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Green Thumbs for a Cause: A Plant Care Manual for Therapeutic Horticulture Volunteers

Initial draft: Tips on growing potted plants indoors in an eldercare facility

“The watchful eye of the gardener is the best fertilizer for his garden” – old saying.

[This is a work-in-progress. The initial draft is focused on eldercare facilities, but we are going to expand it to cover other therapeutic horticulture situations. Some headings are given as place-holders for future content. — Alan Eddy, author of the initial draft.]

The headings below are grouped in A) Basic plant care, B) Potting and propagation, C) Selection of specific plants, D) Growing herbs indoors, E) Special Projects: Terrariums, Bonsai, and Topiary F) Health & safety of both plants and humans.

A1. Water

The tap water available for watering your plants is probably municipal water treated with chlorine and fluoride. Letting the water sit in jugs for 24 hours or more accomplishes two things: it lets the chlorine bubble out and lets the water reach room temperature. Most indoor plants are tropical or subtropical in origin and they do not like cold water right from the tap. If you cannot let the chlorine bubble out, then you may be able to mix cold and hot water from the tap to make room-temperature or lukewarm water for watering. This is true for both municipal water and well water. At times I have watered plants with a hose connected to cold tap water and it worked out okay (air temperature was 65-85 degrees and drainage in the pots was good).

Frequency of watering will vary for plants of different types. In one volunteer setting in a small greenhouse, I used small wooden stakes with color-coding dots. A red dot meant watering once a month or less (cacti and succulents). A yellow dot meant thorough watering every two weeks (jade plants, agaves, aloes, wax plants, and other plants that like to be dry). A green dot meant watering every week (most foliage plants and most flowers — this was the largest category). Plants that required special watering attention

(every 2-3 days), such as seedlings or orchids, received a blue dot. This system allowed for watering by volunteers on a rotating duty roster.

If you need the decision-making about watering to be faster and more accurate, you can purchase a moisture meter.

Drainage is a significant issue (see discussion below of potting soil and drainage material). Many years ago a graduate student in Horticulture told me that when watering a potted plant, one must be sure that at least 10% of the water comes out of the hole at the bottom of the pot. Sometimes it is necessary to come back and dump the excess water out of the saucer under the pot (a few minutes to an hour after watering). Dumping the excess water prevents root rot but is not necessary for all plants. If ambient conditions are dry and the excess water evaporates in less than a day, then dumping the water may not be required. Sometimes limitations of time and personnel make it impossible to dump the saucers. In that case, it may be necessary to select plants that are not prone to root rot. There are many plants that can tolerate these conditions, and proper drainage material in the bottom of the pot will help.

I have often seen recommendations for putting potted plants in a tray of pebbles. In this case, water flows out of the pot into the pebbles. The pebbles prevent too much water from being taken back up into the pot, and the evaporation of water provides ambient humidity for the plants. I have seen this strategy fail due to accumulation of algae and mold in the pebbles, and thus I do not recommend it. It may be necessary to select plants that can tolerate low humidity (there are plenty of them). Also, in place of pebbles you can try using some kind of grid in the tray. I have never done this, but a grid that can be easily cleaned with soap and water could be effective. The Connecticut mail-order company White Flower Farm has a product of this type called “Humiditray” (see photo provided by the authors, Figure XX). You may be able to purchase a less expensive version of this locally.

Growing plants on the windowsills of residents’ rooms or the ends of corridors presents special challenges for watering. In this case, having good trays or saucers under the plants is critical to preventing damage to the windowsill, furniture, or heating/cooling equipment under the pots. Also, arranging personnel to water plants scattered in many locations can be difficult. Putting the resident in charge of watering the pots on his or her own windowsill is great but be cautious of failure due to over- or under-watering. Perhaps the best strategy is to recruit volunteers with empathy and patience to take charge of coordinating plant care with residents. There are plants such as jade plant, wax plant, agave, and aloe that can survive on water every two weeks — the volunteer and the resident can water the plants together on that schedule. Be creative.

Hanging baskets: For watering hanging baskets, it is possible to purchase a plastic squeeze-bottle with a long hooked tube to put water up into the basket without a ladder. (See photo by the authors, Figure XX.) Water dripping onto a waxed floor can be a slip and fall hazard, and water dripping onto a carpet can cause mold. Plastic hanging baskets usually have a built-in saucer under them, but these saucers often overflow and spill water down below. One method is to take down hanging baskets, water them in a sink, work area, or outdoors, dump the saucer, let them drip, and then hang them up again.

Salinity can be an issue with potted plants. When I was taking an introductory class in soil science at Michigan State University, I was also volunteering at a skilled nursing facility that had a large room for potted plants. The air in the room was dry. I took some soil samples from potted plants that looked sickly and tested them with the “Sol-U-Bridge” salinity tester in the soil science lab. The salinity in the flower pots was equal to the Mojave Desert!

So, what is salinity? A soil with high salinity means it has large amounts of salts that prevent water from being absorbed by the roots. A plant in saline soil will appear stunted, discolored, and perhaps a bit wilted. Salts can build up when water does not drain all the way through the pot and out the drainage hole. When water evaporates from the pot or is taken up by the roots, salts can be left behind in the soil. Even minerals that are normally beneficial to plants can contribute to salinity if they build up too much in the soil. Tap water that has gone through a water-softener will be more likely to contribute to salinity due to higher amounts of sodium and lower amounts of calcium. If you have a choice of using softened water or unsoftened water, choose the latter.

