Service Learning Teacher Institute 2010

"Out-of-the-Box Nutritious Options"

Biology
Anatomy and Physiology of Fruits and Veggies Lab

Introduction
There is a common saying in Biology that states "Structure Dictates Function". This statement is referring to the idea that how something is made or built can tell you a lot about how that something works. For example, if you look at a shark's tooth, you will notice how sharp it is overall, and how the edges consist of tiny grooves, much like a serrated knife. That specific structure allows a shark to rip apart the flesh of its prey. This concept holds true in many fields including architecture, chemistry, medicine and much more.

In today's lab, we will be exploring how this idea operates in living organisms. We have already glimpsed some examples of adaptations in animals that help them to survive better, such as how the funnel in a squid allows it to use jet propulsion to swim away quickly from predators. You can also see survival adaptations in plants, although these are often more subtle and require careful observation and thinking.

Procedure
You will be working in groups of two students. You will be given many examples of fruits and vegetables to observe and study. At the end of this lab you should have a better understanding of plant parts, the roles of these different structures in terms of plant survival and reproduction, and how these parts connect to what we eat.

Part One: Plant Structures
There are four main parts of a plant: **roots, stems, leaves,** and **fruits** (Flowers are another important structure that are an extension of a plant's fruit). Look at Table 1 given at the back of this handout and grab an example of different fruits and vegetables to help you learn about the different plant structures. Record your observations and inferences in **Table 1**.

Part Two: Functions of Different Plant Parts
Now, do some online research to check the inferences you made in Part One. Specifically, read and learn further about the different plant parts. Record your findings in **Table 2** given.

Part Three: Energy and Sugar Storage
Think back to Semester One when you learned about Photosynthesis and Cellular Respiration. You know that plants produce sugars (i.e. glucose) as an end product of Photosynthesis. You also know that plants, like most other living organisms, need sugar for energy to live (but convert it to ATP in order to use it). We all recognize that plants are not mobile organisms so their "lifestyle" is quite different from ours. *So what does a plant need energy for anyway?* Well, for one, plants need energy to produce its structure and parts. For example, it takes energy to produce thorns, to develop a fruit, to create colorful pigments, and to make leaves.

Keeping this in mind, go back to the plant parts we've been studying and think about these plants in terms of the parts that we eat. Complete the **Table 3** as you explore each plant part.

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Part Four: Categories of Edible Plants

Lastly, carry out further research (online) to learn about criteria for different categories of edible plants. Then place the plants we had available in class into the correct categories based on the definitions in **Table 4.**

Name _____

Fruit and Veggie Lab Data/ Observations

Table 1 (Part 1)

Plant Structure	**Examples**	**Observations** *(Write down observations relevant to the specific structures here. For example, if you are looking at a carrot as an example of a root, focus your observations on the carrot/ root part and not on the green leaves that stick out of the ground…)*	**Inferences** *(Write down hypotheses here that relate to your observations. For example, if you notice seeds inside a fruit, speculate why the seeds are contained within the fruit.)*
Roots	*carrots, beets*		
Stems	*celery, rhubarb*		
Leaves	*lettuce, basil*		
Fruit	*apples, oranges*		
(Flowers)	*broccoli, cauliflower*		

Table 2 (Part 2)

Part of Plant	**Other Examples** *(list other examples here that you find in your research that we didn't see in class)*	**Functions/ Other Information** *(based on Internet research)*
Roots		
Stems		
Leaves		
Fruit		
(Flowers)		

Table 3 (Part 3)

Type of Plant	**What part of this plant do you eat?**	**Hypothesize on what this structure may do for the plant in terms of its survival, growth, ability to get energy, or reproduce.** *(for example, "the long roots may help the plant get to nutrients that other plants could not. It also may help it survive better in a drought as it can get to deeper water sources").*
Raddish		
Celery		
Spinach		
Tomato		
Cauliflower		

Table 4 (Part 4)

	Fruits	**Vegetables**	**Tubers**	**Herbs**
Definition:				
Examples Seen in Class:				