Physical Science – Mr. Decipeda

Bikini Bottom Experimental Design
WRITE ALL ANSWERS ON A SEPARATE <u>LOOSE LEAF</u> PAPER.

A. Write a <u>short</u> definition for each:
1. Independent Variable:
2. Dependent Variable:
3. Conditions of Independent Variable:
4. Control Group:
5. Experimental Group(s):
6. Constant (Controlled) Variables:
7. Repeated Trials:
8. Sources of Error:

B. Read the passages below and answer the questions that follow.
Krusty Krabs Breath Mints
Mr. Krabs created a secret ingredient for a breath mint that he thinks will "cure" the bad breath people get from eating crabby patties at the Krusty Krab. He asked 100 customers with a history of bad breath to try his new breath mint. He had fifty customers (Group A) eat a breath mint after they finished eating a crabby patty. The other fifty (Group B) also received a breath mint after they finished the sandwich, however, it was just a regular breath mint and did not have the secret ingredient. Both groups were told that they were getting the breath mint that would cure their bad breath. Two hours after eating the crabby patties, thirty customers in Group A and ten customers in Group B reported having better breath than they normally had after eating crabby patties.

9. What was the question Mr. Krabs wanted to investigate? (Make sure it is in a "cause" and "effect" format.)
10. What was the independent variable?
11. What was the dependent variable(s)?
12. How many conditions of the independent variable were used?
13. What was the control group?
14. What were the experimental groups?
15. What were some possible sources of error?
16. What should Mr. Krabs' conclusion be?
17. Why do you think 10 people in group B reported fresher breath?
18. How could this experiment be improved and / or the results be more reliable?

Sponge Bob Clean Pants
Sponge Bob noticed that his favorite pants were not as clean as they used to be. His friend Sandy told him that he should try using Clean-O detergent, a new laundry soap she found at Sail-Mart. Sponge Bob made sure to wash one pair of pants in plain water and another pair in water with the Clean-O detergent. After washing both pairs of pants a total of three times, the pants washed in the Clean-O detergent did not appear to be any cleaner than the pants washed in plain water.

19. What was the question Sponge Bob wanted to investigate?
20. What was the independent variable?
21. What was the dependent variable(s)?
22. How many conditions of the independent variable were used?
23. What was the control group?
24. What were the experimental groups?
25. What were some possible sources of error?
26. What should Sponge Bob's conclusion be?
27. How could this experiment be improved and / or the results be more reliable?

Squidward's Symphony
Squidward loves playing his clarinet and believes it attracts more jellyfish than any other instrument he has played. In order to test his hypothesis, Squidward played a song on his clarinet for a total of 5 minutes and counted the number of jellyfish he saw in his front yard. He played the song a total of 3 times on his clarinet and repeated the experiment using a flute and a guitar. He also recorded the number of jellyfish he observed when he was not playing an instrument. The results are shown in the chart below.

# of Jellyfish observed / Instrument

Trial	No Music	Clarinet	Flute	Guitar
1	5	15	5	12
2	3	10	8	18
3	2	12	9	7

28. What was Squidward's hypothesis stated as an "if . . . then" statement?
29. What was the independent variable?
30. What was the dependent variable(s)?
31. How many conditions of the independent variable were used?
32. What was the control group?
33. What were the experimental groups?
34. What were some possible sources of error?
35. What should Squidward's conclusion be?
36. How could this experiment be improved and / or the results be more reliable?

Super Bubbles
Patrick and Sponge Bob love to blow bubbles! Patrick found some Super Bubble Soap at Sail-Mart. The ads claim that Super Bubble Soap will produce bubbles that are twice as big as bubbles made with regular bubble soap. Patrick and SpongeBob made up two samples of bubble solution. One sample was made with 5 oz. of Super Bubble Soap and 5 oz. of water, while the other was made with the same amount of water and 5 oz. of regular bubble soap. Patrick and Sponge Bob used their favorite bubble wands to blow 10 different bubbles and did their best to measure the diameter of each one. The results are shown in the chart below.

Bubble Diameter (cm)

Bubble	Super Bubble	Regular Soap
1	15	10
2	10	5
3	12	16
4	18	14
5	22	11
6	13	12
7	16	11
8	18	15
9	15	15
10	12	6

37. What did the Super Bubble ads claim?
38. What was the independent variable?
39. What was the dependent variable(s)?
40. How many conditions of the independent variable were used?
41. What was the control group?
42. What was the experimental group?
43. What were some possible sources of error?
44. Calculate the mean bubble diameter for each soap. (round to the nearest whole number)
45. What is the median bubble diameter for each soap?
46. What is the mode bubble diameter for each soap?
47. What is the range of bubble diameter for each soap?
48. What should Patrick's conclusion be?
49. How could this experiment be improved and / or the results be more reliable?

Super Snails
Gary is not the smartest snail in Bikini Bottom and believes he can improve his brain power by eating Super Snail Snacks. In order to test this hypothesis, he recruits Sponge Bob and several snail friends to help him with the experiment. The snails ate one snack with each meal every day for three weeks. Sponge Bob created a test and gave it to the snails before they started eating the snacks as well as after three weeks. Analyze the data in the chart and determine whether or not the Super Snail Snacks create smarter snails!

Test Results

Snail	Before Snacks	After Snacks
Gary	64%	80%
Larry	78%	78%
Barry	82%	84%
Terry	72%	70%

50. What was Gary's hypothesis stated as an "if . . . then" statement?
51. What was the independent variable?
52. What was the dependent variable(s)?
53. How many conditions of the independent variable were used?
54. What was the control group?
55. What were the experimental groups?
56. What were some possible sources of error?
57. What should Sponge Bob's conclusion be?
58. How could this experiment be improved and / or the results be more reliable?

Flower Power
Sponge Bob loves to garden and wants to grow lots of pink flowers for his pal Sandy. He bought a special Flower Power fertilizer to see if will help plants produce more flowers. He plants two plants of the same size in separate containers with the same amount of potting soil. He places one plant in a sunny window and waters it every day with fertilized water. He places the other plant on a shelf in a closet and waters it with plain water every other day.

59. What did Sponge Bob do wrong in this experiment? Explain.
60. What should Sponge Bob do to test the effectiveness of Flower Power fertilizer? Write an experiment. Include the following in your experimental design:
A. Question (in a "cause and effect" format)
B. Hypothesis (as an "if / then" statement)
C. Materials (be specific with sizes and amounts)
D. Procedure (the steps should be clear enough that the experiment can be repeated and yield the same results)