So, what is the cure for salinity? A quick remedy is to water the plants with distilled water (in 2016 in Connecticut, distilled water costs about 80 cents a gallon). This is expensive for a large plant collection, but effective if the problem truly is salinity. In one place where I volunteered, the supply department of the skilled nursing facility was willing to deliver a case of six gallons of distilled water to the small greenhouse on request (about every six months). Salinity can be prevented by letting water drain out of the bottom of the pot with every watering (this flushes out the salts). If plants are growing in a pot that has no drainage at all, then watering with distilled water on a regular basis will prevent salt buildup. Note that with the distilled water you will need to add plant food periodically. Too much plant food can also cause salinity.

Special Watering Method A: Water with distilled water every time, and every month or two months as appropriate put a small amount of soluble plant food in the water and mix it well. Once or twice a year use a soluble plant food that has trace nutrients (which may be called “trace elements” or “trace minerals” or “micronutrients”). This watering

method is good for terrariums, bonsai planters, and pots with no drainage. Orchids do well with distilled water but need orchid food once a week.

Special Watering Method B: Same as Method A above, except that regular tap water is used for two thirds or three quarters of the waterings. This method is easier and less expensive for situations where Method A is not needed.

A2. Light

Light requirements differ for each type of plant. In your facility, only certain types of light may be available, so the trick is to match the plants with the available light. Light may be the most limiting consideration in your selection of what to grow.

In one volunteer setting, I was in charge of a small greenhouse that had a four-story building on the east side and a low wooded hill on the west side. When the obsolete four-story building was demolished, we suddenly had too much light! We implemented a solution of applying “shade paint” to the exterior of the glass greenhouse. (See photo by the authors, Figure XX.) To purchase this product, you will have to contact a company that sells supplies to the greenhouse industry — the usual garden centers and home improvement stores do not have it.

In this greenhouse, we had to re-apply the shade paint every year, usually about the second week of April. One year the facilities department decided to apply the shade paint to the INSIDE of the glass in the hope that it would last longer. In fact, it did not make much difference, and we returned to the method of exterior application. Interior application was difficult due to plants being in the way, and there was no benefit realized. The shade paint weathers throughout the year and becomes very thin after eight or ten months. This was not a concern in the Connecticut climate because we needed less shading in the winter anyway. We found it was important not to delay the April application, because the plants can be cooked by streaming sunlight as the days get longer. When the time came for the new application, the shade paint from the previous year was almost gone.

In your facility, you may have sunlight from windows, picture windows, or a solarium on only one side. The geographic location of your facility and the direction the windows face are both critical issues. Most books about indoor gardening discuss the issue of windows that face north, east, south, or west, so I will not repeat that here. Also, a facility in Florida will be different from a facility in Oregon, but those differences are obvious and probably well-known to you. If you have a north-facing window in a temperate latitude, you will have to be creative in plant selection so that you do not get the appearance of a hotel lobby. Many of the plants that tolerate low light and indirect light will remind you of commercial plantscaping.

One of the problems of sunlight from only one direction is permanent bending of plants due to phototropism. You can rotate plants one-quarter turn every month or so to prevent this. Seedlings are most prone to deformation from unidirectional light and require special attention in this regard. Experiment and see what works in your facility. Also, bear in mind that sunlight coming through glass differs from outdoor sunlight, and foliage plants can be scorched by direct sun.

Perhaps the only light available is artificial light. The plants that tolerate artificial light are often the least interesting from the perspective of therapeutic horticulture. You may wish to purchase “light carts” made specifically for plants, which will broaden your scope of plant material. (See photos by the authors, Figure XX.) Full-spectrum bulbs and other plant-specific lights are expensive but well worth the investment. LED grow lights may not be appropriate for an eldercare facility due to adverse effects on the eyes of residents. Selecting grow lights suitable for both plants and elderly residents is a complex issue worthy of your research time — talk to a supplier who specializes in grow lights.

Sometimes the default location of plants is windowsills in residents’ rooms or the ends of corridors, and conditions can vary widely. (See photos by the authors, Figure XX.) Be sure to carry a floor plan in your pocket or in your head labeled “north, east, south, and west.” When in doubt, experiment. In these situations, the cause of plant death is usually lack of water (or too much water), not lack of light. See discussion above about watering plants on windowsills.

One successful strategy is to rotate plants from windowsills to a favorable location such as a light cart, greenhouse, or solarium. The timing of the rotation will depend on the personnel available and can be done when plant appearance indicates a need for a move to a better location for a while. If possible, involve residents in the decision-making process – e.g. “your plant needs a vacation.” Bear in mind that this strategy needs to be customized since some plants do not like to be moved at all, such as the weeping fig *Ficus benjamina* which is well-known for dropping leaves when moved. African violets don’t like to be moved, either. If plants go outdoors to a patio for the summer, be sure to acclimatize them. Put the plants out for a few hours a day for a week before they go out full-time (gradually increasing the length of time). This can be a participatory activity. When the plants come back indoors, check for insects.

