

The background features a stylized landscape. The top portion consists of several overlapping, semi-transparent green mountain peaks of varying heights and shades. Below this, a wide, textured orange band represents a field or garden. The bottom edge of the orange band is irregular and jagged, suggesting a horizon line or a field of crops. The overall color palette is dominated by greens and oranges.

# Heirloom Seed Gardening

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Just for Fun!



Why should you produce  
your own seed?

# GMO Seeds

- GMO = Genetically Modified Organism
- Indiscriminately combines plant, insect, animal and/or human DNA
- Used to produce plants that can survive when sprayed with proprietary pesticides and herbicides such as Roundup (glyphosate)
- Induce cancer in rats (and humans).
- Constitute large percent of current food supply
- AVOID AT ALL COSTS!

# Hybrid Seeds

- Offspring of two different parents
- Delicious, desirable characteristics
- Will not reproduce what you have (progenitors or sterile)
- Viability may be limited
- Available in most grocery and home improvement stores.

# Open Pollinated Seeds

- Reproduces what you have generation after generation – if kept pure
- Many, many varieties

# Heirloom Seeds

- Subset of open pollinated seeds
- Must have been introduced at least 50 years ago?
- Can be viable up to 10 years depending upon
  - preservation method
  - Storage method
  - Type of seed

# Seed Sources

- Baker Creek Heirloom Seeds – [www.rareseeds.com](http://www.rareseeds.com)
- Reimer Seeds – [www.reimerseeds.com](http://www.reimerseeds.com)
- Weeks Seed Co. – [www.weeksseeds.com](http://www.weeksseeds.com)
- Seed Savers – [www.seedsavers.com](http://www.seedsavers.com)
- Ark Institute
- Seeds of Change - [www.SeedsofChange.com](http://www.SeedsofChange.com)
- Preparedness Sites
- Local Farm Supply Stores

# Planting Starts

- Common varieties to start from starts
  - Broccoli
  - Cucumbers
  - Herbs
  - Onions
  - Peppers
  - Tomatoes
  - Tomatillos

# Planting Starts

- Purchase
- Grow yourself
  - Peat pots or plastic planting containers
  - Potting soil
  - Plant in February/March
  - Plant in April
  - Plenty of daylight
  - Keep moist
  - Harden before planting

# Planting in the Garden

- Soil Preparation
  - 6-8" well drained soil in container or garden
  - Substantial organic base is necessary
  - To build up organic components:
    - Manure (steer, horse, turkey, chicken)
    - Peat Moss
    - Compost
      - Purchase – Store or Landfill
      - Make it!
    - Biodynamics Preparations (Rudolf Steiner)
    - Protogrow - [www.solutionsfromscience.com](http://www.solutionsfromscience.com)

# Planting in the Garden

- Varieties to plant directly from seed:
  - Beans – green and dry
  - Beets
  - Cabbage
  - Cantaloupe
  - Carrots
  - Corn
  - Cucumbers
  - Garlic
  - Lettuce

# Planting in the Garden

- Varieties to plant directly from seed:
  - Leeks
  - Melons
  - Peas
  - Potatoes
  - Radishes
  - Spinach
  - Squash, summer and winter
  - Swiss Chard

# Planting in the Garden

- For spacing
  - Follow package instructions
  - For more intensive planting, consult “How to Grow More Vegetables” John Jeavons
- Support large bushy plants with trellis or cage
  - Pole beans and peas
  - Cucumbers
  - Peppers
  - Tomatoes
  - Tomatillos

# Planting in the Garden

- Rows
- Square Foot Garden (Mel Bartholomew)
- Biointensive (John Jeavons)
- Trellises can be used to take some plants vertical that would not normally be vertical, but large fruits must be supported as they grow
  - Melons
  - Squashes

# Planting Times

- Cold Hardy Vegetables – Plant in the spring as soon as the soil can be worked and/or plant in the fall for winter/early spring harvest:
  - Beets
  - Carrots
  - Kale
  - Leeks
  - Lettuce
  - Onions
  - Parsley
  - Parsnips

# Planting Times

- Cold Hardy Vegetables – Plant in the spring as soon as the soil can be worked and/or plant in the fall for winter/early spring harvest:
  - Peas
  - Potatoes
  - Radishes
  - Spinach
  - Swiss Chard
  - Turnips

