Mālama 'Āina Foundation

Mahope O Ke Kula Ke A'o Mau Ana Program

Name: _____

Date:_____

Birth Date: _____

Zip Code: _____

School:_____

A Different Kind of U-Tuber

Lesson 1. ʻUala

He ʻuala ka ʻai hoʻōla koke I ka wī

The sweet potato is the food that ends famine quickly

(ʻŌlelo Noʻeau No. 946)

ʻUala is a general term for any kind of sweet potato. It was the second most cultivated food in old Hawaiʻi, with kalo being the first. It is known as a canoe plant, as it was brought by the first Polynesian settlers who arrived by canoe in Hawaiʻi. ʻUala planters used many names and descriptors for the different varieties of ʻuala, the shape of the leaves, the color of the leaves and vines, and the type of tuber produced by the plant.

There are several benefits to planting ʻuala as opposed to kalo, however kalo is usually the preferred meaʻai (food). ʻUala can be grown in less favorable sun and soil conditions than kalo. Clay-like soils are the only soils that ʻuala struggles to thrive in. ʻUala also grows very quickly. It takes 3-6 months to produce food, whereas kalo can take between 9-18 months. ʻUala also takes less effort to plant and maintain.

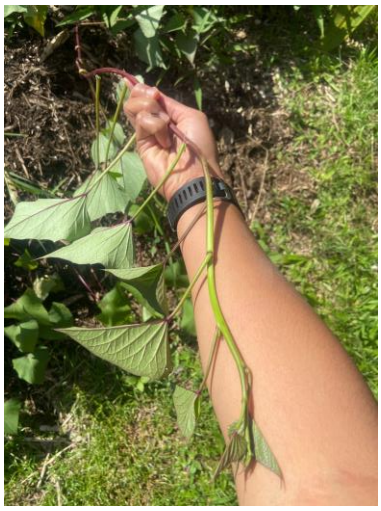
Most people are familiar with eating the tubers, which are the part typically sold in stores. The nutrients found in ʻuala tubers such as Vitamin A, calcium, and phosphorus are found near the skin, so they were typically consumed with the skin still on. Sometimes the tubers were masked into ʻuala hoʻomalamala which had a similar texture to poi. This mixture could also be combined with water and fermented, to create ʻuala ʻawaʻawa or sweet potato beer. The leaves and stems could also be eaten, so nothing was wasted.

ʻUala had many uses in addition to being a nutritious food source for people. The leaves, stem, and sap were used to treat many different ailments. Some varieties could be used to treat and sometimes cure early forms of asthma. It could also be used as a laxative or made into a sore throat tonic. Lawaiʻa (fishermen) used a specific variety of ʻuala as bait when catching ʻopelu. The dried ʻuala leaves and vines were used as padding, when making lau hala or makaloa mats.

The ʻōlelo noʻeau above describes ʻuala as “the food that ends famine quickly”. Why do you think ʻuala is described this way? Use information from the passage to support your claim.

Mahope O Ke Kula Ke A‘o Mau Ana Program

Lesson 2. Propagation of ‘Uala

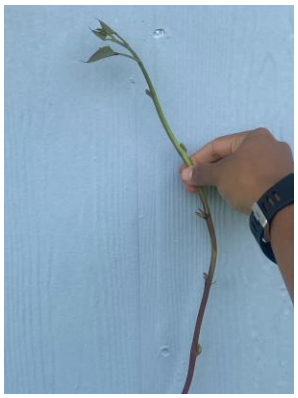


Preparing the Lau ‘Uala

‘Uala is propagated using vine cuttings/slips which are called lau ‘uala. To harvest the lau ‘uala, you can cut a12-20 inch long piece from the end of the vine. To measure this, you can use your ha‘ilima which is the measurement from your fingertips to your elbow. After collecting 2-3 lau ‘uala, you want to carefully remove, or snip off, all of the leaves except for the last three near the mu‘o, which is the leaf bud at the tip of the lau ‘uala.

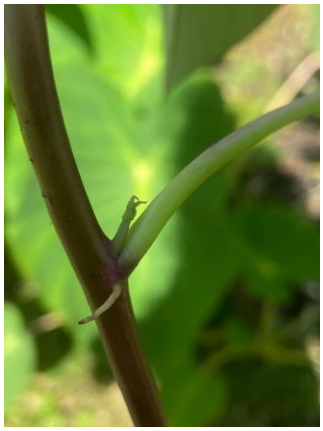
It is better to collect the lau ‘uala when it is not too hot outside. Doing so is said to stunt the growth of the plant, producing less ‘uala tubers.