A3. Temperature

Usually the indoor temperature of any facility will be fine for indoor plants. If plants are transported outdoors in cold winter weather, they will need some kind of temporary protection. If a window is opened in the winter, the plants near the window can be moved temporarily to a warmer location.

In one facility where I volunteered, there was a large solarium in a dining area. (See photos by the author, Figure XX and Figure XX.) In the middle of a winter cold snap, the heating system failed in that area and half of the plant collection died. Fortunately, no sleeping areas were affected. This was a mechanical problem beyond the control of the recreation staff and the horticulture volunteers.

A4. Air, humidity, & drafts

Air quality is not usually a problem for plants. If humidity is not controlled by the ventilation system, there may not be much that the horticulture staff or volunteers can do about it. An old building with an old heating system may have low humidity in the winter heating season. There are plenty of plants to select that tolerate low humidity.

When I was a student at Michigan State University the undergraduate Horticulture Club conducted “plant clinics” for the students. There was something we observed that we called “dormitory disease.” This phenomenon occurred when a potted plant was put on a window sill with a heating unit on one side and a large single-glazed window on the other. The plant would experience warm air rising on the interior side and cold air descending on the window side. Most plants do not like these kinds of drafts and will not do well under these conditions. These conditions may be beyond your control, but try to select suitable locations for plants.

Humidity can be increased for a small area with humidifiers (be sure to follow cleaning instructions carefully). To avoid mineral build-up in the humidifier, fill it with distilled water each time. (See photo by the authors, Figure XX.) A less expensive option that takes a bit of time and effort is spraying water into the air with a spray bottle. (See photo by the authors, Figure XX.) Also, see the “Humiditray” information in the first section above about Water. Misting plants directly is another option, but do not do this when sunlight is on the plants (some plants should not be misted at all).

A5. Plant food

Although I am an advocate for organic plant foods, for indoor plants I find the conventional soluble and liquid plant foods practical and convenient. About once or twice a year I use a soluble plant food with trace nutrients (which may be called “trace elements” or “trace minerals” or “micronutrients”). Special plant foods are available for orchids, African violets, flowering plants, cacti & succulents, and acid-loving plants. Acid-loving plants include gardenias, hibiscus, ferns and *Ficus*. Slow-release fertilizer pellets may be suitable for use when feeding a large plant, but remember not to double up with liquid fertilizer on the same plant. Also, keep track of when the slow-release food will be depleted (see package directions). Reduce plant food applications in the fall and winter in temperate regions. If you give a plant a foliar feeding by spraying the leaves with dilute plant food, do this outdoors to avoid staining.

Overfeeding can be a problem, in terms of too rapid growth or soil salinity. If the plant food container says “feed every two weeks,” I change that to every four weeks or every six weeks. This method has been successful over many years. Sometimes, due to the slings and arrows of outrageous fortune, my plant collection has gone without plant food for six months or more. The plants did not suffer because of this — they were fine. (There were no orchids in the collection at that time.)

See Special Watering Methods A and B under the heading “Water” above.

When I was a member of the Horticulture Club at Michigan State University, I heard a fellow member describe an encounter with a student at one of the “Plant Clinics” held in the dormitories. A plant was brought to the clinic and the owner said “What is wrong with my plant? I give it plant food every day.”

A6. Cleaning and pruning plants

My favorite method for cleaning dust off of foliage plants is putting them outdoors on a warm rainy day. This can be a recreational activity for residents (as either participants or spectators as appropriate). This plan is not appropriate for African violets.

For some plants, it may be suitable to mist heavily with a spray bottle until the water runs off the leaves. For leaves that are smooth and durable, you can use a product called “Leaf Shine” (follow directions carefully).

Pinching or pruning can promote new growth and prevent plants from becoming leggy (best to do this in the spring or summer in temperate climates). Removing dead blossoms gives the plant more strength for re-blooming. This is especially important with miniature roses. Removing yellow and diseased leaves is important for appearance and health. For climbing plants, cut them back after flowering and tie in stray shoots.

Indoor trees and shrubs may have specific pruning requirements, so do some research before you prune. Dead branches and branches that cross each other can be removed any time. The weeping fig, *Ficus benjamina*, can be cut back severely in late winter. If you have a small citrus tree indoors, be sure to prune at the correct time.

B1. Pots, containers, and the re-potting process

I have worked extensively with donated pots and I have found that the type of pot does not make a huge difference. Plants in clay pots may need water with greater frequency. The inexpensive pots used for nursery stock are intended for temporary use and are not attractive enough for a permanent plant collection. Ornamental ceramic pots that have color glazes are attractive but can be heavy to lift. (See photos by the authors, Figure XX.) Breakage of clay pots may be a safety concern for your facility.

The size of pot selected for a plant is important. Even on a limited budget, having pots of the right size should be a priority. You may be able to specify sizes when requesting donations from a garden club. The roots of the plant should have room to spread out within the pot. Selecting a pot that is too large is called “overpotting” and can lead to root rot. When plant size and pot size are matched properly, the result is aesthetically pleasing and healthy for the plant.