# Planting Times

- Cold Tender Vegetables – Plant starts after all danger of frost is past. Seeds may be planted a week or two earlier.
  - Beans
  - Cantaloupe
  - Corn
  - Cucumbers
  - Peppers
  - Squash
  - Tomatoes

# Planting Times

- Cold Tender Vegetables – Plant starts after all danger of frost is past. Seeds may be planted a week or two earlier.
  - Zucchini
  - Melons
  - Most Herbs

# Watering

- DO NOT DO THIS!
  - Water 10 to 15 min per day.
  - This grows lawns and weeds, NOT VEGETABLES!
- DO THIS!
  - Deep soak 2 to 3 times per week as the soil dries out.
  - Water should go down at least 4".

# Watering

- Methods
  - Sprinklers
  - Soaker Hose
  - Drip System
  - Watering Can
  - Flood Irrigation

# Weeding

- DO IT!
  - Do it before they go to seed.
  - Persistence pays off.
  - Minimize by putting mulch, grass, or leaves over growing area.
  - Square foot gardens: Water and fertilize only where you have planted.
  - Spray weedy walkways (NOT YOUR PLANTS) with vinegar.

# Dealing with Pests

- Nourish your soil – deficient soil breeds pests.
- Deer
  - Cayenne pepper
  - Commercial spray-on concoctions
  - Human and/or dog hair
  - NETTING
- Quail
  - Netting
  - Bridal Illusion (germination trouble)

# Dealing with Pests

- Aphids
  - Insecticidal soap or dish detergent and water
  - Ladybugs
  - Garlic
- Snails and Slugs
  - Sluggo
  - Diatomaceous Earth
- Earwigs and Grasshoppers
  - Diatomaceous Earth

# Dealing with Pests

- Blight
  - Captain Jack's Copper Fungicide
  - Rotate
  - Discard old plant material

# Propagating Seeds

- Flower Structure
  - Male parts
    - Stamen – one or more hair-like filaments
    - Anther – produces and dispenses pollen at top of stamen
  - Female Parts
    - Pistil
      - Stigma – part of pistil that receives pollen
      - Style – pollen tube
      - Ovary – contains ovules and become the fruit or seed

# Propagating Seeds

- To preserve purity, only pollen from one variety may reach the stigma of the plant of that variety. All other pollen must be excluded.
- If pollen crosses, present-generation fruit will not be affected, but the seeds will be affected.
  - Cheets and Bard
  - Parrots and Carsnips
  - Cumelons

# Propagating Seeds

- Self-Pollinated Plants
  - Perfect Flowers
    - Have functional male and female parts in same flower
    - Fertilization takes place within each individual flower
    - Does not require but can be cross-pollinated with wind and/or insects
  - Imperfect Flowers
    - Separate male and female flowers on the same plant (e.g., cucurbitae (squash))
    - May be fertilized by insects and/or wind

# Propagating Seeds

- To maintain varietal purity:
  - Isolate different cultivars of the same species
    - Distance (50 feet to 1 mile, depending on vegetable)
    - Time – plant at different times so they flower at different times
    - Variety – only propagate one of a species each year
    - Mechanical – physical barrier
      - Screened cage that can be placed over several plants
      - Tie a cloth bag around fertile blossoms and/or tassels
      - Tape flower closed and hand-pollinate with a brush and/or bees
  - Minimum 6 plants of same variety for pollination

# Resources

- Books
  - Suzanne Ashworth, “Seed to Seed”
  - Caleb Warnock, “The Forgotten Skills of Self-Sufficiency used by the Mormon Pioneers”
- Corn Tassel Bags
  - Southern Exposure Seed Exchange – [www.southernexposure.com](http://www.southernexposure.com) (\$10.75 per 50)

# Annuals – Beans and Peas

- Propagating Beans and Peas (leguminosae) (green beans, dried beans, lentils, peas)
  - Beans will cross within species.
  - Leguminosae have perfect flowers which are self-pollinating, but are occasionally crossed by insects.
  - Crossing may not show up until the second generation, so store each year's seeds separately and discard the obviously crossed seeds and those of the year before if crossing becomes evident.
  - For seed purity, isolate, bag, or cage.
  - Use spun polyester bags tied in place over a flower cluster. Remove when tiny pods begin to show. Mark with string, tape, or poultry bands.