When to Plant



Planting the lau ‘uala can happen right after they have been collected or up to 3 days after they are taken, as long as they are kept damp and protected from the sun‘s rays. It is best to plant lau ‘uala early in the morning or later in the afternoon when the heat from the sun is not as significant. The best moons for planting lau ‘uala are Hilo, Hoaka, the Kū moons, Huna, Mahealani, and Akua. These moons are said to yield the best results for ‘uala crops. As is with the most, it is meakanu, not recommended to plant on any ‘ole moons because ‘ole means nothing, which implies that you will get little to nothing from the crop planted on those days.

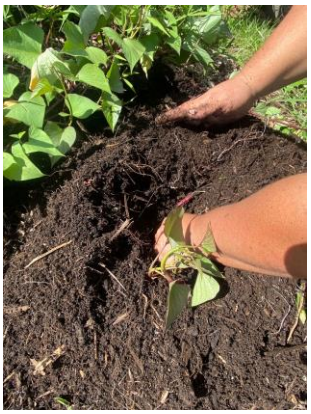
How to Plant



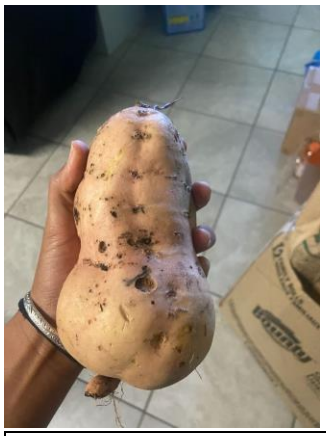
The most practical way to plant ‘uala is to use pu‘e. These are small mounds that are low to the ground. Higher mounds, called pu‘epu‘e, can be used in areas that receive a lot of rain to help with drainage. After creating these pu‘e, plant 2 or 3 lau ‘uala in a hole that is dug 6 to 8 inches down. You can plant them vertically or horizontally, as long as the mu‘o is sticking out of the ground. Cover the rest of the lau ‘uala and give the pu‘e a good watering. Occasional watering may be needed as the ‘uala grows. Be careful not to disturb the roots of the ‘uala itself. As the vines grow longer and longer, twirl them around the center where they were originally planted. Some mahi‘ai will then cover the vines with soil to encourage the plant to put its efforts into producing more tubers rather than vines, but this is optional.

Be careful not to rip the maka or buds that are found at the end of each ha or petiole.

Harvesting



You can harvest the ‘uala around 3-6 months after planting it. You can start by pulling up all the vines and finding the center. Huki or pull the vines up until they come out of the ground. It should come up in one bundle. After you‘ve pulled the vines out, sift through the pu‘e to find the hidden ‘uala tubers.



He ‘uala ka ‘ai ho‘ōla koke I ka wī

Respond to Reading

Directions

Respond to the questions below. Underline and identify specific lines from the passage that support your claim.

Which moons are best for planting ‘uala?

How can pu‘epu‘e help the growth of ‘uala?

Which conditions are best for harvesting lau ‘uala? Which conditions should be avoided?

Lesson 3. Environment and Plant Growth

Question: How does a plant's environment affect its growth?

Experiment: Comparing the planter box to _____

Procedure:

For this experiment, you will be comparing the growth of 'uala in the planter box to a method of your choice. You will be compare the length of your 'uala vines and the length after a periu. In order for this experiment to be accurate, certain elements need to remain consistent. Determine your controlled elements before conducting your experiment.

Materials:

Use the empty spaces below to note any additional materials you may need to conduct your experiment.

- ❑ Planter Box
- ❑ Lau 'Uala (At least 2-3 per sample)
- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____

Controlled Elements:

Date/Time Planted: _____

Moon Phase: _____

Length of lau 'uala (inches): _____

Amount of lau 'uala planted: _____

Lesson 4. Plant Adaptations

There are five vital components of a successful plant: air, light, warmth, water, and nutrients. Without one of these components, it is unlikely for a plant to grow successfully. Plants grown in the dark with grow tall searching for light, but will eventually weaken. Losing access to water will cause a plant's stem and leaves to dry up. If the ground is cold, a seed will be unable to germinate and grow into a healthy plant. Because of these requirements, some plant species have adapted to survive in harsh environments. Some plants will go dormant during the winter months and shed their leaves. This is because they are unable to take in ice in the same way they would take in water. In areas such as the Arctic, where temperatures are cold year-round, plants have adapted to grow closer to the ground or in shapes that help them to shed the heavy snow. Plants in desert habitats have adapted to cope with the lack of water. The best example of this phenomenon is the cactus. The cactus adapted to have thick skin and large stems that can store water while reflecting the heat.

