

Leaf Me Aloe!

4th Grade

Ted Pavlic

Benchmarks:

- LS-1: Compare the life cycles of different plants including germination, maturity, reproduction and death
- LS-2: Relate plant structures to their specific functions (e.g., growth, survival and reproduction)
- SI-2: Discuss observations and measurements made by other people.
- SI-5: Record and organize observations (e.g., journals, charts and tables)
- SI-6: Communicate scientific findings to others through a variety of methods (e.g., pictures, written, oral and recorded observations)

Objective:

Students will describe similarities and differences between different plants (Venus fly trap, agave, aloe vera, old man cactus, and red top cactus). Additionally, students will speculate about the plants' adaptations to an environment. Students are able to see these first hand.

Materials:

- 5 groups of students
- 5 plants: Venus fly trap, agave, aloe vera, old man cactus, red top cactus
- 5 spray bottles with water in them, possibly adjusted for a sharp stream of water
 - (note: droppers might work just as well, but the extra force behind the stream of water from a spray bottle can be helpful)
- The five labels attached to the end of this document
- The 5-page worksheet attached to the end of this document

Target Concept:

- Students will learn to describe life forms in terms of similarities and differences.
- Students will identify adaptations to unique environments.
- Students will learn about cactus, aloe, agave, and carnivorous plants
- **Teacher: Recall that carnivorous plants** get their nitrogen and other nutrients from their “prey” and are adapted for low nutrient soil. Thus, fertilizing the soil of a Venus fly trap will kill the fly trap; in fact, most fly traps are grown in moss that simply holds a lot of water. Also, **recall that agaves, aloe, and cacti** are all succulents that store water in their fleshy pulp; however, agaves and aloe are not cacti and while aloe juice may be medicinal, agave juice can be an irritant that causes weeks worth of eczema. Note that **the succulent plants are waxy** for two reasons: (1) to hold water in and (2) to force water to quickly bounce or roll down the leaves into the roots or the central root where they can be absorbed (by the very salty roots, which absorb water quickly due to their high salt content). Finally, **note that neither aloe nor agaves** are cacti; they (as well as cacti) are all succulents though.

Initial Introduction:

Introduce the lesson with the name “Leaf Me Aloe.” The lesson is called this because the leaves of plants make those plants unique. That is, when grouped by the leaves, many plants stand alone. Additionally, one of the plants that will be observed is an aloe vera plant.

Arrange five tables for the five stations. Use the labels below on each station and place each plant on its respective label. As you place the plants, introduce them to the students. When introducing the agave, ask an ESL student who knows Spanish to sound out the word. As the students where the plant probably comes from based on its name (answer: Mexico). Point out that you did not know the name of the plant and had to figure it out. Ask the students how someone could find information about an unknown plant. The students will start with answers like “look on the Internet” and “look in a plant book.” Ask them for more details. Ask them what to look for in the plant book. Point out that you looked for a “variegated” and “rosette” (or “rosetta”) when looking for the name of the agave. Explain what these terms mean. Use these as examples of how you might describe plants.

It may be interesting to point out that the red top cactus is actually two different types of cactus that have been grafted together. In fact, sometimes the red tops have been genetically altered (via radiation, for example) not to produce chlorophyll which is what gives them the red color. In these special cases, they would die alone and need the other green cactus in order to survive. It is only possible to do this strange sort of grafting with plants.

It may be a good idea to hint that (1) the venus fly trap is green so it must get its energy from the sun and not from anything it might eat; and (2) the venus fly trap only grows in soils that have very few nutrients and will die if fertilizer is applied to the soil (that is, even a little bit of fertilizer is too much). The students might be able to use this information to figure out why the fly trap catches bugs (and small animals). However, many students may not realize that’s what the fly trap does.