# Annuals – Beans and Peas

- Harvesting Beans and Peas (leguminosae) (green beans, dried beans, lentils, peas)
  - Allow seed pods to mature and dry on plant. They can be picked and allowed to dry until crisp, too, if about to be ruined by frost.
  - Bean weevils will destroy home saved seeds. To prevent this, freeze the dry seeds for 5 days in an airtight container. When removed from freezer, allow to reach room temperature overnight before opening to prevent condensation on the seed.

# Annuals - Melons

- Propagating Melons (*cucumis melo*)  
(muskmelon, cantaloupe, honeydew, casaba, pocket melon, Armenian cucumber)
  - Each plant produces male and female flowers.
  - Rely on insects for pollination.
  - All within the same species will cross. Cumelons!
  - To prevent random pollination, hand pollinate.

# Annuals - Melons

- Propagating Melons (*cucumis melo*) (muskmelon, cantaloupe, honeydew, casaba, pocket melon, Armenian cucumber)
  - To hand pollinate:
    - Female blossoms sit atop a small, immature fruit.
    - Male blossoms are attached to a straight stem.
    - In the evening, find male and female blossoms that are almost ready to open (show color along seams and tip may begin to break apart). Tape shut.
    - In the morning, find the taped blossoms.

# Annuals - Melons

- Propagating Melons (*cucumis melo*) (muskmelon, cantaloupe, honeydew, casaba, pocket melon, Armenian cucumber)
  - To hand pollinate:
    - Pick the male flower and several inches of its stem.
    - Remove tape from male flower. Tear off all of the flower petals.
    - Gently remove tape from female flower. Work quickly to avoid accidental insect pollination.
    - Rub pollen from the male flower onto each section of the stigma of the female flower. (Use several male flowers if possible.)

# Annuals - Melons

- Propagating Melons (*cucumis melo*) (muskmelon, cantaloupe, honeydew, casaba, pocket melon, Armenian cucumber)
  - To hand pollinate:
    - Retape the female flower.
    - Tie a brightly colored yarn or ribbon around its stem.
    - This method is most successful early in the season during the formation of the “crown fruit” – the first fruits to be set.

# Annuals - Melons

- Propagating Melons (*cucumis melo*) (muskmelon, cantaloupe, honeydew, casaba, pocket melon, Armenian cucumber)
  - To hand pollinate:
    - For the melo species only, the plant will abort approx 80% of the female blossoms, so only 10 to 15% of hand pollinated blossoms will develop into fruit.
    - Use small pieces of masking tape (1/4" wide and 1.5" long). Pinch the tape together beside the flower but leave tip ends apart to make it easier to untape.
    - Use the first female flowers that bloom and remove non-hand pollinated fruits to improve maturation ratio.

# Annuals - Melons

- Harvesting Melons (cucumis melo) (muskmelon, cantaloupe, honeydew, casaba, pocket melon, Armenian cucumber)
  - Grow fruit to full maturity and harvest.
  - Allow fruit to continue to ripen for another 20 days after harvesting.
  - Cut open fruit and remove seeds.
  - Clean off flesh and seed attachments by straining or fermenting (fermenting is better).
  - Dry seeds on rigid surface away from direct sunlight until they break in half rather than bend.
  - Store up to 5 years in cool, dry, dark location.

# Annuals - Watermelons

- Propagating Watermelons (*cucumis lanatus*)
  - All varieties of watermelon will cross
  - Isolate by 1/2 mile to prevent cross pollination by insects OR
  - Hand pollinate.

# Annuals - Watermelons

- Harvesting Watermelons (*cucumis lanatus*)
  - Most reliable method of determining ripeness is observing when the small tendril directly opposite the fruit's "peduncle" (stem attachment) changes from green to brown and becomes dry.
  - Seeds are mature when watermelon is ready to eat.
  - Eat watermelon, spit seeds into cup, collect cups, wash seeds gently in mild dish detergent, pour seeds into strainer, rinse thoroughly, and dry.
  - Store for up to 6 years in cool, dry, dark place.

