



Young America Horticulture Contests

National Junior Horticultural Association

Age Group:
<input type="checkbox"/> 5 to 8
<input type="checkbox"/> 9 to 11
<input type="checkbox"/> 12 to 14
<input type="checkbox"/> Group
<input type="checkbox"/> Individual
Project Area:
<input type="checkbox"/> Gardening
<input type="checkbox"/> Environmental Horticulture
<input type="checkbox"/> Experimental Horticulture
<input type="checkbox"/> Plant Propagation

Use this ENTRY PAGE as the first page of your project report. Fill it out completely. See the project specific guidelines listed for the project area being entered to learn what else to do. Please print, type, or write your report legibly.

Name/Group: _____

Date of Birth: _____

NOTE: The age group is your age as of December 31 of this year. Group projects should be entered based on the age of the oldest group member. For group projects, indicate the name of the youth who is preparing the report. List the names and ages of all youth participants in the project under number 2 of the Specific Guidelines.

Address: _____

City: _____ State: _____ Zip: _____

E-mail: _____

Parent or guardian's name: _____

Address: _____

City: _____ State: _____ Zip: _____

E-mail: _____

Leader's name: _____

Address: _____

City: _____ State: _____ Zip: _____

Name of local newspaper: _____

E-mail: _____

DO NOT WRITE BELOW THIS LINE.

OVERALL RATING	Suggestions or comments of judges:
Excellent	
Good	
Fair	
Poor	

Signed: _____ Chair of Judging Committee



Division D. PLANT PROPAGATION National Junior Horticultural Association Young America Horticulture Contest

Making new plants is fun, and will give you lots of new plants to keep or give away. There are many ways to propagate plants -- by seeds, cuttings, layering or grafting, to name a few. Some take a week or so, others take several months. Some can be done outdoors, others inside. Why not see what you can do?

AGE GROUPS	SUGGESTED PROJECTS
5 to 8 years	Use 2 or more different methods. (Seeds or stem-tip cuttings are easiest.)
9 to 11 years	Use 4 or more different methods.
12 to 14 years	Use 6 or more different methods.

Your age group depends on how old you will be on December 31. In other words, if you are 11 years old while you work on your project, but will be 12 by the end of the year, you must plan your project for the 12-14 age group. Any participant who previously was awarded a Grand National Award for Plant Propagation is ineligible to further compete in the same age group, but may compete in the next age group (example, if a 6-year old wins, the next year must enter 9-11 rather than 5-8).

GROUP PROJECTS

Group projects can also be done. A group is defined as a 4-H club, school class(es), or other organized youth group. The age category to use when submitting the report should be based on the age of the oldest youth involved in the project.

GETTING STARTED

1. Select the plants you want to propagate.
2. Find out how to propagate them. (Be sure you have enough methods for your age group.)

Or

1. Select the methods of propagation you want to learn about.
2. Choose plants that can be propagated by these methods.

Then go ahead!

RECORDS TO KEEP

1. Write down the kinds of plants you propagate and sources of seeds or cuttings.
2. Keep a notebook of when you take cuttings or sow seeds, methods you use, how long it takes for seeds to germinate or cuttings to root - anything to do with your project.
3. Take photographs of your project at each stage so you can see how plants develop. Record the date and a caption describing what the picture is showing.
4. Put these observations in a thin report folder organized in a manner that someone can easily read and understand what you have done.

SUGGESTIONS AND ADVICE

Some of the methods of propagating plants are described here. For the easy methods, this may be all you need. For harder ones you should get more information and help by talking to people and by reading.

If you have entered this contest before in the same age group, use different plants or different methods each time.

PROPAGATION

You can propagate plants by taking pieces of plants and letting each piece grow into a whole new plant. This is called vegetative reproduction. Plants are also propagated non-vegetatively using seeds.

NON-VEGETATIVE PROPAGATION

Seeds

Most garden flowers and vegetables are grown from seed. They need water, warmth and air to germinate or sprout. If you buy your seeds, follow the packet directions. Plant them outside in the ground, or inside in a container of soil mix.

Very fine seeds should be barely covered. Plant larger seeds 2 to 3 times as deep as their greatest dimension. Water carefully - don't wash your seeds away - and check every day. Don't let the soil dry out!

