Midterm 1

1.)

1.

A. Knowing the orbits of the stars around the center of the galaxy, scientists use them to calculate the mass of the object at the center of the galaxy. The mass of the object is too high to be anything other than a black hole.

B. Epidemiologists the reproduction parameter, R0, which is the number of new infections resulting from one new infected person.

C. According to Newton's Laws of motion, objects that have different masses and different shapes would still accelerate downward at the same rate.

2.

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The first step in starting the tomato garden is to acquire the seeds and space for them. The entire process must be done during summertime to maximize survival rate of the plants. Secondly the plants must be monitored by photo sensors to ensure proper light levels are being attained. Lastly the tomatoes must be watered daily with the proper amount.

2.)

Icecube Neutrinos are subatomic particles that were created in the first second of the universe, and have been continued to be created by nuclear reactions. They are used to detect a supernova before it is visible, giving telescopes to predict its location when visible. The detectors are located between 1500 and 2500 meters deep in the Antarctic ice, and take up close to a square kilometer due to the needed spacing. The reasoning for their location is due to the pressure being able to eliminate air bubbles from interrupting the detectors. The Icecube Neutrinos have resulted in detecting supernova and gamma rays giving scientists more information to look at. In conclusion, Icecube Neutrinos have been successful in detecting

supernovas, and gathering more information in this field, as well as providing radiation levels from gamma rays.

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3.)

1.

The baby was 11 pounds when born.

The baby grew really fast, at one she is 36 inches tall..

Radio transmission took a month between the Earth and the Moon.

A hiker walked a 60 km trail in 4 days, making her average speed 0.625 mph.

2.

Starting facing the refrigerator, you will open it and look at the right bottom shelf. Next to each other in that location there will be a jar of jelly as well as a jar of peanut butter. Grab both of those jars and place them on the cutting board, left of the fridge. From the cutting board you will look straight and open the cupboards. On the top shelf there is a loaf of bread, with this loaf of bread you will use two slices. Grab two slices and return the loaf back onto the shelf. Now from the same location you will turn 180 degrees. There is a small drawer directly in front of you, in that drawer is a stack of butter knives. Grab one of the knives, close the drawer and turn another 180 degrees back towards the cutting board. Open each of the jars spread, use the knife to spread peanut butter on one slice of bread, and jelly on the other. Finish the sandwich by placing the slices so that the jelly and peanut butter are facing each other. Next to the cutting board there are paper plates, place your sandwich on one of them. Turn 90 degrees counterclockwise and place the dirty knife into the sink, and put the jars back where they were. Then enjoy.

4.)

1.

Acceleration of Earth's gravity, g, was measured with a pendulum. First the length of the pendulum measured to be 20 cm. Second the pendulum was hung straight down and dthe bob was displaced 5 cm to the right. The pendulum was released and recorded the number of times it returned to the same position. The calculations showed that it returned to its original position every 0.90 seconds. The results were inserted into the formula predicted by Newton's Laws, and g resulted in 9.81m/s^2.

2.

The trials were conducted in a room with no air flow. The average horizon- tal distance bacteria travel after a person sneezes was measured. A sample of 20 infected people were gathered. When the subject felt the urge to sneeze they were directed to sneeze straight down the line. Each subject was required to be within 6 inches of 5 feet 6 inches tall. Petri dishes were arranged in 0.5 meter intervals out to 10.0 meters on the floor in front of the subject. Bacterials colonies were allowed to grow under ideal conditions for one week. The results inform the epidemiology of spreading bacteria. Results showed that it is possible to spread infection to someone who happens to be 8.0 meters away.