# Annuals - Corn

- Corn
  - Will cross with other corn up to one mile away.
  - To maintain genetic purity, isolate or bag.
  - Allow corn to fully develop until the kernels are “dented.”
  - Allow to turn brown on stalk.
  - Harvest and shuck ear. Allow ear to dry for several weeks.
  - Rub kernels off ear.
  - Store in envelope in cool, dry place.

# Annuals - Cucumbers

- Propagating Cucumbers (*cucumis sativus*)
  - All cucumbers will cross (except for Armenian cucumbers).
  - Isolate by  $\frac{1}{2}$  mile or hand pollinate.
  - Hand pollination is usually 85% successful.

# Annuals - Cucumbers

- Harvesting Cucumbers (*cucumis sativus*)
  - Grow cucumbers for seed to full maturity – past the edible stage (e.g., golden oldie) – deep yellow or orange and soft.
  - Cut cucumbers open and scoop seeds into large bowl. Add as much water as seeds. Set bowl away from direct sunlight to ferment for 1 to 3 days. Some mold may form. Stir twice per day. Fermentation is complete when most seeds have settled to bottom of bowl and seedcases are floating on top.

# Annuals - Cucumbers

- Harvesting Cucumbers (*cucumis sativus*)
  - Stir mass while adding water, allowing clean seeds to settle to the bottom.
  - Pour off debris with excess water.
  - Repeat until only clean seeds remain.
  - Pour seeds into strainer, wipe bottom of strainer to remove moisture, and dump seeds to dry on non-stick surface.
  - Store up to 10 years under ideal conditions.

# Annuals - Lettuce

- Propagating Lettuce (compositae – lactuca sativa)
  - Different varieties only minimally cross due to insects.
  - Flowers are perfect and are only open between 30 minutes and several hours.
  - Separate varieties by 12 to 25 feet or cage when two or more varieties are flowering.

# Annuals - Lettuce

- Harvesting Lettuce (compositae – lactuca sativa)
  - Allow plants to bolt, bloom, and go to seed.
  - Slit top of head of heading varieties of lettuce to allow the seed stalk to emerge.
  - Allow seeds to ripen and harvest daily 12 to 24 days after flowering. Shake the seed heads into a large grocery sack and store in a dry area. LABEL SACKS!
  - OR Cut entire plant and stuff head first into a bag. When seeds are totally dry, grab cut ends of stems and shake vigorously into bag. Rub seed heads with palms. Sift with a sieve or fine mesh screen to minimize chaff.
  - Store for 3 years in cool, dry, dark location.

# Annuals - Radishes

- Propagating Radishes (*brassica raphanus sativus*)
  - Will cross with other radish varieties but no other brassicaciae.
  - Must be insect pollinated.
  - To keep genetic purity:
    - Propagate one variety per season. OR
    - Separate by 1/2 mile and use caging techniques.

# Annuals - Radishes

- Harvesting Radishes (*brassica raphanus sativus*)
  - Let bolt, bloom, and go to seed (3 foot seed stalks). Allow seed pods to dry.
  - Open seed pods, empty seeds and allow to dry. (Very irritating!)
  - Gently pound stubborn pods with a large hammer or wooden maul.

# Annuals - Spinach

- Propagating Spinach (*spinacia oleracea*)
  - Plants produce either all male flowers or all female flowers. Unique. Use ratio of 1 male to 2 female plants.
  - Prickly seeded varieties produce flat leaves while smooth seeded varieties produce wrinkled leaves.
  - Will cross with other varieties of spinach.
  - Wind pollinated; separate by 5 to 10 miles or use a bagging technique (min 2 male, 4 female per cage)

# Annuals - Spinach

- Harvesting Spinach (*spinacia oleracea*)
  - Spinach bolts when daylight reaches 12.5 to 15 hours; faster if exposed to alternating cold and hot temps. Plant in very early spring or late fall.
  - Allow to bolt, bloom, and go to seed.
  - Dry seed in the field or pull plants when seed is fully formed but not yet dry OR
  - Harvest directly from plants by stripping seeds off in an upward motion and let them fall into basket or sack.
  - Dry.
  - Will retain 50% germination for 5 years when stored under ideal conditions.

