Tina Yetukuri

Walton High School

Aquaponics project includes components like fish tanks, mechanical filter, biofilter, pumps and requires plumbing techniques to integrate these components as a system. Before installing an aquaponics system we should make a descriptive field investigation to make sure that the site is suitable in terms of stability; proper shield to wind, rain, and snow and an exposer to sunlight and shade. It is advisable to build the system in its final location as it involves many components and tools to be used to integrate we must follow certain safety standards during the build. The most important safety rule is; Follow the instructions from start to finish! Always maintain the safety equipment on the site and use posters to specify the location of the safety equipment and how to use it. Follow the dress code like: covered shoes, long pants, and keep your hair up. Make sure you wear protective gear as needed like lab coat, safety googles, gloves, hearing protection and other items.

The project requires good computation and estimation skills.Building an aquaponics system requires estimation skills to analyze data and develop a reasonable explanation. The shape and depth of the media bed is very critical in an aquaponics system. The standard shape is rectangular with a width of about 1 m and a length of 1-3 m. The depth of the media bed depends on the type of vegetables that are grown. If we change the size of the bed, the design stability has to be reassessed. A variable here is the depth of the bed which varies between 15-30 cm. This depth is the critical mass of the media and should be properly accounted to make sure that the media is stable and sustainable. Depending on the amount of media filled in the media bed the sump tank should be designed. In general the sump tank design should be at least 70% of the total media bed volume.

Scientific inquiry must be used to find what is best for the system. The choice of medium must be inert, not dusty, non-toxic, and neutral pH. Looking at many possible media; the volcanic gravel, lime stone, light expanded clay aggregate are the most suitable media. The volcanic gravel has the most surface area, neutral pH, long life span, and supports the plant. Lime stone has less surface area, basic in pH, long life span. Light expanded clay aggregate has better surface area, neutral in pH, long life span, with medium support for plants. (Noam, 2014)

Prokaryotic cells lack membrane bound organelles and are unicellular organisms, which reproduce through binary fission. Organelles in a prokaryotic cell are cell wall, cytoplasm, plasma membrane, cytoplasm region or nucleoid region, ribosome, plasmids, pili and flagella. A cell wall provides strength and rigidity to the cell and it is permeable to solutes. Cytoplasm helps in cellular growth, metabolism and replication. Ribosomes play a vital role in protein synthesis as they consist of protein and RNA and are attached to the endoplasmic reticulum. Eukaryotic cells are membrane-bound organelles, which have a multiple membrane-bound organelles to carry out specific cell tasks. Some of the main organelles in a eukaryotic cell are cell wall, cytoplasm, mitochondria, chloroplasts, and vacuoles. The cell wall helps in protecting the plasma membrane and plays a vital role in supporting and protecting the cells. Mitochondria is where energy is stored and used. Enzymes function as a catalyst by speeding up the reaction by lowering the activation energy. The four macromolecules are carbohydrates, proteins, lipids, and nucleic acids. The functions of each of these macromolecules are: carbohydrates is being used for energy production during cellular respiration, proteins provide structural support for things like hair and nails, lipids are used for long term energy storage and the fluidity of the cell membrane, and nucleic acids is used for storing and transferring genetic information. Water is required by living organism to maintain osmolality in the cells with respect to the environment. (Utah LessonPlans, 2014)

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LessonPlan,U.(2014, October2).Retrievedfrom

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