



SUNFLOWERS

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This information has been prepared by Marin Master Gardeners in conjunction with Farm Day, 2011

Sunflowers



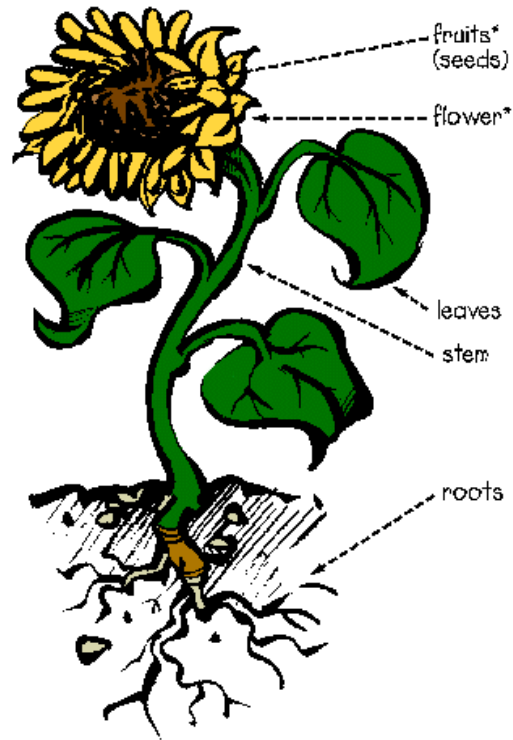
Introduction to Sunflowers

The cheerful and beautiful blooms of sunflowers are associated with the summer. Sunflowers are annual plants belonging to the genus *Helianthus annuus* of the Asteraceae family which possess a large single flowering head and typically grow from 5' to 12'. There are 37 varieties (species) of sunflowers and they are native to Central America.

Sunflower buds are heliotropic which means at sunrise their faces are turned towards the sun. During the day they follow the sun from east to west. Once they have bloomed they face east and are no longer heliotropic.

Sunflowers are extremely useful plants with many health benefits.

- Ornamental plants and cut flowers
- Sunflowers produce oil used for cooking, to produce margarine and bio-diesel fuel
- Whole seeds are a snack food and a bird food.
- Sunflowers can be processed into a type of peanut butter and type of rye flour.
- Sunflower stalks are used for livestock feed.
- Sunflowers can be used to extract toxic lead, arsenic and uranium from the soil.