# Annuals - Squash

- Propagating Squash (*cucurbita*) (summer squash, winter squash, pumpkins)
  - 6 species – will cross within species but not outside of species
    - *Cucurbita maxima* (All Gold, Alligator, Amish Pie Pumpkin, Atlantic Giant, Atlas, Banana, Bix Max, Buttercup, Hubbard, Winter Marrow, Turban)
    - *Cucurbita mixta* (Big White Crookneck, Cushaw, Seroria Squash, Silver Seeded Gourds)
    - *Cucurbita moschata* (Butternut, Cheese, Field Pumpkin, Golden Cushaw, Maryland Pie Pumpkin, Orange Cushaw, .

# Annuals - Squash

- Propagating Squash (cucurbita) (summer squash, winter squash, pumpkins)
  - 6 species – will cross within species but not outside of species
    - Cucurbita pepo (Acorn, Cocomelle, Crookneck, Gourds, Hondo Small Sugar Pumpkin, Jack – O 'Lantern, Scallop (patty pan), Small sugar pie, spaghetti squash, vegetable marrow, zucchini
    - Cucurbita foetidissima (calabazilla or buffalo gourd)
  - One variety from each species can be grown side-by-side.
  - Separate same species by ½ mile or hand pollinate.

# Annuals - Squash

- Harvesting Squash (cucurbita) (summer squash, winter squash, pumpkins)
  - Grow until fully mature.
  - Summer squash must be left to grow until large with hard-shelled rinds that cannot be dented by a fingernail.
  - Let sit for 3 weeks or longer for more viable seed.
  - Mark seed squash with a felt pen before storing.
  - Open squash, remove and rinse seeds in colander, drain and dry.
  - Store up to 6 years in cool, dry, dark conditions.

# Annuals - Solanaceae

- Propagating Tomatoes, Tomatillos, Eggplants, Peppers, and Potatoes
  - Have perfect flowers, but can cross within species with wind and insects.
  - To maintain genetic purity, isolate or cage.

# Annuals - Solanaceae

- Harvesting Tomatoes, Tomatillos, Eggplants, Peppers, and Potatoes
  - Allow to become dead ripe. Use finger to scrape out seeds.
  - Put seed/vegetable mixture in water and stir vigorously. Good seeds will sink and immature seeds and junk will float. Pour off junk.
  - Tomato seeds should be fermented until moldy.
  - Strain, wipe water off strainer, and pour seeds into glass or ceramic dish to dry. Stir twice daily while drying to prevent clumping.

# Annuals - Solanaceae

- Harvesting Tomatoes, Tomatillos, Eggplants, Peppers, and Potatoes
  - Peppers will retain 50% germination up to three years when stored in cool, dark, dry area.
  - Store tomato seeds up to 4 to 10 years.
  - Store tomatillo seeds up to 3 years.

# Biennials - Beets

- Propagating *beta vulgaris* (chenopodiaceae) (garden beet, sugar beet, swiss chard)
  - All beets and chard will cross with each other.
  - Wind pollinated; pollen can travel up to 5 miles.
  - Crop isolation should be 2 to 5 miles. OR
  - Bag or cage at least 6 plants.
    - Overwinter, either out of the ground or covered with a low tunnel or other shelter. Allow plant to bolt, flower, and go to seed. Collect seeds.

# Biennials - Beets

- Harvesting *beta vulgaris* (Chenopodiaceae) (garden beet, sugar beet, swiss chard)
  - Overwinter, either out of the ground or covered with a low tunnel or other shelter.
  - Allow plant to bolt, flower, and go to seed. (4 foot stalk)
  - Collect seeds as they mature or cut entire stalk when much of it is mature. Thresh or jog in place on bag of dried stalks.
  - Store for 6 years (50% germination) in cool, dark location.

# Biennials - Umbelliferae

- Propagating Umbelliferae (carrots, celery, dill, coriander, carrots, fennel, parsnips, and parsley)
  - Have perfect flowers but cannot self-pollinate.
  - Are insect pollinated.
  - To produce pure seed:
    - Isolate – 3 miles from same species and weeds (Queen Anne's lace and wild fennel)
    - Hand Pollinate – every day for 14 to 30 days. Bag immature umbels before flowers open. Debag between 7:00 and 11:00 a.m. and rub camel's hair brush over open flowers from head to head and back again.
    - Alternate day caging.

