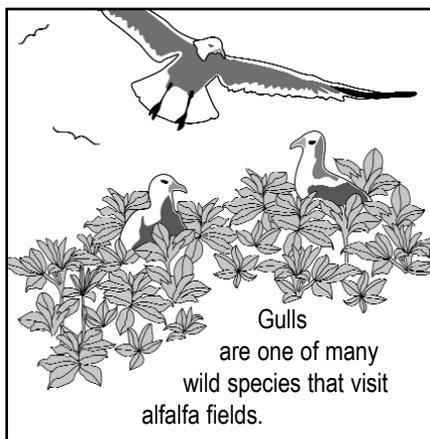


Alfalfa

Information compiled by the California Alfalfa and Forage Association

How Produced – Alfalfa is a perennial crop, which means it will grow for several years after planting. Alfalfa is planted in the spring or fall. Since the seeds are so small (1-2 millimeters), slightly wider than the tip of a pencil lead, they must be planted close to the surface of the soil. Between 15-25 pounds of seeds are planted per acre, which is about the size of a football field. There are about 200,000 alfalfa seeds per pound. After sprouting, the seedlings are relatively weak and must be protected from weeds. However, after developing a "crown," the swollen top of the root, alfalfa plants are vigorous and can re-grow many times after the tops are cut for hay, between three and 11 times per year, depending on the area. Roots can grow deeper than 15 feet. The purple alfalfa flowers are pollinated by bees, whose hives are placed next to fields that are for alfalfa seed production.



Alfalfa is harvested with a swather, which cuts off the crop a few inches above the ground and places it in strips three to five feet wide where it dries in the sun. When the cut alfalfa is dry enough, the hay is raked and a baler is used to gather it up and compress it into a bale. Bales range in weight from 50 pounds to one ton and usually take the shape of small rectangles that can be managed by one person. Large square or round bales are moved by tractors or "squeezes," which are forklifts made specifically for hay. The haymaking process is highly mechanized, and most hay goes from field to barn without being touched by human hands.

Alfalfa can also be made into silage by harvesting the forage and storing it in a silo while it is still moist, where it is preserved in a process called fermentation. Alfalfa is sometimes grazed by sheep and cattle, which means the animals eat it while it is growing in the field. Other times alfalfa is made into small cubes or pellets for easy storage and delivery. Some hay and cubes are exported to other countries such as Japan.

History – Remains of alfalfa more than 6000 years old were found in Iran. The oldest writings about alfalfa are from Turkey, dating 1300 B.C. Alfalfa was probably domesticated near Turkmenistan, Iran, Turkey, the Caucasus regions, and other regions in Asia Minor.

Alfalfa was important to the early Babylonian cultures, and to the Persians, Greeks, and Romans because of its importance for feeding horses used in war. The name "alfalfa" comes from Arabic, Persian, and Kashmiri words meaning "best horse fodder" and "horse power."

The eastern United States colonists, including Thomas Jefferson and George Washington, grew alfalfa on a few acres. However, it was not widely grown in this country until the California Gold Rush of 1849. Horses, beef, and milk

cows were valuable, and everything was animal-powered. From California, alfalfa spread eastward to Nevada, Utah, Kansas, and Nebraska. Today, alfalfa is grown on 23 million acres from coast to coast and is the nation's fourth largest acreage crop.

Varieties – Many alfalfa varieties are available to growers. Those that tolerate freezing are grown in the northern United States and Canada. Other varieties continue to grow during the winter months in areas such as Southern California and Arizona where growers may harvest all 12 months of the year. Alfalfa breeders have developed many varieties of alfalfa that are highly resistant

to diseases and insect pests, thereby reducing the need for pesticides.

Commodity Value – Among United States crops, alfalfa is third in value, after corn and soybeans. Its national value is more than \$8 billion each year, not including the value of dairy or other animal products, which are the final products of alfalfa. In California, alfalfa is planted on more than one million acres and has a value of nearly \$1 billion annually.

Alfalfa is an important rotation crop as it adds nitrogen to soil and improves soil structure for future crops. Unlike other crops, alfalfa does not need nitrogen fertilizer. Nodules on alfalfa roots contain bacteria that take nitrogen gas from the air and convert it to nitrogen plants can use. This process is called nitrogen fixation. The exact financial value of this soil improvement is not calculated, but is significant. Wildlife, including over 130 bird species, use alfalfa fields for food and shelter. For many animals, including endangered species, alfalfa fields are their preferred habitat.

Top Producing Counties – California produces nine percent of the nation's alfalfa hay, harvesting over seven million tons annually. The leading counties in alfalfa hay production are Imperial, Kern, Tulare, Merced, and Fresno.

