# MID TERM ASSIGNMENT

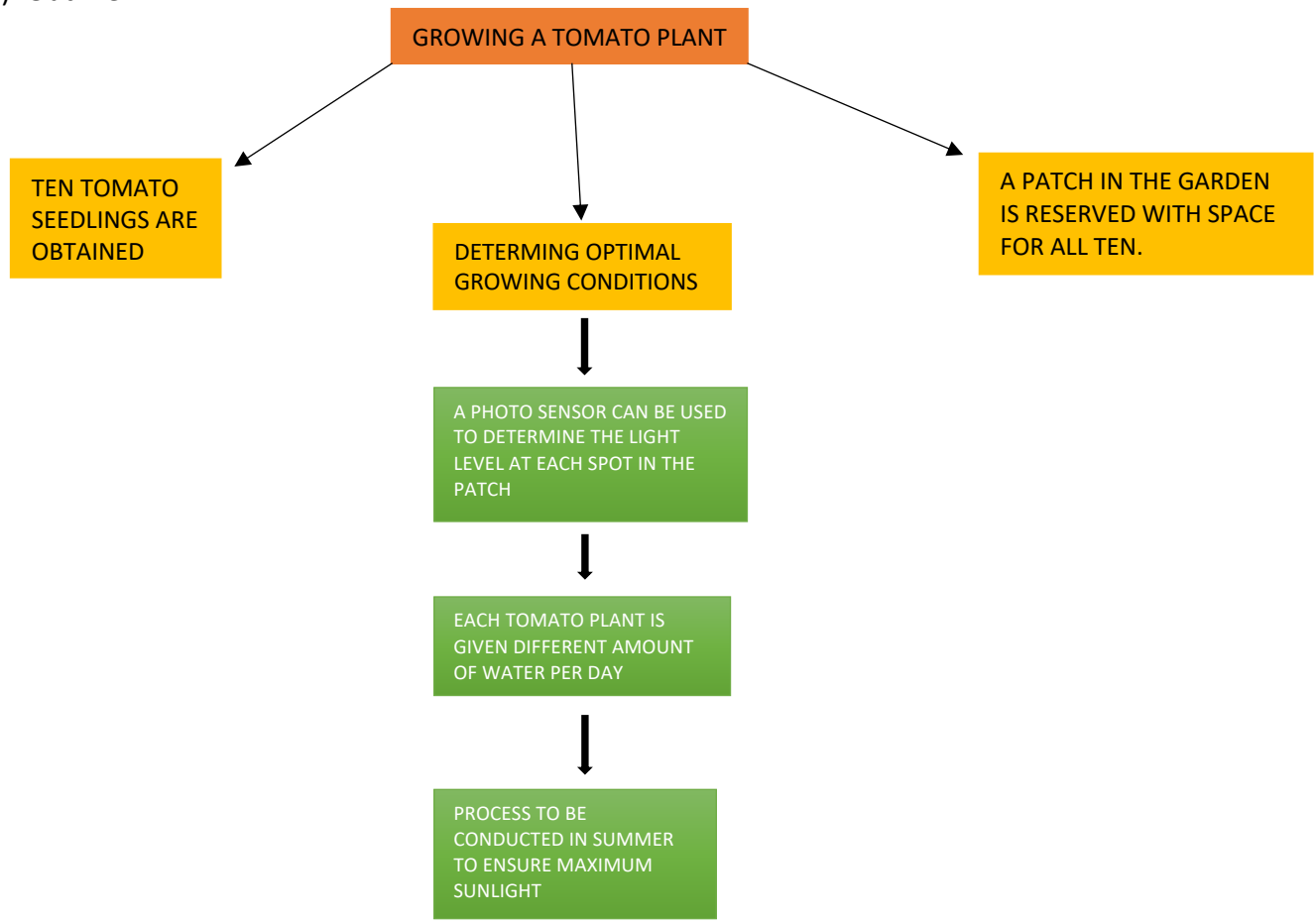
**WEEK 1-**

1)A- Knowing the orbits of the stars, scientists can calculate the mass of the object in the center of the galaxy. The mass of the object is so large that it is of a black hole.

B- Epidemiologists use a reproduction parameter, R0, that is the number of new infections resulting from one new infected person.

C- According to the newton's law of motion, things that have different masses and shapes would still accelerate downward at the same time when dropped.