If you are starting seeds inside, keep in a warm place (65-85oF) until they sprout, then move to a cooler place with lots of light. Transplant to larger pots when seedlings are big enough to handle.

If you want to just germinate seeds, spread them on a damp paper towel and leave in a warm place. If you use mung beans or alfalfa seeds, you can eat the sprouts!

Spores

Most ferns grow from seed-like spores that are almost too small to see. Find a fern with dark spots on the underside of the frond (leaf). These are sporangia that produce spores. If they're brown and mature, hold a piece of paper under the frond and shake it so the spores drop to the paper. Pour the spores from your paper into an envelope.

If the sporangia are still slightly green, cut off the frond and put it in an envelope. In a few days, the sporangia will mature and drop the spores.

You can start the spores on an upside-down clay flowerpot, peat-pot or peat pellet. Soak it in water, and stand it in a saucer or dish that has water in the bottom. Sprinkle your spores on the wet top and sides of the pot. Cover with a clear plastic cup or a glass to prevent mold and fungus spores from getting on it, and place in a location where it receives bright, but not direct light. Be sure to keep water in the dish or saucer, so the pot doesn't dry out.

In about six weeks, the pot should turn green. Small, leaf-like prothalli form first. In a few weeks more, tiny ferns should grow from the prothalli.

VEGETATIVE PROPAGATION

Cuttings

Cuttings are taken from different parts of the plant and rooted in moist sand, vermiculite, perlite, or a mix of these.

Stem Tip Cuttings

Stem tip cuttings are easiest. Cut 3 to 5 inches from the tip, just below a node. Take off the bottom leaves that would be covered by the rooting medium. Place cuttings upright in your pot or tray. Water them. Cover with clear plastic and put in a warm place with bright light. After a few days, remove the plastic. When cuttings have good roots, transplant into pots using a standard soil mix. Some plants you can use are: chrysanthemum, coleus, forsythia, geranium, peperomia, and wax begonia.

Leaf Bud Cuttings

Leaf bud cuttings are treated like stem-tip cuttings, and can be used on the same plants. You can get more plants from one parent plant with this method. Just cut between every two nodes. Ivy, honeysuckle, coleus, and camellias can be grown from this method.

Leaf Petiole Cuttings

Leaf petiole cuttings will give a new plant from just a leaf and its stalk (the petiole). Use young, healthy, medium-sized leaves. Cut from the plant, leaving the petiole about one inch long. Place in rooting medium deep enough to cover the petiole and firm medium around it. Treat like stem tip cuttings. Some plants you can use are: peperomia, piggy-back plant, and African violet.

Leaf Section Cuttings

Snakeplant is grown from leaf-section cuttings. Cut a leaf into two-inch sections and stick them halfway into rooting medium, right side up! Keep fairly dry. Roots form in about one month. Young plants form a month or so after that. If you remove the young plants, more will start. Striped snake plants produce plain green ones, because the new plants grow from the center where the leaf is green.

Stem Section Cuttings

Some house plants are grown from stem-section cuttings. Cut the stem into sections so that each has one or more nodes. Lay the sections flat on sand or vermiculite, and cover the bottom half. Some plants you can use are: Chinese evergreen, dracaena, and dumbcane.

Root Cuttings

Root cuttings should be one to three inches long, about 1/4- to 1/2-inch across for trees and shrubs. Keep the end that grew toward the stem pointing up! Place in moist rooting medium with the tops just above the surface. Some plants you can use are: chrysanthemum, apple, cherry, hawthorn, plum, quince, and blackberry.

VEGETATIVE PROPAGATION IN OTHER WAYS

Some plants produce new plants on their own. Propagate these by planting the new ones.

Viviparous Leaves

The hen-and-chicks plant and some kalanchoes have this kind of leaf. This means that small plants form on the edges of the leaves. You can pick them off and pot them in a regular soil mix.

Runners

A runner is a long stem that produces new plants at its nodes. You can remove the runner with its small plant and root it under plastic or you can simply set a small pot of good soil near the parent plant and fasten the runner to the soil. When the runner plant roots, cut it free.

Suckers

Some trees and shrubs send up suckers from their roots. These are shoots that can be dug up and cut free, then planted.

