Farm Day 2012
Marin Master Gardener
Teacher Packet
The Ways Plants Begin - Plant Propagation

Teaching Objective: An understanding that plants can start from things other than seeds and that seeds come in many different "packages"

1. Introduction to Plant Propagation
2. Types of Plant Propagation – with Mother Nature and with help from people
   Bulbs/Corms/Rhizomes/Tubers/Tuberous roots
   Cuttings
   Offsets
   Seeds Seeds have many "packages"
3. Farm Day Activity – View Grow Boxes with various starts from different types of propagations
   Offsets (hens and chicks)
   Corms, (freesia)
   Seeds (radish, carrot, marigold)
4. Farm Day Activity – Open various seed "packages" and look with magnifying glass
5. Farm Day Activity – Choose and pack seeds/starts to grow/decorate seed packages

Kids having fun with one of 2011's Farm Day Projects at the Marin County Fair

This information has been prepared by Marin Master Gardeners in conjunction with Farm Day 2012

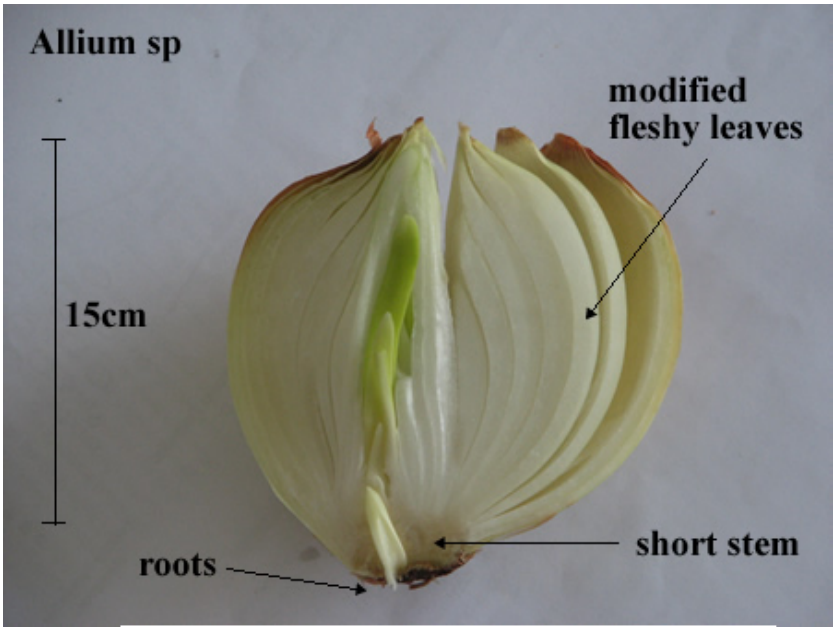
Introduction to Plant Propagation

Propagation is the word used to describe how one plant can become many plants. All plants can do this on their own, but often, people - farmers, gardeners, scientists and kids - help in various ways. Here are just a few of the ways plants propagate.

Everybody knows something about seeds and all plants make them. But more about them later. Sometimes seeds are not the easiest way to get new plants. Over time, plants have developed many ways to propagate in addition to "setting" seeds.

BULBS

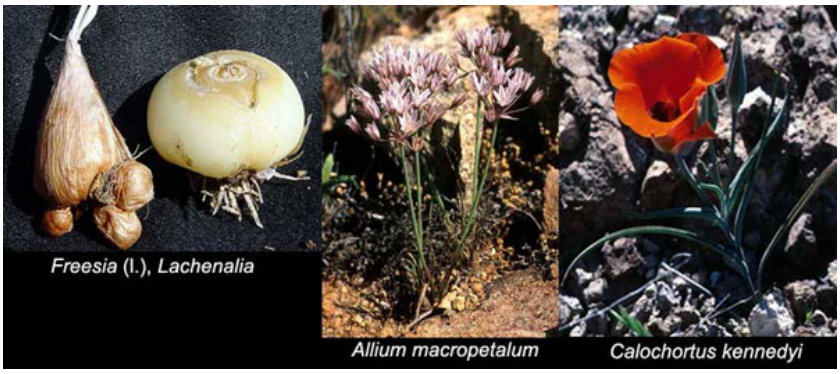
Some plants grow best from **BULBS**. There are five bulb types. A true bulb is a swollen, underground part of the stem that stores lots of plant nutrients and energy to use in making a new plant. If you cut a bulb in half vertically, you can see layers that correspond to the leaves that will grow from. The layers surround a "bud" that will eventually become a flower. Bulbs often have paper-like scales as their outer-most layer. Think of the papery outside of an onion.