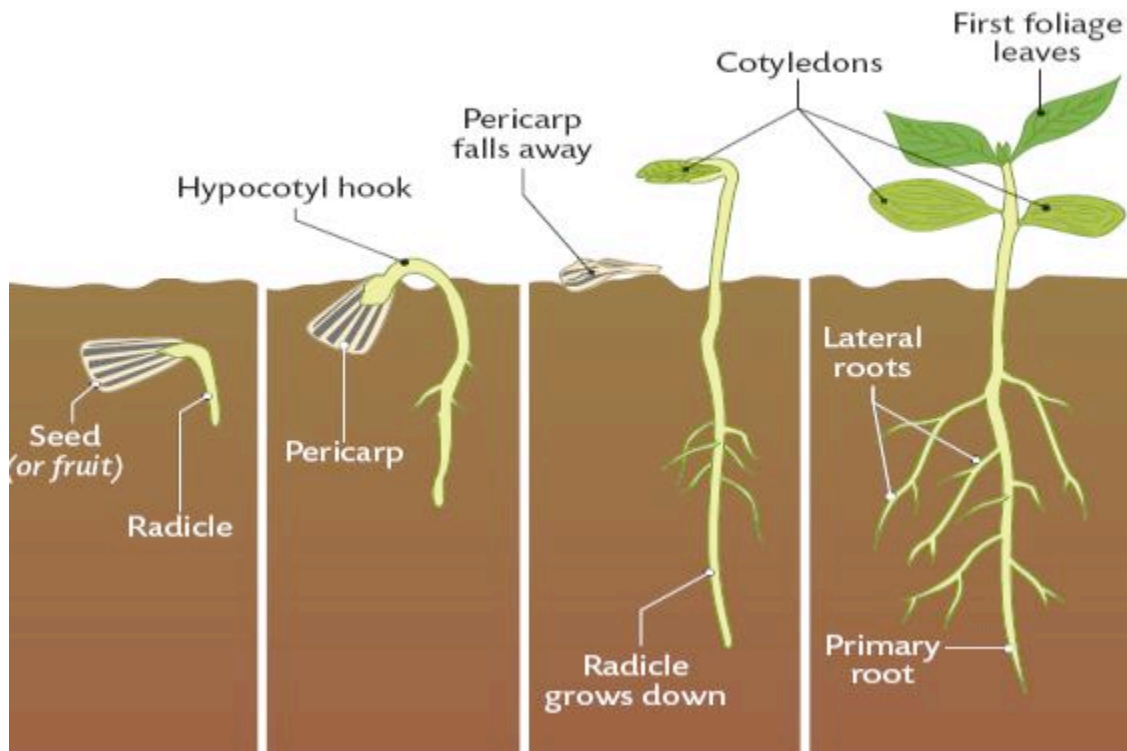


Germination process

Germination is the process by which the seed develops so that a stem and root (hypocotyl) emerges as a new baby plant (seedling).

- Germination happens when a seed gets warmth, air and water. We plant seeds in the Spring when the soil warms up.
- The seed provides food for the baby plant until it grows its own root system and when the first leaves appear.
- After the leaves appear, the seed coat is discarded and photosynthesis begins. The seed is said to have germinated when food is created by the leaves using photosynthesis.
- The radicle is the part of the plant from which the root originates and is attached to the stem.