Procedure:

- Setup the tables as described above.
- Have the students start at one table and rotate after 6-10 minutes drawing and describing the plant. If you wish, have them wait to describe what they *think* about the adaptation for later.
- Follow around the class and help the kids come up with ideas. Make sure they write those ideas down. The students will be eager to give ideas audibly but will “forget” to write those ideas down.
- Ask the students about the plants. Why does the old man cactus have spines that hurt (and possibly even detach) when touched? What is the pink thing at the top of the old man cactus? If you’ve already discussed flowers, then speculate about cactus fruit.
- As the students complete more stations, ask them questions comparing the current plant to previous plants that they’ve seen. Aloe and agaves both have rosettes. Cacti, aloe, and agaves have skin that causes water to slide down it to be absorbed by the roots whereas venus fly trap leaves get wet. Cacti is hard, aloe is pulpy and soft, agaves are pulpy and

thin and soft, Venus fly traps have thin leaves that are not pulpy. The Venus fly trap has eyelash-like teeth at the ends of some of its leaves; these are similar to the spikes on an aloe plant (and on an agave if examined very closely). These are some samples.

- At the end of the activity, have the students recall which plants had **leaves, stems, or both**.

Target Observations:

- Similarities and differences between these plants. The students should recall enough about the unique plants in order to talk about adaptations later.

Final Target Concept:

- Different plants are adapted for different purposes. Plants are similar due to a similar history, but they have been specialized for individual environments.

Summary & Discussion:

Students observed different types of strange plants. These observations showed applications of specialized adaptations.

Extensions (Optional):

- Consider following up this activity with the “Amazing Structures” activity from the curriculum guide. “Amazing Structures” compares and contrasts cacti and aloe skin and pulp and uses things like sponges and wax paper to describe adaptations of the plants. It would be easy to come up with your own “Amazing Structures” that takes apart some of these plants to compare their internals. Students probably already have a guess at what the pulpy insides look like.

