Scientific Method – Spongebob Problems

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 their 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.

1. **Which people are in the control group?**
2. **What is the independent variable?**
3. **What is the dependent variable?**
4. **What should Mr. Krab's conclusion be?**
5. **Why do you think 10 people in group B reported fresher breath?**

Spongebob Clean Pants

Spongebob 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 the Sail-Mart. Spongebob 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.

1. **What was the problem Spongebob wanted to investigate?**
2. **What is the independent variable?**
3. **What is the dependent variable?**
4. **What should Spongebob's conclusion be?**

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.

Number of jellyfish/instrument				
Trial	No Music	Clarinet	Flute	Guitar
1	5	15	5	12
2	3	10	8	18
3	2	12	9	7

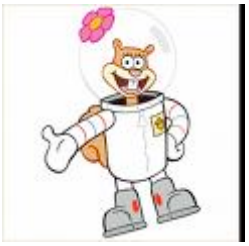
1. **What is the independent variable?**

2. **What is the dependent variable?**

3. **What should Squidward's conclusion be?**

4. **Are the results reliable? Why or why not?**

Flower Power



Spongebob 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 it 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 on a shelf in a closet and waters it with plain water every other day.

1. **What did Spongebob do wrong in this experiment? Explain.**

2. **What should Spongebob do to test the effectiveness of Flower Power fertilizer? Write an experiment.**

Super Bubbles

Patrick and Spongebob 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 about of water and 5oz of regular bubble soap. Patrick and Spongebob 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.

Bubbles Diameter in 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

1. **What did the Super Bubble ads claim?**

2. **What is the independent variable?**

3. **What is the dependent variable?**

4. **Look at the results chart**

   a. **Calculate the average diameter for each bubble solution**

Super Bubble = _____ cm
Regular Bubble = _____cm

   b. **What should their conclusion be?**

5. **Are the results reliable? Why or why not?**

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 Spongebob and several of snail friends to help him with the experiment. The snails ate one snack with each meal every day for three weeks. Spongebob 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.

1. **Based on the data provided, do the Super Snail Snacks work? Explain.**

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

Bubble Time

Patrick loves bubble gum and would like to be able to blow bigger bubbles than anyone else in Bikini Bottom. To prepare for the Bikini Bottom Big Bubble Contest, he bought five different brands of bubble gum and needs your help to find the brand that creates the biggest bubbles. Write an experiment to test the bubble power of the bubble gum brands and help Patrick win the contest.