Plants need to be re-potted periodically (spring is generally the best time in temperate climates). This has been a major source of activities for residents during my years of volunteering in skilled nursing facilities. The system I worked out is as follows. I would take an old twin-size flat bedsheet and spread it over a table (to catch the spilled potting soil and prunings). A standard plastic tablecloth works just as well. Then pots, soil, drainage gravel, tools, and supplies would be made available for the work project. Removing the plant from the existing pot may require assistance from volunteers or staff, especially if the soil is dry and hard. One technique is to turn the pot upside down, with one hand to support the plant (put the stem between two fingers). With the other hand, pull up on the pot to slide it off of the root ball. It may be necessary to knock the edge of the pot against the edge of a table to loosen the root ball in the pot. See discussion of potting soil and drainage below. I often put potting soil in dishpans with small scoops. Use of sharp pruning tools may require supervision. At the conclusion of the project, I fold up the table cover and shake it out over a compost heap.

Planting hanging baskets: Most hanging baskets come with built-in saucers to catch drips of water, but the usual saucers are too small to prevent water from overflowing onto the floor. Select baskets with large saucers that will not overflow. (See photos by the authors, Figure XX.) If watering the basket in a sink or outdoors, the saucer can be dumped before the basket is hung up again. Drainage material in the bottom of the basket may or may not be required — if you are able to plant successfully without drainage material then omit it (see discussion below about packing peanuts as drainage material).

Planting bulbs: Bulbs can often be planted without drainage material in the pot.

Planting cuttings: Newly rooted cuttings can be planted individually in small pots or in groups in larger pots. Water gently but thoroughly after potting to fill in air pockets. A small pot may not need drainage material.

For all planting operations, be sure the soil level is below the rim of the pot by about one inch or a little less. This allows space for water to be added to the pot without running over.

B2. Potting soil and internal drainage

There are many types of potting soil that will successfully support plant growth, but when selecting soil for resident activities I have a specific objective in mind. I want a rich, peaty soil that is not powdery or crumbly. My ideal soil can be easily compressed by making a fist and easily broken apart with a finger or thumb. I look for something that gives a satisfying feeling when you run it through your hands. Even while wearing gloves, one can still enjoy the texture. A quality garden center may call this “professional mix.” If you have to make budget decisions, don’t skimp on the soil. There is an ongoing debate about natural garden soil versus soil-less mixes based on peat, perlite, and other ingredients. Natural garden soil has micro-organisms that can be beneficial to the plant but may contain pathogens harmful to individuals with compromised immune systems. I think the soil-less mixes or sterilized composts are fine because the plant roots or seeds will bring beneficial micro-organisms with them. In most cases, residents will be wearing disposable gloves or gardening gloves when they handle soil or potting mix. Bear in mind that harvesting peat moss damages the environment, so keep an eye on quantities used. Compost works just as well. Special potting mixes are available for cacti & succulents, orchids, bromeliads, and African violets.

Drainage material: In the potting process, I would put two inches of gravel in the bottom of each pot. You can select a type of gravel of your choice from the bagged gravel available at home improvement stores. Avoid “beach gravel” that may have salt in it and marble chips that are too alkaline. The gravel should be large enough so that it does not fall out of the drainage holes in the bottom of the pot. One strategy is to put some large stones or pieces of broken clay pot over the holes and then put in two inches of pea gravel. The gravel has four functions: 1) it allows water to drain out of the pot, 2) it prevents water from being taken back up from the saucer, 3) it prevents the soil from falling out of the drainage holes, and 4) it acts as ballast to keep the pot from tipping over. Adding some bits of charcoal to the gravel is a good idea. You can buy horticultural charcoal sold for this purpose — it prevents buildup of mold and rot in the bottom of the pot. Do not use charcoal made for burning or grilling.

There are certain circumstances when the gravel can be omitted, such as when planting a small bulb, seedling, or cutting in a small pot. If the soil does not fall out of the drainage holes, then you are all set. Experiment and see what strategies work in your situation.

There may be times when you want a drainage material that is light rather than heavy, such as when potting a hanging basket. Styrofoam peanuts or noodles used for packing fragile objects for shipping are suitable for this purpose. The packing peanuts made from corn starch dissolve in water and are not appropriate. Test the packing product with water before using it in this way.

B3. Propagation techniques

Many plants can be propagated from cuttings as an activity for residents. Use of “rooting hormone” may be too risky with a vulnerable population, but for many common plants it is not needed anyway.

Here is a specific technique that I have used with easy-to-root plants such as wax plant and tip cuttings of geranium. 1) Take cuttings about five to six inches in length and remove the leaves from the bottom half of the cutting. 2) Take plain vermiculite and put it in a gallon clear plastic zipper-top bag, about three or four inches deep. 3) Add water to the vermiculite so that it is moist but not saturated. When you squeeze a fistful of moist vermiculite, a few drops of water should come out. That is the right amount of water. 4) Put the cuttings in the vermiculite (about three inches apart — do not overcrowd). 5) Blow air into the bag and zip it shut. This makes more space available for the cuttings. I also explain to residents that the carbon dioxide that we breathe out is good for the cuttings. 6) Put the bag in indirect light, such as a north window, for four to five weeks. It is not necessary to open the bag or add water during that time. 7) Remove the rooted cuttings and pot them up right away. For leaf cuttings of African violet, the time will be two or three weeks (see the section about African violets below in the A-Z list). This same technique will work for germinating lily seeds, but shorten the time span to three weeks.