2). Outline –




Paragraph-

Tomatoes are plants grown in mid-warm weather and soil conditions, with temperatures from 65-75 degrees. In order to grow a tomato plant, ten seedlings can be obtained to start off with and keep ample space for the seedlings should be created in the garden with appropriate amount of spacing between them. Before putting the seeds into the soil, the optimal growing conditions such as lighting and water systems should be determined and

taken care of before in order to ensure proper growth of the plant. After seeding the plants, they should be monitored carefully for at least 6-8 weeks before the initial harvesting stage to make sure the crops aren't damaged by any pests. Wait for another week before harvesting as the tomatoes ripen and climate becomes warmer.

**WEEK 2-**

The COVID-19 pandemic has infected millions of people with no clear signs of abatement owing to the high prevalence, long incubation period and lack of established treatments or vaccines. Vaccines are the most promising solution to mitigate new viral strains. The genome sequence and protein structure of the coronavirus were made available in record time, allowing the development of inactivated or attenuated viral vaccines along with subunit vaccines for prophylaxis and treatment. An important consideration for vaccine design is safety. Many vaccines rely on immunological presentation of whole structural motifs, for example, full-length S protein, which will present a large repertoire of potent epitopes leading to a broad spectrum of antibody and cellular responses. However, earlier studies on different vaccine candidates have pointed to risks of antibody-dependent enhancement (ADE) of infection. In the former, presence of non-neutralizing antibodies contributes to increased infections whereas the latter can lead to life-threatening allergic inflammations. While there is no clear evidence yet, immunological data from patients may point toward possible ADE for COVID 19, suggesting that high IgG correlate with worse outcomes. Therefore, developing peptide epitope vaccine strategies targeting the SARS-CoV-2 S protein may yield a safer vaccine.

Sources-


1. Iwasaki, A. & Yang, Y. The potential danger of suboptimal antibody responses in COVID-19. *Nat. Rev. Immunol.* **20**, 339–341 (2020).
2. Peeples, L. News feature: Avoiding pitfalls in the pursuit of COVID-19. *Vaccin. Proc. Natl Acad. Sci.* **117**, 8218–8221 (2020).
3. Zhang, B. et al. Immune phenotyping based on neutrophil-to-lymphocyte ratio and IgG predicts disease severity and outcome for patients with COVID-19,(2020).


**WEEK 3-**

I)

1. When born, the baby weighed 12 pounds and was 2.5 feet long.
2. The bay grew really fast, by the time she was 1 year old, she was 3.5 feet
3. Radio transmission took 5 years between the earth and the moon.
4. A hiker walked the full 60 km trail in 4 days, making her average speed 0.625km/hr.

II) In order to cook Lemon and pepper chicken we will grab and collect all the ingredients required for it. We start off by taking out the chicken breasts kept in the refrigerator and put it aside on the counter to cool down for 15-20 minutes while we chop 4 cloves of garlic kept next to basil and parsley plants and pluck a few leaves off them as well and rinse it thoroughly, then we go to the shelf next to the oven that opens vertically to the top and

take out 1 cup of flour, paper towels, and 2 lemons kept next to it. Now let's start by thoroughly drying the chicken with paper towels. Generously seasoning it all over with salt and pepper.
Now, let's heat 2 table spoons of olive oil in a pan kept next to the stove over medium-high until shimmering. Working in batches if needed, add the chicken and sear until deeply browned on the bottom, 6 to 7 minutes. Flip with tongs and sear the other side until browned, 6 to 7 minutes. Transfer the chicken to a plate; set aside.
Reduce the heat to medium and add the butter. When melted, add the garlic, 1/2 teaspoon salt, and 1/4 teaspoon pepper and cook, stirring occasionally, until just starting to soften, about 1 minute. Add the flour, stir to evenly coat the garlic, and cook for 1 minute more.
Stir in the half-and-half or milk and broth until no lumps from the flour remain, making sure to scrape up any browned bits from the bottom of the pan. Bring to a boil. Reduce the heat to a simmer. Return the chicken to the pan and simmer until the sauce is thickened enough that it coats the back of a spoon and the chicken is cooked through, 3 to 4 minutes. Stir the lemon juice into the sauce. Garnish with the parsley, basil and lemon slices and serve immediately.

**WEEK 4-**

1. 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 5cm to its left. The pendulum was released and as it swung back and forth for a minute, the number of times it returned to the same position was recorded. It was calculated that it returned to its original position every 0.90 seconds. The following results was inserted into the formula predicted by Newton's Laws. The result for *g* was 9.81 m/s^2.

2. 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. The trials were conducted in a room with no air conditioning and therefore no airflow. 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. Fourth, bacterial colonies were allowed to grow in the dishes for one week under ideal conditions. The average horizontal distance bacteria travel after a person sneezes was measured. 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's possible to spread infection to someone who happens to be 8.0 meters away. These results inform the epidemiology of spreading bacteria.