40.32 Germination in sunflower



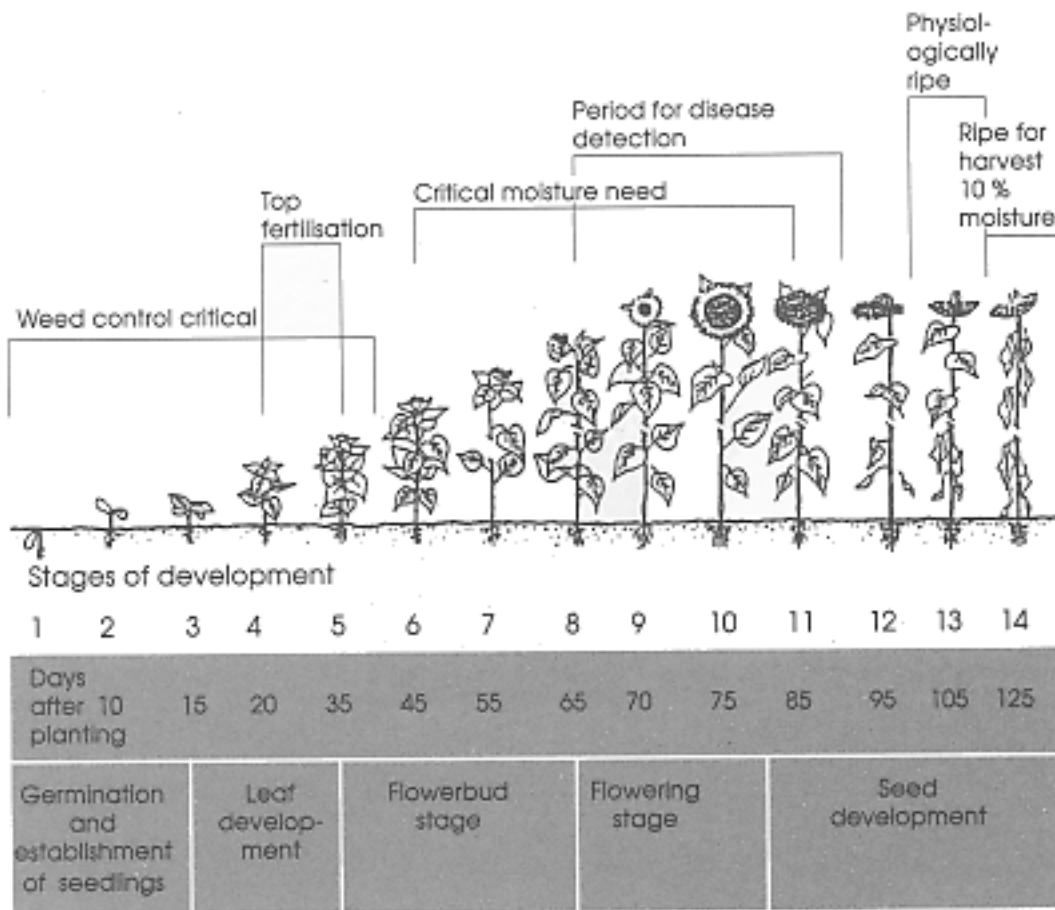
Cultivation of Sunflowers

- Sunflowers are easy to grow and produce lots of nectar and pollen to attract bees.
- Sunflowers need lots of warmth and full sunlight and are a summer crop.
- Plant sunflower seeds or seedlings in early spring after the threat of frost is over, in well-drained, warm soil that is above 60 degrees
- Use lots of organic matter, compost and mulch.
- Dig a shallow trench and fill with water and allow to drain before placing the seeds.
- Plant 1 seedling or seeds about 3" – 6" apart and cover with ½" – 1" of soil and water again.
- When plants are 3' tall, tie them to a stake so they grow straight. Continue to stake as they grow so the stem does not bend over.

- The sunflower heads are ready to be harvested when the back has

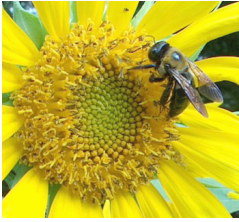


- turned brown.
- Rub the seeds off of the plant by hand.
- Sunflower growth Stages:



Sunflower growth stages

SUNFLOWER POLLINATION - BEES ***THE GREAT SUNFLOWER PROJECT***



How do bees make fruits and vegetables?

Bees help flowers make seeds and fruits. Bees go to flowers in your garden to find pollen (the powder on the flower) and nectar which is a sweet liquid. The markings on a flower guide the bee right into where the pollen or nectar is. All flowers have pollen. Bees gather pollen to feed their babies which start as eggs and then grow into larvae. It's the larvae that eat the pollen. Bees use the nectar for energy. When a bee goes to a flower in your garden to get nectar or pollen, they usually pick up pollen from the male part of the flower which is called an anther. When they travel to the next flower looking for food, they move some of that pollen to the female part of the next plant which is called a stigma. Most flowers need pollen to make seeds and fruits.

After landing on the female part, the stigma, the pollen grows down the stigma until it finds an unfertilized seed which is called an ovary. Inside the ovary, a cell from the pollen joins up with cells from the ovary and a seed is born! For many of our garden plants, the only way for them to start a new plant is by growing from a seed. Fruits are just the parts of the plants that have the seeds. Some fruits are what we think of as fruits when we are in the grocery store like apples and oranges. Other fruits are vegetables like tomatoes and cucumbers and peppers.

Join the SFSU Great Sunflower Project by planting “Lemon Queen Sunflowers”!!
Sign-up at www.greatsunflower.org

In 2008, this project started by Gretchen LeBuhn who is an associate Biology professor at San Francisco State University, as a way to gather information about our urban, suburban and rural bee populations. She wanted to enlist people all over the US and Canada to observe their bees and be citizen scientists. She asked them to plant sunflowers in their gardens so we could standardize the study of bee activity and provide more resources for bees. Sunflowers are relatively easy to grow and are wildly attractive to bees. So far we've found that the on average, our gardeners are likely to see a bee pollinate every 2.6 minutes. Surprisingly, over 20% of our gardens never saw a bee! We want to thank all of our citizen scientists for being our observers.

Observation takes less than 15 minutes. It is easy and No Knowledge of bees is required!

Enter your bee counts online or send in a paper form. We would love to have you join us. Let's help our most important pollinators together!



