com/y9pve63j

67. What does the term *replication* mean in science?_____

68. If results are able to be repeatedly replicated, it means they are more likely to be what?_____

69. Repeated replication of results may turn a hypothesis into a what?_____

70. Why was it so important that scientists tried to replicated the results of the vaccination / autism experiment?_____

_____

_____

Task 10: Scientific Scenario – NO Internet Required!

Read the scientific scenario below. Then answer the questions.

Sawyer observed ants digging tunnels in his back yard and wondered what time of day the ants were most actively digging the tunnels. He decided to investigate whether ants dig longer tunnels in the light or in the dark. He thought that ants used the filtered light that penetrated the upper layers of soil and would dig more tunnels during the daytime hours. Ten ant colonies were set up in ant farms with the same number and species of ants per ant farm. The same amount of ant food was given to each colony, and the colonies were kept at the same temperature. Five of the colonies were exposed to normal day light and five were covered with black construction paper and did not receive light. Every other day for three weeks, Sawyer measured the length of the tunnels in millimeters using a string and a ruler. Averages for the light and dark groups for each measured were calculated. The averages are listed in the following chart.

Length of Tunnels in Different Light Conditions		
Day	Light (mm)	Dark (mm)
1	4	6
3	9	14
5	21	26
9	32	47
11	51	63
13	63	96
15	70	115
17	90	120
19	100	125

71. What did Sawyer observe?_____

72. What qualitative data did Sawyer collect? _____
What quantitative data did Sawyer collect?_____

73. What was the problem?_____

74. What was Sawyer's hypothesis?_____

75. What was the independent variable?_____

76. What was the dependent variable?_____

77. What variables did Sawyer control?_____

78. Did the data support Sawyer's hypothesis? Why?_____

79. What should Sawyer's conclusion be?_____

80. What would be the benefit of other people repeating this experiment?_____