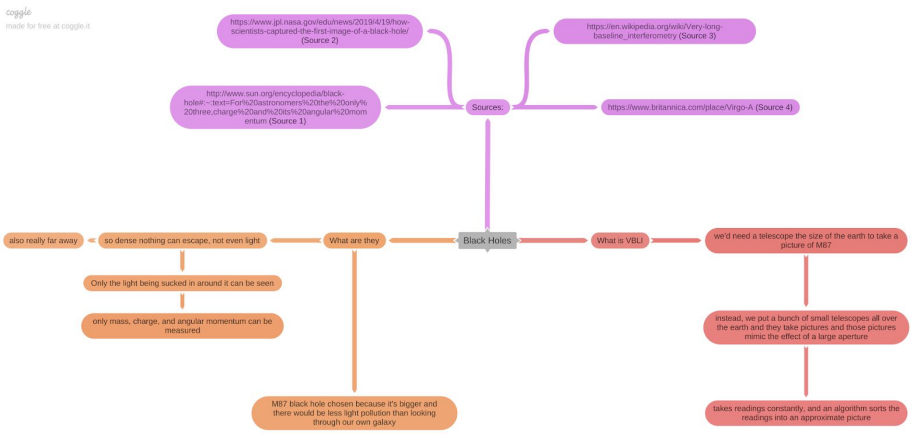
1.
    a. Scientists use the orbits of stars to calculate the mass of the object at the center of the galaxy. The object's mass is so large that it has to be a black hole.
    b. Epidemiologists calculate the number of new infections resulting from one infected person. This is called the reproduction parameter, or R0.
    c. According to Newton's Laws of Motion, objects with different masses and shapes will accelerate at the same rate when dropped.
2.
    a. • Ten tomato seedlings are obtained • A patch in the garden is reserved with space for all ten • A photo-sensor can be used to determine the light level at each spot in the patch • Each tomato plant is given a different amount of water per day • This whole process is done during the summer when the amount of sunshine is maximized • The growth of each plant per day is recorded
    b. First, ten tomato seedlings are obtained. A patch in the garden with varying light levels is prepared for the new plants. Once the seedlings are planted, the light level for each seedling is measured using a photo sensor and recorded. Each day, the growth of the tomato plants is recorded, and a different amount of water is given to each plant. This experiment is conducted during the summer to allow for maximum sunshine and warmth. Using these variables, the optimum growing environment of tomato plants can be found.
3.
    a. Black holes are objects in space with so much mass that they create a hole in the fabric of space, drawing in everything, including light, and allowing nothing to escape [1]. Because of this, and because of the distance between the earth and the closest supermassive black holes (the black hole used in this study, M87, is 55,000 light years away from the earth [4]), taking a picture of a black hole has been incredibly difficult. In order to take a picture of an object that far away, scientists would need a telescope with an aperture the same size as the earth [2]. This is impossible, so instead a technology called Very Long Baseline Interferometry (or VLBI) was used. VLBI uses a grouping of smaller telescopes to act as a much larger virtual telescope [2]. The telescopes took radio readings of M87 simultaneously, and these readings were pieced together by a computer algorithm to create the very first image of a black hole [3].
    b. http://www.sun.org/encyclopedia/black-hole#:~:text=For%20astronomers%20the%20only%20three,charge%20and%20its%20angular%20momentum (Source 1)
    https://www.jpl.nasa.gov/edu/news/2019/4/19/how-scientists-captured-the-first-image-of-a-black-hole/ (Source 2)
    https://en.wikipedia.org/wiki/Very-long-baseline_interferometry (Source 3)
    https://www.britannica.com/place/Virgo-A (Source 4)

c.



4.

a. When born, the baby was both heavy and long.
b. The baby grew quickly. By the time she was 1 year old, she was much longer.
c. Radio transmission was slow between the earth and the moon
d. The hiker's average speed was moderate, as she completed the 60 km trail in 4 days.

5. Walk into the kitchen, past the island, and turn slightly to the right to face the fridge. Open the right door of the fridge and take the tomato soup and the mustard from the middle shelf in the door, the sliced cheese from the top drawer, and the butter from the little drawer at the top of the drawer. Close the right door, and open the left door (the freezer), and take out the sliced bread loaf. Close the left door, and turn to the right.walk forward until you reach the cabinets underneath and slightly to the left of the stove. Open the pair of cabinets closest to the stove and take out the small blue soup pot and the square ridged pan. Place both on the stove. Pour the soup into the soup pot and turn the stove on medium heat. While the soup is heating, open the cabinet above and directly to the right of the stove and take a plate. Put two slices of bread on the plate, and then put the plate into the microwave, directly above the stove, for 20 seconds. Put mustard on the bread to taste, place cheese on also to taste, and then put the sandwich together. Microwave the sandwich in increments of 30 seconds, until the cheese is slightly melted. Then spread butter on the side of the sandwich that is facing up, and use a spatula from the blue vase to the left of the stove to put the sandwich on the square pan, with the butter side down. Immediately butter the other side of the sandwich, and turn the stove to medium-high heat. Take a wooden spoon from the same vase as the spatula, and stir the soup while waiting for the sandwich to grill. Add salt, basil, and garlic to taste, stir the soup again, and then flip the sandwich over. Once the soup is as hot as you would like it to be, turn the heat off and pour the soup into a bowl. Continue grilling the sandwich until both sides are toasted a golden brown with dark lines from the ridges of the pan, and the cheese is melty. Turn off the heat, use the spatula to put the sandwich back on the plate, and cut diagonally. Enjoy by dipping your grilled cheese into your tomato soup.

6.

a. The acceleration due to Earth's gravity (g) was measured with a pendulum. First, the length of the pendulum was measured to be 20 cm. Second, the pendulum

was hung straight down, and the bob was displaced 5 cm to the viewer's right. The pendulum was released, and the number of times it returned to the same position was recorded as it swung back and forth for one minute. It was calculated that it returned to its original position every 0.90 seconds. The results were interested into the formula predicted by Newton's Laws. The result for g was 9.81 m/s2.

b. The average horizontal distance bacteria travel after a person sneezes was measured. First, a sample of 20 infected people was gathered. The height of each subject was required to be within 6 inches of 5 feet 6 inches tall. Second, petri dishes were arranged in 0.5 meter intervals out to 10.0 meters on the floor in front of the subject. Third, once each subject felt the urge to sneeze, the subject was required to aim the sneeze down the line without covering their mouth.The trials were conducted in a room with no air conditioning, and therefore no air flow. Fourth, bacterial colonies were allowed to grow in the dishes for one week under ideal conditions.The category of dishes with the largest colonies were the ones corresponding to 8.0 meters.The results show that when a person sneezes, it is possible to spread infection to someone who happens to be 8.0 meters away. These results inform the epidemiology of spreading bacteria.