Here are some instructions for propagating cuttings of the genus *Hoya*, quoted from the 1995 catalog of the Hill n’ Dale Nursery in Fresno, CA:

“Make a fresh, sharp cut just below a node (the point where two leaves are attached is the node)...With large-leaved species you can just cover the node and the leaf petiole with potting mix, leaving the leaves attached to the node and exposed to provide additional photosynthetic surface. With small-leaved types pinch off at least enough leaves to provide a stem area sufficient to pot...Firm the mix around the buried node with your fingers, wet thoroughly and mist the foliage occasionally...Most often cuts will root in a week or ten days, and new growth will start in a month or so. The time of year has a lot to do with this. Don’t wiggle or pull on your cuttings.”

The technique of using moist vermiculite in a zipper plastic bag will also work with hoyas.

There are many plants that can be rooted in water. Avocado pits, sweet potato sections, and carrot tops can be propped in water with toothpicks. Rooting in water tends to make weak roots and is not the recommended method. Never add plant food to the water when rooting in water. Adding horticultural charcoal to water can help keep the water sweet. Rooting willow branches in water can be an educational activity about how rapidly roots form and how willows are planted on streambanks for erosion control

and animal forage. Spring cuttings of pussy willow branches can double as both activity and decoration.

Fresh watercress, *Rorippa nasturtium var. aquaticum*, purchased from the grocery store will root in water or potting soil. Many garden books say that watercress has to be grown in running or still water, but this is not required. Watercress will be happy as long as its roots are in mud.

B4. Special considerations for growing plants from seed

C1. Specific types of plants: selected recommendations A-Z

African violets: These are the most popular indoor flowers. They bloom best in an east or west window, or possibly a bright north window (they don't like to be moved and they don't like drafts). They also bloom under artificial light. Use plastic or glazed pots only. You can buy potting soil and plant food made specifically for African violets. Avoid getting water on the leaves — water from below or water carefully at the edge of the pot. The water should be room temperature or lukewarm, and the soil should be evenly moist but not soggy. Rotate the plants one half turn every week. African violets do best when roots are potbound. Individual leaf cuttings can be rooted in moist African violet soil or vermiculite. Take leaf cuttings from the center of the plant, not the outer leaves. When roots have formed after 14-21 days, plant the cutting in a 2-1/4 inch plastic pot.

Bromeliads: This is the family *Bromeliaceae*, 3,170 species of flowering plants from the American tropics and subtropics, including Spanish moss, pineapple, and desert-growing succulents. Give them 1-2 hours of bright light per day (not direct sun) and fertilize every six months. Keep soil moist and do not let stand in water. Water with distilled water (see Special Watering Methods A and B above). Follow the directions that come with a purchased plant. Some bromeliads get watered in the center of the leaf rosette (but never put plant food in the rosette – put it in the soil).

Cacti and succulents: There are thousands of species of cacti and succulents in over twenty plant families. These plants can provide color and learning opportunities, and often last for a long time. Care requirements vary from plant to plant, so check the instructions that come with a purchased plant. Most of these plants require direct sunlight for at least part of the day, some require more. Since these plants evolved in dry climates, beware of overwatering and causing rot. For starting out a new collection, you might try some of the “pincushion” cacti, the “Tom Thumb” cactus, succulent spurges, or “hens and chickens.” Bear in mind that many cacti and succulents are technically poisonous in the unlikely event that plant tissue should be consumed by a person. Use common sense precautions to protect vulnerable people.

Geraniums (scented and unscented) *Pelargonium hortorum* and other species: The regular flowering geraniums can grow to be 24 inches tall, so plan for adequate space. Scented geraniums come in compact sizes. Geraniums like cool temperatures — days at 70 degrees F and nights down to 55 (this may not be possible in your conditions). Full sun in a south window is best for winter and move to a west window for the summer. In insufficient light, they will grow leggy and bloom sparsely. Pinch back the tall stalks to induce branching. Cut out spent blossoms with shears. This plant is a good choice for putting outdoors in a summer rain shower (monthly through the summer). Alternatively, geraniums can go out on a patio for the entire summer if you wish. If you are purchasing scented geraniums, ask for the ones with compact growth that will fit into a small area and do well indoors. Scented geraniums can be a source of aroma in the winter and make a good conversation piece. They are an excellent source of stimulation and satisfaction for blind residents and those with dementia. There are many different scents available: apple, apricot, camphor, chocolate, cinnamon, citronella, coconut, eucalyptus, ginger, gooseberry, lemon, lime, mint, nutmeg, orange, peppermint, pine, many variations of rose, southernwood, and strawberry. The lemon-scented geranium “Cy’s Sunburst” (a sport of *Pelargonium crispum*) is available from Well Sweep Herb Farm in Port Murray, NJ: www.wellsweep.com. The finely-divided leaves are gold and green. Another rare geranium is the Mabel Grey scented geranium, *Pelargonium citronellum* ‘Mabel Grey.’