Nutritional Value – Alfalfa is considered the premier forage of dairy cows. Thus, much of the milk, yogurt, cheese, cream, dried milk and ice cream we eat are connected to alfalfa. Dairy cows today are capable of producing about 60% more milk per cow than in 1970, and these cows need the nutrition that high quality alfalfa hay provides.

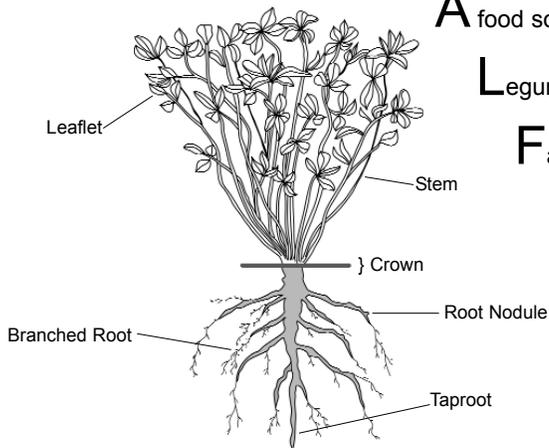
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Alfalfa Activity Sheet

The Benefits of . . .



A food source for dairy cows, beef cattle, sheep, horses, and even zoo animals.

Legumes such as alfalfa convert atmospheric nitrogen into forms that plants can use.

Facilitates soil conservation by reducing soil erosion.

A wildlife habitat for hundreds of animals, including some endangered species.

Lots of open space is created, which provides beauty.

Flowers on the plant make alfalfa honey the main honey crop in the U.S.

A habitat for over 1,000 diverse species of insects, spiders, and mites.

Lesson Ideas

- Make ice cream. Discuss how the milk and cream used depended on alfalfa.
- On a California map, locate the major counties where alfalfa is grown. What geographic characteristics do these counties have in common? How do these help in alfalfa production?
- Research the symbiotic relationship that exists between the bacterium *Rhizobium* and the roots of legumes such as alfalfa. Discuss the importance of symbiosis in biology using other examples from nature.
- Visit the California Alfalfa and Forage Association Web site (www.calhay.org). Read "Alfalfa, Wildlife and the Environment" and discuss what was read.
- Determine the acres of lawn at your school. If those lawns were planted with alfalfa, how much nitrogen would be fixed annually? If nitrogen was worth \$1 per pound as fertilizer, what would be the value added to your school?

Alfalfa Fun Facts

1. True or False? Alfalfa helps make ice cream.
 2. For how many years has alfalfa been domesticated?
 3. Who was the first United States president to grow alfalfa?
 4. About how many alfalfa seeds are in one pound?
 5. How deep can alfalfa roots penetrate into the soil?
 6. In what form do people eat alfalfa directly?
 7. How many different bird species are known to visit alfalfa fields?
 8. True or False? Lots of honey is made from alfalfa.
 9. True or False? Alfalfa is a crop which is cut only once.
- 1) true, the dairy cows eat the alfalfa 2) 6000 years 3) George Washington 4) 200,000 5) over 15 feet 6) alfalfa sprouts 7) over 130 8) true 9) false; alfalfa can be cut from 3-11 times, and can last up to 25 years in the field.

Lesson Plan: It All Began With Alfalfa!

Introduction: Alfalfa contributes to a wide range of nutritious foods that we enjoy every day. Alfalfa is fed to dairy cows and beef cattle. Much of the honey in the United States comes from alfalfa flowers.

Materials: Obtain from school lunchroom, grocery store, or restaurant a collection of the following: cheeseburger, ice cream with chocolate syrup and whipped cream, beef taco with cheese and sour cream, chocolate milk, bread slice with butter and honey, pepperoni and cheese pizza, and a bowl of nutritious cereal with milk.

Procedure:

1. Create seven stations. Display one of the menu items and accompanying food containers at each station.
2. Divide the students into seven small groups and assign each group to a station.
3. Ask the students to closely examine the items, discuss the origin of each food and estimate how many different

components began with alfalfa, and name other plants and animals that contributed to the food. They should write down their thoughts.

4. After a few minutes, have the groups rotate to another station and repeat the procedure. Continue until each group has visited all of the stations.
5. Have a representative of each group report their findings. Discuss concepts that may have been overlooked.
6. Create a bar graph that displays each menu item and the number of ingredients that could have originated from alfalfa.
7. Poll the class to determine which food item is most popular. Create a bar graph that depicts the popularity of the food items. Compare the two graphs. Are there any relationships that can be determined? Discuss the impact alfalfa has on the lives of students.

