**Bean plants in different light**

Do exposing bean plants to different amounts of light affect their growth rate?

The scientists research the role of light in photosynthesis, which is how plants create energy.

If bean plants are exposed to a greater amount of light, then they will grow taller than bean plants exposed to less light because plants will be able to produce more energy.

The scientists gather 9 bean plants and plant them in the same type of soil. 3 plants are exposed to 2 hours of light per day, 3 are exposed to 8 hours of light per day, and 3 are exposed to 15 hours of light per day. The scientists measure the height of the bean plants every day for two weeks. The scientists chart the bean plant heights, find the average height of the 2 hour plants, the 8 hour plants, and the 15 hour plants then create a bar graph of their averages. Their graph shows that the 15 hour plants grew the tallest over the two week period.

The scientists conclude that their hypothesis was correct. Bean plants grow faster when exposed to more light.

**Tomatoes with different amounts of water**

Does the amount of water given to tomato plants affect how much fruit they produce?

The scientists research the role of water in plant growth, gathering any information that may have already been published by other scientists.

If tomato plants are watered daily, then they will grow taller than tomato plants watered less often because the plants need water to produce the fruit.

The scientists gather 12 tomato plants. They are all planted in the same soil and given the same amount of sunlight. 3 plants are not watered at all, 3 are watered once per week, 3 are watered 3 times per week, and 3 are watered daily. The scientists chart the total mass of the tomatoes produced at the end of 3 weeks, create a data table and a bar graph showing the mass of the tomatoes at different watering levels. Their chart and graph shows that the plants watered 3 times per week grew the highest mass of tomatoes.

The scientists conclude that their hypothesis was incorrect. The plants watered 3 times per week grew the most tomatoes. This shows that it is possible to over water tomato plants.

**Fish in different sized containers**

Does keeping fish in different size containers affect their size?

The scientists research different factors that affect fish growth rates such as nutrition and environment.

If fish are placed in different size containers, then the fish placed in the largest containers will grow the largest because they have more room to grow in the container and the environment a fish is raised in is important to its growth development.

The scientists gather 9 goldfish. Each is placed in its own container and fed the same food over the course of 4 weeks. 3 fish are placed in a small container, 3 fish are placed in a medium sized container, and 3 fish are placed in a large container. The scientists will measure the length of the fish 3 times per week.

The scientists create a chart of fish length, find the average length for the 3 types of containers for each date that they measured the fish, then create a line graph showing the average growth of each fish over time. The scientists find there is not much of a difference in size between the fish in different containers.

The scientists conclude that their hypothesis incorrect. The experiment was inconclusive. Container size did not appear to affect the size of gold fish. The scientists recommend repeating the experiment with a different type of fish or making the aquarium sizes even more varied in size.

**Recording fall times of objects with different weights**

Does exposing dropping objects with varying weight from the same height affect how fast they will fall to Earth?

The scientists research the role of gravity in pulling objects to Earth, and find that gravity accelerates all objects on earth at around 9.8 m/s2.

If different weight objects are dropped to earth from the same height, then they will all hit the ground in the same amount of time because gravity accelerates all objects at the same rate.

The scientists gather 10 different solid, round objects, ranging from 10 grams in mass to 1 kg in mass. They drop each of these objects from a height of 1 meter, then at a height of 2 meters. They use a stopwatch to record the fall time for each object and repeat the trials 3 times.

The scientists chart average fall time for each object. All of the objects took the same amount of time to hit the ground when dropped from 1 meter, and also took the same amount of time to hit the ground when dropped from 2 meters.

The scientists conclude that their hypothesis and reasoning was correct. Gravity affects all objects on Earth the same, regardless of their mass.

**Determining how much iron you can pick up with different amounts of magnets**

Will changing the number of magnets affect the mass of iron you can pick up?

The scientists research magnetism and the magnetic properties of the element iron.

If more magnets are used to pick up iron, then a greater mass of iron can be picked up because the magnetic force of the magnets will increase as you add magnets.

The scientists pick up iron with 1-6 magnets, repeating each trial 3 times and recording the mass for each trial. They average their data from each trial and create a line graph that compares the number of magnets vs. the mass of iron picked up for each number. The graph shows that the largest mass of iron was picked up with 6 magnets, and the mass went down as you decreased the number of magnets.

The scientists conclude that their hypothesis was correct. The more magnets, the stronger the magnetic field, and since iron is attracted to magnets, more iron can be picked up with a larger number of magnets.

**Does chewing gum affect memory?**

Does chewing gum affect memory?

The scientists research concept of memory, and how memory can be measured. They also research any information about how gum affects brain activity.

If students are given gum during a memory test, they will have on average higher results than without chewing gum because gum increases brain activity.

The scientists gather 4 classes of 20 students. The entire class is given a memory test without gum. Each classes results are averaged. The next day, one class takes another memory test, again without gum. The three other classes take a similar memory test, this time while chewing gum. The scientists calculate the change in average test scores from test 1 to test 2. They find that the average test scores in the class without gum stayed the same, while the average test scores in the class with gum went up by 10%.

The scientists conclude that their hypothesis was correct. Gum does increase test scores on a memory assessment. Since the class average without gum did not improve and all 3 classes who were given gum improved their scores, the scientists accept their hypothesis.