From: http://click4biology.info/c4b/9/plant9.1.htm

After the flowers and leaves of the parent plant fade, the roots below the bulb also shrivel.

Then the bulb "rests" until the weather conditions are right for it to start sending out new roots and shoots for a new plant to begin. Some bulbs plants grow big bulbs right from their main bulbs. When the new bulbs are broken away, they too can become new plants. Some examples of plants grown from true bulbs are onions, lilies, tulips and daffodils.



Other plants grow **CORMS** that look like bulbs but are solid and don't have layers inside. They too are swollen, underground portions of stem that, like bulbs, store energy for growing new plants. Some examples are gladiola, crocus and Freesia.

From:http://www.desertmuseum.org/programs/succulents_definition.php

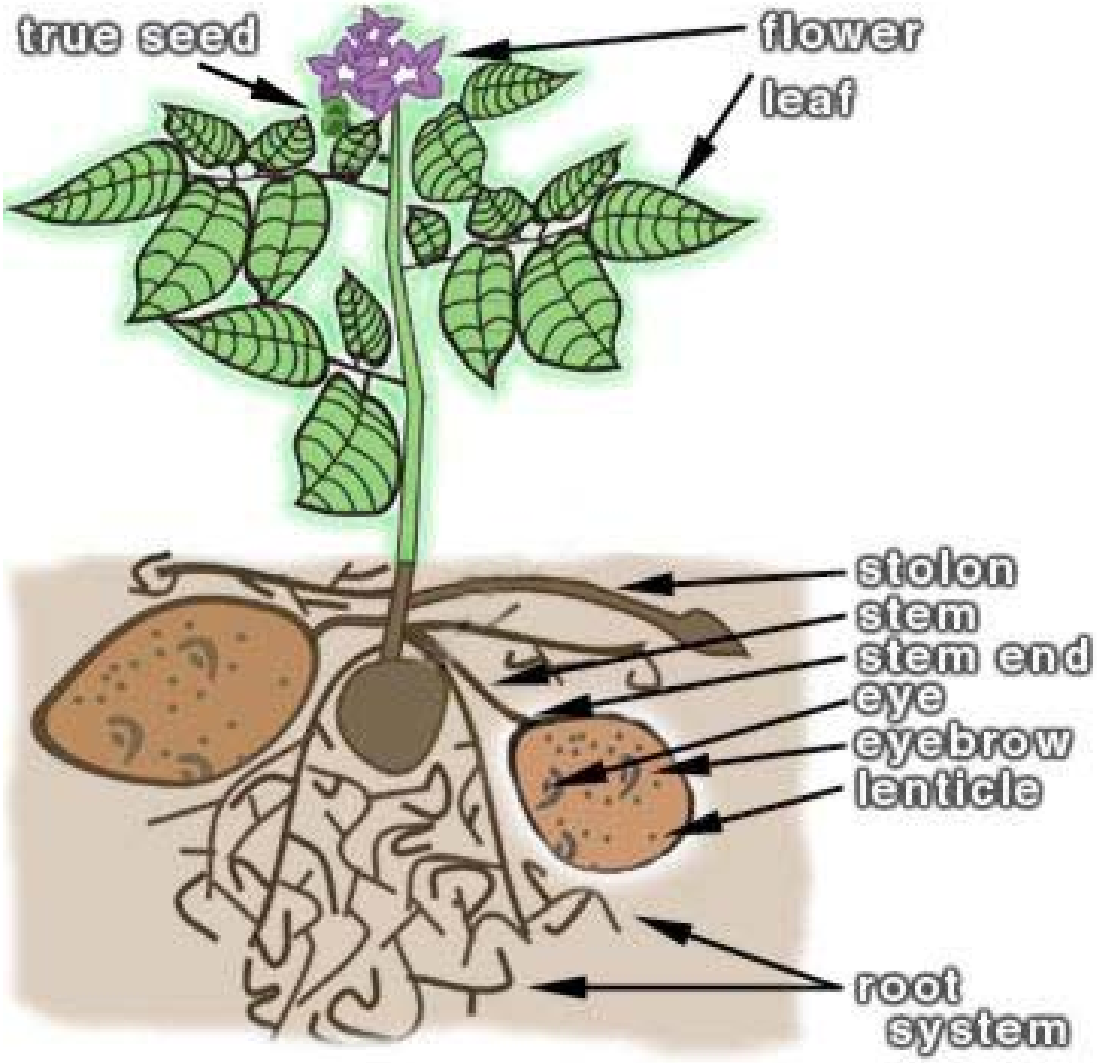
RHIZOMES are thick underground stems with stored starch (energy food) that spread horizontally away from the parent plant and send roots into the ground and shoots into the air to make new plants. Some examples are lily of the valley, iris and ground ivy. (Ground ivy is considered an invasive, problem plant here in California.)