Venus Fly Trap

Venus Fly Trap

Agave

Agave

Aloe Vera

Aloe Vera

Old Man Cactus

Old Man Cactus

Red Top Cactus

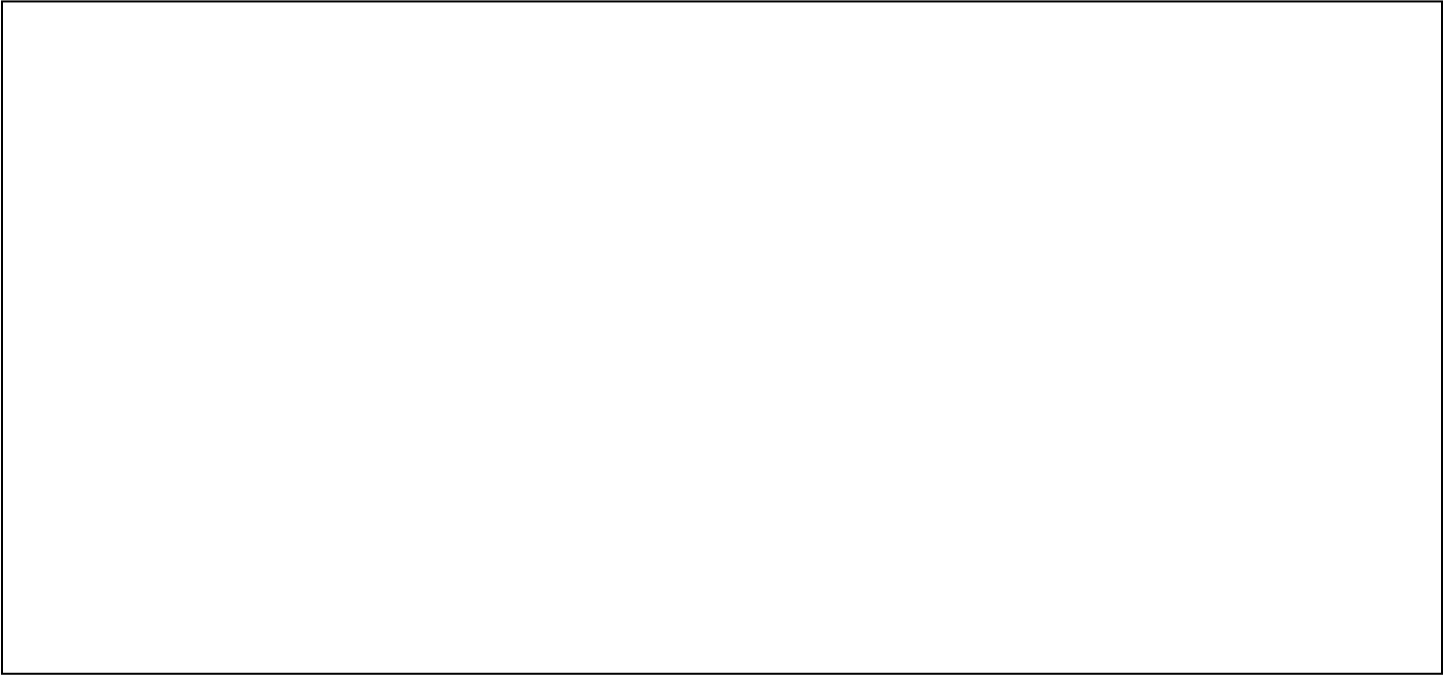
Red Top Cactus

Name: _____

Leaf Me Aloe!

Venus Fly Trap Station

Draw the plant:



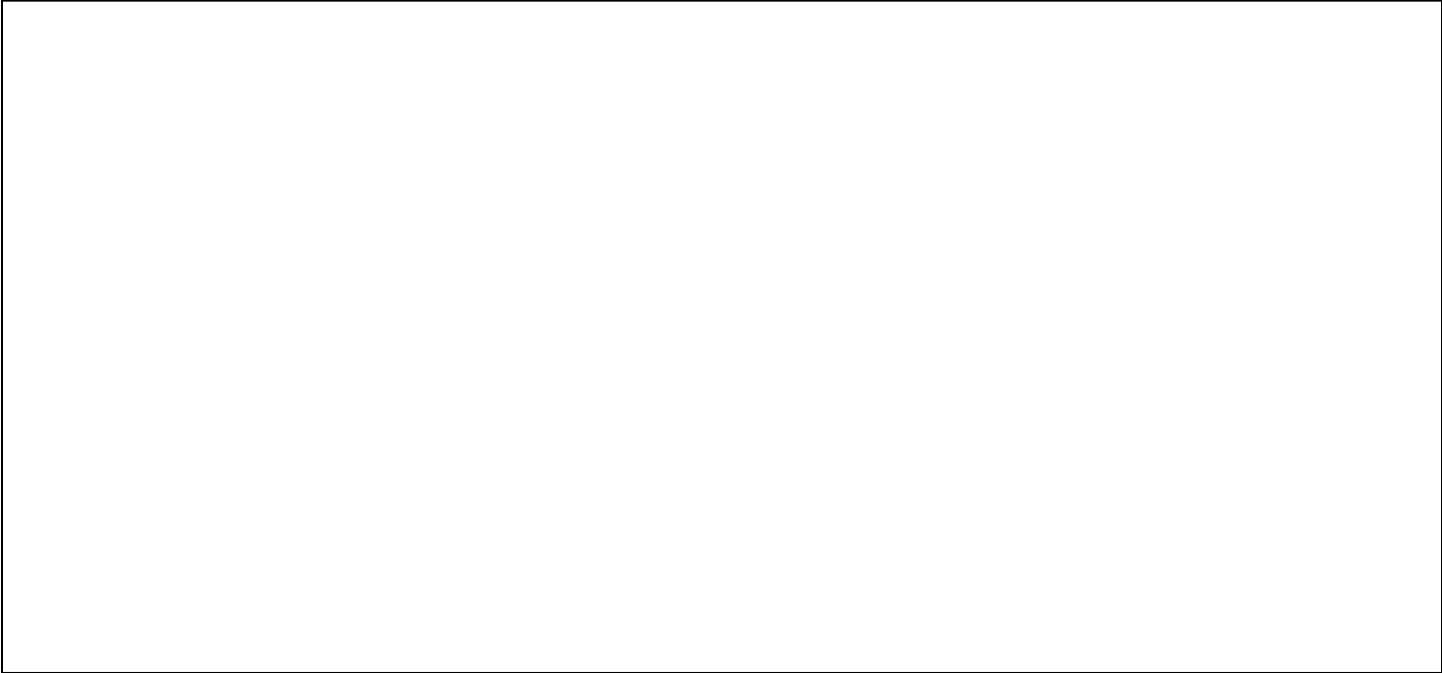
Describe the plant. For example, describe the color, shape, size, and texture of the *leaves*.