Farm Day Sunflower Seed activities:

1) Be a Seed Investigator using a magnifier

- Sunflower seeds – investigate different shapes and sizes
- Sunflower seeds (soaked), – dissect to see the seed coat and cotyledon (embryo plant)
- Partially germinated seeds, with roots and stem emerging – examine
- Full grown plants – examine

2) Seed Game - match the seed to the plant

3) Farm Day Sunflower seed activity: Take home seeds to plant and join the Great Sunflower Bee observation Project!

You can start your sunflowers indoors using peat pots which can be transferred straight into the soil when it has warmed up after the threat of frost is gone. Sunflowers like full sun. Plant seeds in the garden or in a pot at least 15” deep. Plant each seed 1’ deep and 6” apart. The sunflower seeds have an 80% chance of germinating, so you might want to plant 2 seeds for every one plant that you want. They can be thinned after they come up. Water gently, not to disturb the seeds. In 7 to 10 days you will begin to see tiny leaves emerging. Thin to 12” apart when seedlings are 3” tall. Keep the soil moist and fertilize with compost or organic fertilizer every other week. Tie plants to a stake when 3’ tall.

4) Board Game - Sunflowers in the Sustainable Food and Feed Cycle

- Bees pollinate the sunflowers to create food for people and feed for animals (in this case cows).
- Cows consume feed, made of food processing by-products, corn, soybean, and minerals.
- People consume sunflower products and make compost from scraps and other materials (browns and greens).
- Compost and animal waste is broken down in soil by micro-organisms (bugs and worms).
- Compost and decomposed animal waste is used to fertilize the field
- growing sunflowers.
- The farmer harvests feeds the harvest by-products to cows.

Art Connections

- The cheerful face of the blooming sunflower can almost speak to you and has been the subject of famous artists. Introduce students to Vincent Van Gogh, Picasso and other painters. Have students make their own sunflower paintings. Create a sunflower seed collage.
- Sunflowers can be printed on fabric and many other surfaces.



links:

<http://www.kinderart.com/drawing/sunflo.shtml>

Math Connections

- Count sunflower seeds. Estimate how many sunflower seeds are in a bag. Predict how many seeds it takes to fill a bag.
- Measure and weigh sunflower seeds.
- Predict how long it will take for the seeds to sprout that were planted..
- Use a ruler to measure and record the height of the plants as they are growing.
- Chart the growth of the plants and compare the heights of the plants from different seeds.

Literature / Writing Connections

“Wherever humans have gone, sunflowers have followed. The sunflower is the consummate American plant: tenacious, brash, bright, open, varied, optimistic, and cheerful, it might well be considered the true American flower. The impressive physiological characteristics of the sunflower and its very long association with mankind are worthy of a lifetime of study... From its complex natural history, its persistence, its great appeal as a symbol of the sun, and its usefulness, we gain insight not only about this plant but the plant kingdom as a whole.”

Lady Bird Johnson, *Wildflowers Across America*

“Sunflower House” by Eve Bunting

“Sunflower Houses – Garden Discoveries for Children of all Ages” by Sharon Lovejoy

“Sunflower Seeds and Crows” by Margo Fallis
From Seed to Sunflower by Gerald Legg, Carolyn Scarace

“Sam Plants a Sunflower” by Kate Petty, Axel Scheffler

“Sunflowers” by Rebecca W. Atwater Briccetti

“Sunflower” by Miela Ford

“The Sunflower Went Flop” by Joy Cowley

Writing: Write stories/poems about sunflowers (e.g., If I were a sunflower). Students should keep a sunflower journal to write down notes about the growth and progress of the sunflowers they planted.

Fun Facts

- Largest sunflower producing states are Minnesota, Kansas, Colorado, Texas, California, Nebraska.
- The sunflower is the state flower of Kansas

Sources for Materials:

The Great Sunflower Project

www.greatsunflower.org

Things you can do across the curriculum

<http://www.greatsunflower.org/resources-teachers>

based on a project from Windy Mack at the National Teacher Training Institute

National Sunflower Association: All About Sunflower

www.sunflowersa.com

Wikipedia – Sunflowers, and how to grow sunflowers

<http://en.wikipedia.org/wiki/Sunflower>

Sunflower Production: <http://agriculture.kzntl.gov.za/portal/AgricPublications>