Hoyas, also called wax plants: the genus *Hoya* contains 200-300 species native to Asia, the Philippines, Polynesia, New Guinea, and Australia. The most commonly used as a houseplant is *Hoya carnosa*, which, according to recent research, is good at removing indoor air pollutants. In their native habitats they are either epiphytic or terrestrial, and they have evolved to provide shelter for ants, one of their chief pollinators. Some small hoyas are excellent terrarium plants. Instructions for growing *Hoya carnosa* are listed below under “plants that get watered every two weeks.” Instructions for propagating hoyas from cuttings are given above in the propagation section. The web site of the International Hoya Association is www.internationalhoya.org.

Orchids: Tropical orchids that grow above the ground (epiphytes) can thrive indoors but have some special requirements. Purchase potting medium and plant food made especially for orchids. Most orchids can tolerate too little water better than too much — they usually need water about twice a week. Try to customize the watering by observing the plants closely. If the pot is a clay pot: a cold, clammy feel to the pot means it does not need water and a dry, dusty feel means it does. Since orchids do not get any nutrients from the potting medium, they need orchid food once a week. Orchids need 3-4 hours of direct sunlight per day, and bloom better if they do not get artificial light after sunset. If humidity is low, try misting orchids lightly in the morning.

Sago palm *Cycas revoluta*: This is a large slow-growing plant that incorporates well into lessons in botany. It is not a palm but a cycad — an ancient plant from the dinosaur era. This plant likes a few hours of sun in an east or west window, or a bright north window (artificial light will also work). If temperatures are above 70 degrees F, mist as often as possible. When soil surface is dry water thoroughly and dump the saucer. Feed all-purpose plant food half as often as package directs. Add a thin layer of potting soil to the surface of the soil once a year. Bear in mind that cycads are technically poisonous, in the unlikely event that plant tissue would be consumed.

C2. Recommended plants: indoor trees & shrubs, patio tropicals

C3. Recommended plants: windowsill plants & novelty plants

a) Foolproof plants for residents' rooms

1. ZZ plant, *Zamioculcas zamiifolia*: This low to medium light plant can be put outdoors in a shady area in warm weather. Water thoroughly every 7 to 14 days and let the soil dry out between waterings. Average indoor temperatures are fine. Give plant food monthly during spring and summer. This plant will grow to a large size and can provide an activity project when it needs to be re-potted.

2. Dracaenas: Use the more colorful plants of this group. Medium light plants, 60-85 degrees F. Keep soil moderately moist.

3. Neanthe bella palm, *Chamaedorea elegans* 'Bella': Low light plant, 60-85 degrees F. Water thoroughly when soil surface is dry — do not let soil become completely dry. This plant comes in all sizes and will grow larger over time.

4. Creeping fig (climbing fig), *Ficus pumila*: Medium light plant, 60-85 degrees F. Keep soil moderately moist.

5. *Peperomia obtusifolia* or *Peperomia obtusifolia variegata*: Medium light plant, 60-85 degrees F. Keep soil moderately dry.

6.

b) Plants that get watered every two weeks

1. Jade plant *Crassula argentea*: High light, medium temperature plant (55-70 degrees F). Put in a cool location near a sunny window. Keep soil moderately dry.

2. Wax plant *Hoya carnososa* or other hoyas: High light, medium temperature plants (55 to 70 degrees F). Keep soil moderately dry.

3. *Aloe vera*, also called Medicine Plant, Unguentine Plant, or True Aloe: High light, medium temperature plant (55 to 70 degrees F). Soil should be moderately dry. Propagate by division.

4. *Agave americana* Century Plant: High light, medium temperature plant (55-70 degrees F). Keep soil moderately dry.

5.

c) Plants with colorful flowers or bright foliage

1. Coleus:

2. Croton, *Codiaeum variegatum*: High light plant — put near a sunny window (temperature 60-85 degrees F). Keep soil moderately moist. The leaves provide color year-round.

3. Kalanchoe, *Kalanchoe blossfeldiana*:

4. Begonias:

5.

d) Scented plants for a richer sensory experience

e) Bulbs for forcing indoors, with instructions

1. Paperwhite narcissus: Put 2-4 inches of attractive stones in the bottom of a tall clear glass or plastic “hurricane vase.” Put narcissus bulbs on top of the stones, so close that they almost touch each other. Add more stones so that the tops of the bulbs are showing. Add water so that the level of the water is just at the bottom of the bulbs — keep this water level by adding more as water evaporates. For the first two or three weeks, keep the bulbs in a cool place away from direct sunlight (50-60 degrees F). After the bulbs sprout, move the bulbs to a sunny window. Keep an eye on the water level, since bulbs in active growth can dry out in a day or two. When blooming is finished, put the bulbs in the compost — they will not bloom again after being forced indoors.