From: http://www.garden.org/urbangardening/index.php?page=june_qa

TUBERS are also food-storing, underground swollen portions of stems. They are lumpy-looking with many potential growing points called buds or eyes. When planting tubers, it is important to make sure there is at least one bud in each section that you cut from the main tuber. The roots can grow from all over the section except from the bud/eye, which will become the new, above ground portion of the plant. Some examples of plants that grow from tubers are potatoes, begonias and cyclamen.

From: http://www.timberpress.com/blog/2010/10/plant-profile-hardy-cyclamen/

(Have you ever thought about where your French fries come from? Well, from potatoes, of course! But which is the best way for a farmer – or you - to grow potatoes? They could be started from seeds, but centuries of experience have shown that a very, very good way to start new potato plants is from a potato that has begun to sprout "eyes". The eyes of a potato are the little white nubs or shoots that you sometimes see if a potato has been in the cupboard for too long. Farmers let the sprouts happen on purpose to make "seed potatoes" or chittings. They place the potatoes with eyes in a sunny place until the eyes begin to grow green leaves. That's when they are called chittings. The whole chitting is then placed in the ground to start a new potato plant that will grow lots of green leaves that will photosynthesize energy to be stored in the roots which will develop new potatoes for eating and making new chittings. You can try this at home or in your classroom. You'll need small potatoes with sprouting eyes, some egg cartons, sun and water.)



From: http://www.gov.pe.ca/af/agweb/index.php3?number=1000971&lang=e

TUBEROUS ROOTS are the only "bulbs" that are actually from real roots. They thicken underground from roots at the base of an old stem, often circling the base with big individual bulbous growths which store lots of nutrients. To start a new plant, be sure to include the little bud (eye) near the top of the tuberous root near the old stem when you break or cut the "bulbs" apart. Then plant the bulb with the eye facing up and the roots facing down. A good example of a plant grown from tuberous roots is the Dahlia.

From: http://www.cooltropicalplants.com/Growing-dahlias.html

From: http://www.parkswholesaleplants.com/spring-plants/annuals-ai/dahlia-figaro-mix/

CUTTINGS

CUTTINGS are another way that you or Mother Nature can start a new plant from an old one. Many parts of plants can be used, but it seems that different kinds of plants have their own best parts for starting new plants.

For instance, if you have a violet plant that you really like, you can try starting a new plant by putting one of its leaves in good potting soil and placing it in a sunny location. Moisten it gently and wait for it to grow roots and send up shoots for a whole new violet.

From: http://www.gardeningoncloud9.com/200907/propagate-flame-violet-cutting/

Or, you can break off a small, tender branch with several leaves from a Geranium (the real name is Pelargonium). Strip off the leaves from the bottom few inches of the branch. Stick it in the ground in a place with conditions similar to the parent plant. Keep the area moist – not wet - and see what happens. Chances are very good that you'll have a new little Geranium in a few weeks.

From: http://trees.naturehills.com/zone-4-annuals--list

New plant can also be started by taking cuttings from the roots of dormant (not growing/after the end of growing season) plants. Cut small sections from healthy roots. Place them vertically in damp potting soil with the ends that used to be closest to the plant at the top of the soil. Keep them moist and away from the sun until you see sprouts emerging. Then move them to sunlight and watch a new plant grow.