How do you *think* the plant uses its *adaptations*? In other words, why do you think the plant looks the way it does?

Leaf Me Aloe!

Old Man Cactus Station

Draw the plant:



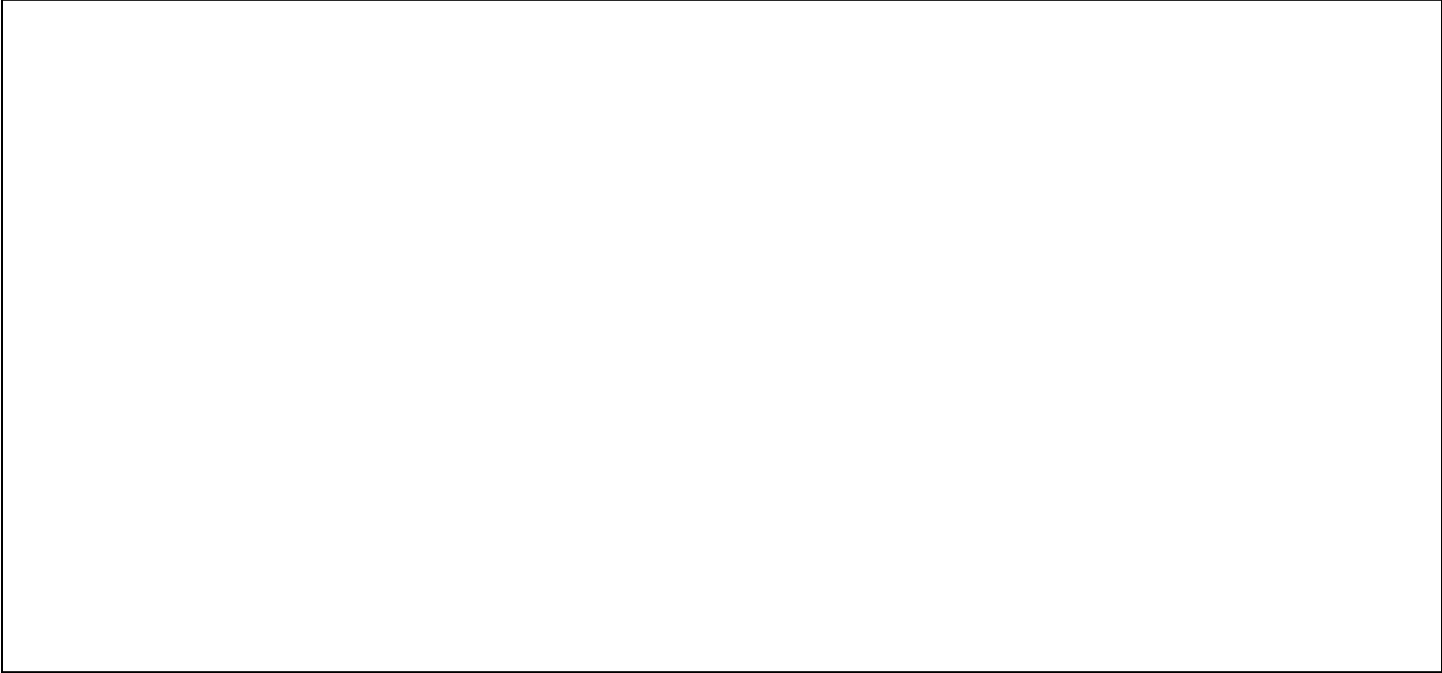
Describe the plant. For example, describe the color, shape, size, and texture of the *leaves*.

How do you think the plant uses its *adaptations*? In other words, why do you think the plant looks the way it does?

Leaf Me Aloe!

Red Top Cactus Station

Draw the plant:



Describe the plant. For example, describe the color, shape, size, and texture of the *leaves*.

How do you think the plant uses its *adaptations*? In other words, why do you think the plant looks the way it does?