2. Jonquils, miniature daffodils, or Tête-à-tête:

3. Other bulbs:

f) Novelty plants for fun and learning

1. Lucky bamboo, *Dracaena sanderiana*
2. Ponytail palm, *Beaucarnea recurvata*: This interesting plant likes temperatures of 60-70 degrees F, a bright light location, and moderately moist soil.
3. Piggyback plant *Tolmiea menziesii*: Medium-light, cool temperature plant (40-65 degrees F). Put in a cool location. Keep soil moderately moist. This interesting plant, also called “mother of thousands,” has tiny baby plants growing on top of the leaves. This can be a topic for group discussion during a plant work session.
4. Dwarf Egyptian Papyrus, *Cyperus papyrus*: a monocot plant, a sedge (with a triangular stem), that grows in the Nile Delta and in Sudan. The pith of the plant was made into writing-paper by the ancient Egyptians, but papyrus was also used for making reed boats, mats, rope, sandals, and baskets. It can be grown in a dishpan of water in a high-light location.
5. Ginger, *Zingiber officinale*:
- 6.

g) Plants to avoid

Based on my experience, here are some tips of plants to avoid. Spider plant, *Chlorophytum*, is easy to propagate but can get unruly and unsightly. The cast-iron plant, *Aspidistra eliator*, is over-used and lacking in interest. The same is true for Swedish ivy and prayer plant. Wandering jew and the tradescantias can get out of hand — use them with caution. Grape ivy can be successful if you have lots of space, but try to find something more original. The snake plant is overly common but can be useful because of its tolerance for dry air. See also Appendix A on poisonous plants.

C4. Hanging plants

D1. Growing herbs indoors: general instructions

Introduction to herbs: Most herbs grow best in temperatures ranging from 50 to 60 degrees F, so indoor temperatures can be a bit too warm. Try to find a cool location such as a sunroom or an area near large windows. The plants can be grown in a cool location and rotated to warmer living spaces on a regular basis (such as 2-week intervals). Almost all herbs need bright light. Herbs can go outdoors on a patio for the summer (check for insects when you bring them back inside). If you have herbs under grow-lights, put the lights on a timer for 14-16 hours per day (do not be tempted to run lights for 24 hours — the plants need a period of darkness). The distance between the

lights and the plants is important: leave some breathing room but not a long distance. The plants should not be heated by the lights, but should be close enough so they do not grow leggy reaching for light. The herbs mentioned below are just a small selection — there are plenty of books about growing herbs indoors if you want to branch out further.

At the time this paragraph was written (January 2016) the “Gourmet Chia Herb Garden” was available in local stores and pharmacies for \$7.99 plus tax. The kit includes three small pots, soil-less planting mix, and six packets of seeds: basil, chives, cilantro, dill, marjoram, and parsley.

The Herb Society of America is a good resource: www.herbsociety.org . The HSA Library has information on every aspect of herbs, including use of herbs by the native peoples of North America. Here is a tip from Karen Kennedy of the Herb Society: plan an herb activity with a theme such as lemon-scented plants. This theme could include lemon thyme, lemon verbena, lemon balm, lemon-scented pelargonium, lemon grass and lemon gem marigolds. For stress management, try growing chamomile. Another recommended container combination is scented geraniums, lavender, and chamomile. Branch out! Be creative!

Here are some ideas that can be replicated with a group of container plants:

- a) An 18th-century dooryard garden.
- b) An Elizabethan knot garden.
- c) A Native American herb garden.
- d) A tea garden.
- e) A Medieval monastery or convent herb garden

D2. Traditional herbs A-Z

Basil *Ocimum basilicum*: Both the green-leaved and purple-leaved varieties can be used in cooking — the dwarf varieties are best for indoor growing. Special varieties include anise basil, cinnamon basil, and lemon basil. Since basil is an annual, it will need to be replanted every year. You can start seeds in February or purchase small plants. Plant seeds one quarter inch deep and provide temperatures of 70-85 degrees F. Basil seeds take 7 to 14 days to germinate. Plant basil in a standard potting soil and, when mature, water every week. Put the plants in a sunny location or a brightly-lit area. Give plant food monthly at the rate recommended on the package. Using a thumb and forefinger or a pair of scissors, pinch out the tips of the shoots to prevent blooming. This will also make the plants more compact. Once flowers form on the plant, it will be less attractive and less useful in cooking. Basil plants can become large over their growth period, so plan ahead and re-pot as needed.

Mints (the genus *Mentha*): This large group of plants has been used for cooking, beverages, candy, and as a strewing herb for centuries. There are two that are especially good for growing indoors: American apple mint *Mentha gentilis* var. *variegata* and Corsican mint *Mentha requienii*. The former is good for the usual cooking use of mint and the latter is a conversation piece with a strong aroma similar to peppermint. A rare mint that does well in containers is Ginger Mint, *Mentha x gracilis* 'Variegata.' When the author lived in central Michigan in the 1970s, he found peppermint growing wild adjacent to the fields where it had formerly been grown commercially on a large scale. With the invention of artificial peppermint flavor, peppermint ceased to be a crop, but one can still find it escaped from cultivation in the windbreaks and streambanks nearby. Plant mint in a rich, peaty potting soil, water weekly, and give plant food every two months. Mint is more shade-tolerant than other herbs and will do well with indirect light. Once a year, repot mint by dividing the roots — saving only the best vigorous roots. Repot the healthy roots and your mint will last for years.

Oregano, *Origanum vulgare* and sweet marjoram *Majorana hortensis*: These herbs require a full-sun location and should be replaced with new plants once a year. You can customize the potting soil for these herbs by mixing two-thirds potting soil with one-third perlite. Keep the soil barely moist — water weekly or when the top inch is dry. Pinching back or cutting sprigs to use in cooking will keep the plants compact. Grown indoors, these plants reach a height of about twelve inches. Provide plant food monthly at half the recommended strength.