OFFSETS

From: http://www.thriftyfun.com/tf75731396.tip.html

OFFSETS are new, complete plants that grow from the base of the parent plant. They are seen on many plants, especially succulents. Maybe you have plants called "hens and chicks"? These plants propagate most easily by "hatching" little chicks from the mother plant. You can help by gently easing a chick away from its mother and planting it nearby. You can also start a new plant by gently removing the chick and exposing it to air for several days to several weeks to let it "harden" – that is let the stem/roots become quite dry. Then, you can place the stem in moist potting soil to begin a new plant.

SEEDS

So far, all the propagating we've discussed has been "asexual". That means that the new plant has the identical genetic makeup as the parent plant. Seeds, however, are the result of pollination, the fertilization of the of the female plant parts (ovules) by the male plant parts (pollen). This can happen with ovules and pollen from the same plant or from different plants of the same species. But unless conditions are very carefully controlled, seeds can start new plants that are somewhat different from the parent plant from which they were collected. For instance, if a bee takes pollen from a white sweet pea to a pink sweet pea, the seeds may not grow sweet peas that are the same color as either parent, or, the new flowers may be the color of the parent with the "dominate" characteristics.

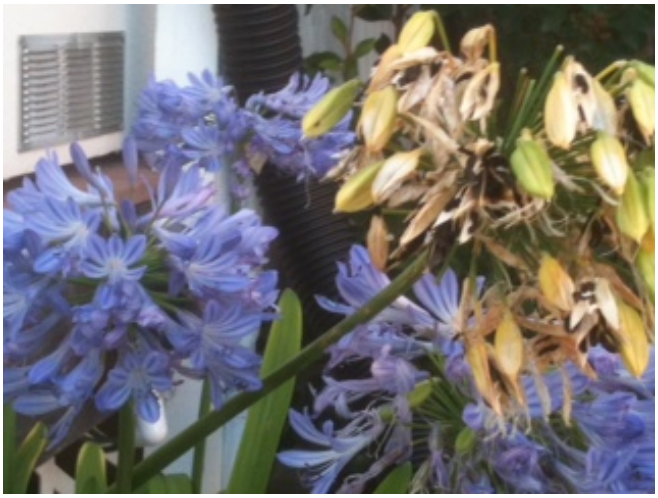
But, what we really want to talk about here, in preparation for Farm Day 2012, is the great variety of "packages" that contain seeds. And, we're not talking about the little envelopes that you buy at the store!

Think about the flowers in a garden, orchard or farm near you. After the flowers are pollinated, the seeds begin to develop, sometimes in obvious fruit like apples, sometimes in not-so-obvious fruit like rose hips or Alstroemeria (Peruvian lilies) or Agapanthus (Lily-of-the-Nile).

From:
http://islandnature.ca/2010/10/amongst-the-lily-seeds/

From:
http://inetgardens.com/alstroemeria-psittacina.htm

From:
http://foxhavenjournal.com/2010/04/26/seeing-the-world-in-raindrops-and-oceans/



Lilies of the Nile with seed heads

Marigolds make easy-to-collect seeds

On Farm Day 2012, you will get to look at some different types of “seed packages”, open them and use a magnifying glass to see what’s inside.

Sources for Materials

http://youtu.be/-xYVSfFX8n8 Great seed dispersal video with links to other plant life cycle videos

http://www.potato2008.org/en/index.html international year of the potato website

www.potatoes.com/PotatoKids.cfm Washington state potato website for kids

http://www.finegardening.com/how-to/videos/dividing-perennials-plants-with-offset-roots.aspx how to propagate from offsets video

http://www.youtube.com/watch?v=eTX48mU_cng Hens and chicks propagation

http://www.thriftyfun.com/tf75731396.tip.html hens and chicks

http://www.sciencekids.co.nz/gamesactivities/lifecycles.html the parts of a flower dissection game

http://en.wikipedia.org/wiki/Stolon definition of "stolon"

California Master Gardener Handbook – 5th printing 2009 by University of California

Sunset Western Garden Book – 2007 by Sunset Publishing