Separation

Separation of bulbs (tulip, narcissus, hyacinth, amaryllis) or corms (gladiolus, crocus) means breaking off the small bulbs or corms that form around a large one. Each of these can then be planted.

VEGETATIVE PROPAGATION BY DIVISION

Some plants have fleshy roots or stems that can be cut into sections, so that a new plant grows from each section. This is called division. These stems and roots have special names.

The crown of some plants is the part near the surface of the ground from which new shoots come. When the clump gets large, it can be cut apart. Examples include: day lily, phlox, peony, and rhubarb.

Rhizomes are underground stems. Examples include: lily-of-the-valley and bearded iris.

Tubers, like Irish potatoes, are swollen, underground stems that store food.

Roots like dahlia and sweet potato store food also.

Each of these is treated differently. Finding out their unique requirements can be fun!

VEGETATIVE PROPAGATION BY LAYERING

Layering is a method of making roots develop on a stem while it is still attached to the parent plant. After roots form, it can be cut free and planted. Layering usually works best in spring or late summer. There are many different methods of layering.

Simple Layering

In simple layering, a low branch is bent to the ground and buried, except for the tip. Wounding the branch helps roots to form. Do this by cutting part-way through the part that will be buried. Examples include: cotoneaster, forsythia, quince, and some roses.

Air Layering

Air layering is used on rubber plants and other indoor woody plants. Wound the stem, or remove a ring of bark, about a foot from a branch tip. Wrap the place with damp sphagnum moss. Tape plastic around this to keep it in place. Keep the moss moist. Roots should form in a few weeks to several months. When they form, cut off the stem below the roots and plant. *Dracaena*, dumbcane and camellia can be air layered.

VEGETATIVE PROPAGATION BY GRAFTING

Grafting is the joining together of plant parts so that they unite and grow as one plant. The top part is called the scion, and the lower part is called the stock. Plants to be grafted must be closely related.

Splice Graft

The splice graft is used on non-woody plants. Choose stems about the same size, and cut them on a slant. Make the cuts on stock and scion the same size. Hold the graft together with masking tape and cover the plant with plastic for a few weeks.

Cleft Grafting

Fruit trees are often grafted to get a desired variety on a strong rootstock. There are many methods. The cleft graft is one of the simplest.

In winter or early spring, when plants are dormant or not actively growing, prepare your wood. Cut two scion sticks with three buds each. Trim the bottoms to make them wedge-shaped. Use a sharp knife. The side towards the lowest bud should be a little wider.

Saw your stock off squarely. Split it with a knife or chisel and hold it open with a wedge. Put both scions in place at the outer edges of the stock with the lowest bud to the outside. Then remove the wedge. Cover all the cut surfaces with grafting wax or a tree-coating compound. If both scions grow, cut off the weaker one in the fall. If one dies, remove it.

Budding

Budding is a method of grafting in which the scion is a single bud on a small piece of wood. The stock is usually a rooted cutting or seedling. In spring or early summer, when the bark is loose, slip the bud under the bark of the stock piece. Hold it in place with rubber ties or wrap it with plastic.

REFERENCES

Your library should have books on plant propagation. Here are some good ones to look for.

Anon., *Propagation for the Home Gardener*. Plants & Gardens: Brooklyn Botanic Garden Record, Vol. 40, No. 1, May 1984, #103. Brooklyn Botanic Garden, 1000 Washington Ave, Brooklyn NY 11225.

Bir, R.E., et al., *Budding Nursery Stock*. (AG-396). \$2.00 per copy from: Dept of Ag. Comm, Campus Box 7603, NCSU, Raleigh, NC 27695-7603. (Make check to: NC State Univ.)

Browse, Philip McMillan. *Plant Propagation*. 1979. New York: Simon and Schuster.

Bryant, Geoff. *Propagation Handbook: Basic Techniques for Gardeners*. 1995. Mechanicsburg, PA: Stackpole Books.

Dirr, Michael A. & Charles W. Heuser. *The Reference Manual of Woody Plant Propagation - From Seed to Tissue Culture*. Varsity Press, Athens, GA. (Advanced, technical publication).