Respond to Reading

Directions

Respond to the questions below. Underline and identify specific lines from the passage that support your claim.

The pine tree is an example of a tree that can survive cold temperatures. Which traits of this tree help it survive harsh snowy conditions?

Plants have adapted to survive different conditions, but do they still require the same components to survive?

Lesson 5. Climate Change and Plant Growth

Most organisms are affected by climate change and plants are no different. Scientists predict that plants growing in North America, Europe, and Central America will actually consume more water in the future because of climate change. The reason for this is that increased carbon dioxide means that plants require less water for photosynthesis, this means that there will be more water in the soil and in streams. However, global warming also means longer, warmer seasons. This gives plants more time to grow and consume more water. This will eventually dry the land. This type of environment causes plants to grow larger leaves because of amped up photosynthesis. The increased surface area leads to increased evaporation. Scientific models show that increased evaporation from leaves will affect levels of runoff and soil moisture. Earth's water cycle is regulated by plants, which is why changes in photosynthesis can cause so many other environmental changes. It is for this reason that climate change is referred to as a domino effect.

Respond to Reading

Directions

Respond to the questions below. Underline and identify specific lines from the passage that support your claim.

Climate change has been described as a domino effect. What are some examples of this phenomenon occurring?

Why would scientists be concerned about the effects climate change is having on plants and photosynthesis?

Lesson 6. Necessary Resources

Humans and plants have more in common than we realize. Both organisms require food and water in order to survive and thrive. Another factor that influences the survival of both humans and plants is environment. For example, if a cactus was planted in an arctic environment, the cold temperatures would cause stress for the plant and it may not grow. The same is true for humans. When a person is in a stressful environment, they may not have the desire to care for themselves or do the activities that they enjoy. They may also avoid sleeping because they are too worried about the problems they are facing. When levels of stress are this high, it can start to affect a person‘s health. For this reason, you should remove yourself from stressful environments before they become unhealthy. It is important to remember that stressful environments are not just places, but also stressful situations. For example, if you are overwhelmed with school work to the point where you skip meals and lose sleep. When you are facing this type of situation, it is best to take steps to avoid making things worse. Sometimes this means discussing your work load with a teacher you trust, sticking to an eating and sleeping schedule, or taking a break to do something you enjoy. If the environment is dangerous for yourself or someone involved, it is better to be safe than sorry. Seek out a trustworthy person who can get you the proper help.

A friend is upset that you aren‘t spending time with them. The reason why you don‘t have time is because you are overwhelmed with assignments for school and taking care of your siblings. What is a healthy way of addressing this problem?

Think of a stressful situation that you are currently facing, what are some strategies you can use to keep it from becoming unhealthy?

Lesson 7. ‘Oli Pale

This is a chant that asks for protection over the area which will be cultivated and soon become the māla (garden). It also asks for protection for those who will till the soil, kanu(plant), mālama (maintain) the māla, ‘ohi (gather, harvest, pick) what is grown in the māla, as well as everything that the māla produces.

Noho ana Ke Akua i ka nāhelehele	God dwells in the forest
I ‘ālai ‘ia e ke kī‘ohu‘ohu	Hidden away by the mists
I ka ua koko	And low-lying rainbow
O nā kino malu i ka lani	And those bodies protected by the heavens
Malu e hoe	Protected to breathe
E ho‘oūlu ana	Giving inspiration,
Ke Akua i kona mau kahu	God to his attendants
‘O mākou nō, ‘o mākou nō, ‘o mākou nō, ā	Namely us

Respond to Reading

Directions

Respond to the questions below. Underline and identify specific lines from the passage that support your claim.

Identify the line from the ‘oli that asks for protection for one of the resources plants need for survival.

Lesson 8. Collect Data

Use the space below to record your findings from the previous lesson.

SAMPLE A (Planter Box)

Type of seed: _____

Planted on: _____

Moon Phase: _____

Length (inches): _____ Recorded on: _____

Additional observations: _____

_____

_____

SAMPLE B (_____)

Type of seed: _____

Planted on: _____

Moon Phase: _____

Height (inches): _____ Recorded on: _____

Additional observations: _____

_____

_____

Sketches

SAMPLE A	**SAMPLE B**

Drawing Conclusions

Reflect on the experiment process and your findings. What changes did you notice with your plants? What are some of the positive and negative aspects of your process? Support answers with data collected from the experiment.

How did the differences between the two environments influence your plant‘s growth?