# Biennials - Umbelliferae

- Harvesting Umbelliferae (carrots, celery, dill, coriander, carrots, fennel, parsnips, and parsley)
  - Allow to overwinter or dig, store, and replant.
  - Allow to produce seed stalks, flower, and go to seed.
  - Cut umbels from plant when seeds are fully formed. Umbels can be further dried under 95 degrees.
  - Rub umbels between hands to dislodge seeds. Sift or screen.
  - Store carrot seeds for up to 3 years.

# Biennials – Allium

- Propagating Allium (onions, garlic, leeks)
  - Allium flowers are perfect but do not self-pollinate. Flies and bees are the primary pollinators.
  - Allium within the same species will cross-pollinate within 1 to 3 miles. Leeks, onions, and garlic do not cross with each other.

# Biennials - Allium

- Propagating Allium (onions, garlic, leeks)
  - To preserve seed purity:
    - Isolate varieties or alternate day caging.
    - Hand pollinate every day for 2 weeks to 30 days.
    - Bag with corn tassel bags at secure with removable strings or plastic twist ties at least 10 flower heads of each variety before any of the individual flowers open.
    - Each morning, between 9:00 a.m. and noon, remove bags from as many heads as can be kept free of insects. Use a camel hair brush to transfer pollen between open flowers, moving from head to head and back again. Rebag.
    - Remove bags when all the seeds have set. Tag the flower heads for identification during harvest.

# Biennials - Allium

- Harvesting Allium (onions, garlic, leeks)
  - Plant in the fall. Overwinter. The plant will flower. Collect seeds or bulbils (little bulbs at the top of the plant) as soon as the plant dries. Do not dry in a food dehydrator over 95 degrees.
  - Seeds will fall out of the pods when the heads are dry. The remainder can be removed by jogging on top of the heads or using a small seed thresher.
  - Winnow the seeds from the seedpods and debris.

# Biennials – Brassica Oleracea

- Propagating Brassica oleracea (broccoli, Brussels sprouts, cabbage, cauliflower, collards, kale, and kohlrabi)
  - All of these will cross with each other.
  - Have perfect flowers but require insects carrying pollen from one plant to another for pollination.
  - Propagate one variety every year. OR
  - Isolate by  $\frac{1}{2}$  mile, cage with introduced pollinators, or use alternate day caging.
    - 1 cage per variety, remove in morning and replace in evening
    - Use trapped flies or newly hatched bees for pollinators.

# Biennials – Brassica Oleracea

- Harvesting Brassica oleracea (broccoli, Brussels sprouts, cabbage, cauliflower, collards, kale, and kohlrabi)
  - Overwinter, allow to flower and go to seed.
  - Allow seedpods to fully develop, dry, and turn light brown.
  - Seedpods tend to shatter so harvest immediately.
  - Harvest progressively over several weeks as they mature.

# Biennials – Brassica Rapa

- Propagating Brassica rapa (turnips, Chinese cabbages, and broccoli raab)
  - All of these will cross with each other.
  - Have perfect flowers but require insects carrying pollen from one plant to another for pollination.
  - Propagate one variety every year. OR
  - Isolate by 1 mile, cage with introduced pollinators, or use alternate day caging.
    - 1 cage per variety, remove in morning and replace in evening
    - Use trapped flies or newly hatched bees for pollinators.

# Biennials – Brassica Rapa

- Harvesting Brassica rapa (turnips, Chinese cabbage, and broccoli raab)
  - Overwinter, allow to flower and go to seed.
  - Allow seedpods to fully develop, dry, and turn light brown.
  - Seedpods tend to shatter so harvest immediately.
  - Harvest progressively over several weeks as they mature.

# Seed Storage

- Store in paper envelopes, zip loc bags, or small containers (bungee cord containers)
- Label with type, variety, and year
- Store bags in metal tins, cherry buckets, or 5 gal containers
- Store in cool, dry, dark place
- OR Freeze