Hartmann, Hudson T., Dale E. Kester, Fred T. Davis & Robert L. Geneve. *Plant Propagation - Principles and Practices*. (6th ed.) Prentice-Hall, Inc., 1997. (Technical book with all the information an advanced propagator needs to know, many good drawings and photos.)

Hill, Lewis. *Secrets of Plant Propagation: Starting Your Own Flowers, Vegetables, Fruits, Berries, Shrubs, Trees & Houseplants*. 1985. Storey Communications Inc., Vermont.

Phillips, Harry R. *Growing and Propagating Wildflowers*. 1985. Chapel Hill: University of North Carolina Press.

Pranis, Eva, and Jack Hale. *GrowLab: A Complete Guide To Gardening in the Classroom*. 180 Flynn Ave, Burlington, VT 05401. Phone: 802-863-1308; FAX 802-863-5962.

Toogood, Alan. *Plant Propagation Made Easy*. 1994. Timber Press, Portland, OR.

Toogood, Alan (ed.). *Plant Propagation: The Fully Illustrated Plant-by-Plant Manual of Practical Techniques*. New York: DK Publishing, Inc. 1999.

Young, James A. & Cheryl G. Young. *Seeds of Woody Plants in North America*. Dioscorides Press, 1992. (Revision of: *Seeds of Woody Plants in the United States*. Forest Service, U. S. Department of Agriculture. 1974. Agricultural Handbook No. 450. Washington, D.C.; Superintendent of Documents.)

PREPARING YOUR REPORT

To enter your project for evaluation, make a report on it following the guidelines below and mail to the project chair between May 1 and September 1. Every effort will be made to return your project, but you may want to make a copy of the project just in case a problem would occur. Reports will be returned via your state leader (if your state has a leader) or will be mailed back to you.

GENERAL GUIDELINES

1. Your entire report should be in your own handwriting. If you type it, please note at the end of the report that you actually typed it.
2. If you want to include some type of computer or word processor program in your report, include only original information that you have developed yourself and not a commercial or prepared program. Also be sure to indicate that you developed the entire portion done by a word processor.
3. Do not include a daily diary as part of your report. Just include totals, summaries and/or important items.
4. Enclose only the information requested (do not include other project materials or forms that might have been a part of another youth organizations' report). You may add your personal art work to your cover or inside pages if you wish.
5. Enclose your report in a thin, inexpensive binder or folder (not a heavy binder or notebook).

REPORT FORMAT

Review to make sure that all sections are included. Young students with emerging writing skills or those with developmental delays may choose to dictate their story into a cassette tape or use rebuses to enable them to complete their projects.

Please organize your report into the following sections:

Part 1: Fill out the Entry Page and use it as the first page of your report. Put your name and page number on every page after that.

Part 2: Tell briefly what you did in your project. This is where you would list participants for a group report. Example: I propagated 10 different kinds of houseplants using seven different methods.

Part 3: List kinds and numbers of plants you propagated.

Part 4: Project Report: Describe what you did in your project including important dates (such as dates cuttings were taken, seeds were sown, roots appeared on cuttings, seeds germinated, etc); special techniques (extra heat, use of hormones, etc.); use of special media (such as vermiculite, perlite, sand, or a commercial propagating mix); lighting arrangements, etc.

This section should be a rather detailed description of what you actually did in your project. Much of this information could be put in tables or charts and be much easier to read. This section is a summary of the things you should have been recording in your notebook.

Part 5: Include several photos of your project showing a nice sequence from the beginning to the end. They may be black and white or color. Mount the photographs in such a manner that they will not become separated from your notebook. Each photograph should be dated and have a short caption describing what it shows.

Part 6: Write a story telling one of the following:

- a. What you learned from your project.
- b. What you learned about propagation methods you used.
- c. What your project meant to you.

If you are in the 5-8 year old division, the story should be 50-75 words. If you are in the 9-11 year old division, the story should be 75-100 words long. If you are in the 12-14 year old division, the story should be between 100 and 200 words.

Send your entry no later than September 15 to:

Carol Norden
8516 Southfield Place
Raleigh, NC 27615-1834
Phone: 919-847-5462 or 919-368-5166
E-mail: cnorden@bellsouth.net

Your report will be judged on thoroughness, accuracy, originality, photos, and depth and breadth of project.