Sage *Salvia officinalis* and pineapple sage *Salvia rutilans*: These woody perennials of the Mint family require a full-sun location. Plant in a mixture of two-thirds potting soil and one-third perlite. Keep the soil barely moist — water weekly or when the top inch is dry. The normal height of sage is about two feet, but indoor plants can be pruned back to a height of one foot. New shoots can be pinched back. Sage plants grown indoors will become unsightly after three years, so start new plants from cuttings in time to replace them. Keep mature plants and new cuttings going in a three-year rotation. Give plant food monthly according to package directions.

Thymes (the genus *Thymus*): The best thyme for use in cooking is the common thyme, *Thymus vulgaris*. This small-leaved plant with woody stems grows outdoors as an evergreen in mild climates. Plant thyme in standard potting soil and place the plants in a full-sun location. Water it weekly but keep the soil moderately dry. Thyme can get straggly when grown indoors, so start new plants from cuttings in a three-year rotation. Shape the plants by pruning or cutting sprigs for use in cooking. Give plant food monthly at half the recommended strength.

D3. Unusual herbs: A-Z

Cleveland sage, *Salvia clevelandii*

Frieda Dixon pineapple sage, *Salvia elegans* 'Frieda Dixon'

Lemongrass.

Mexican marigold.

Nasturtium.

Orange balsam thyme, *Thymus vulgaris* 'Orange Balsam'

Purslane.

Portulaca oleracea var. *sativa* and *P. oleracea* var. *aurea*

Superb pink, *Dianthus superbus*

E1. **Terrariums**

E2. **Bonsai**

E3. **Topiary**

F1. **How to diagnose and treat ailing plants**

If leaves of a plant are turning yellow, there could be six causes: 1) too much plant food, 2) too little plant food, 3) too much water, 4) too little water, 5) too much light, and 6) too little light. See how easy it is to diagnose a plant problem?

Seriously, though, don't give up!

The first question to ask about an ailing plant is this: is it the oldest leaves or the newest leaves that are affected? If the oldest leaves are turning yellow, gray, or brown, that could be the natural growth cycle of the plant. It is normal for old leaves to fall off as new ones take their place. If the plant is in poor health, there will be other signs that will give you clues.

If the brand new growth is gray and shriveled, that means you need to take action right away. The plant could be too dry or could have a fungus disease. Take a look at the

temperature situation and drafts of air. Try moving the plant to a good location where most plants thrive, but quarantine in case of fungus diseases. If the new leaves turn yellow and start to fall off that could mean the plant is too dry. You can try giving the plant lukewarm distilled water in either of the situations mentioned here.

Other signs of an under-watered plant are as follows: plant is wilted, soil is dry and pulled away from the edge of the pot, there is very little new growth, and leaves may be brown and brittle at the edges. If the humidity is too low, the buds might fall off or not open and the leaves might droop. The leaves could also turn yellow or brown at the tips.

Over-watering is a more common problem, indicated thus: soil is soggy and may have white salt build-up on the top, leaves are limp and may turn yellow from the bottom of the plant to the top, and there may be some rot at the base of the stem. A saucer or tray full of water is another clue. If the plant is over-watered, dump the saucer and let the plant dry out. If the plant is losing leaves, it might not survive long enough to dry out. In that case, your best bet is to re-pot the plant in fresh soil.

If a plant is getting too much or too little light, it may need a new location.

Too little light is indicated by: new growth that is spindly with small widely-spaced leaves, and lower leaves that turn yellow and drop off. Two other clues are variegation turning solid and shoots reaching toward a source of light.

Too much light is indicated by: scorched patches on leaves, edges of leaves that are brown and brittle, and leaves that are faded or washed-out.

The diagnosis of insect and disease problems is beyond the scope of this document.

F2. Pest control: a brief overview

For serious insect or mite problems, your facility maintenance personnel may have a solution. Also, you can consult a Cooperative Extension Service Office or Experiment Station.

One non-toxic remedy that I was able to use as a volunteer was small yellow adhesive strips held by plastic rods inserted into the soil. These greatly reduced our infestation of white fly and fungus gnat. I bought these items (sold for this purpose) at a garden supply store. It is possible to buy the yellow strips in bulk and keep clipping them to the re-used plastic rods. The trick is to use lots of them — I had to put one yellow strip every four to six square feet in a small greenhouse to get sufficient control. The yellow strips with the trapped insects can be discarded.

The best way to control plant diseases caused by fungi or bacteria is to promptly quarantine or discard an infected plant. This technique also works for mites and slow-moving insects such as mealybugs, aphids, or cottony-cushion scale.

Insecticidal soap and other non-toxic control materials can be used but follow directions carefully and get permission from your facility.

F3. Poisonous plants to avoid (see also Appendix A)

F4. Safety

In an eldercare facility, it may be necessary to keep plant food, pest control materials, and pruning shears in a locked cabinet for the protection of residents with dementia or other impairments. Be sure to have a binder of Material Safety Data Sheets (MSDS) for all the chemicals that you use, even the ones that seem harmless.

Water spilled on floors is another safety hazard, and watering may often be done by residents, youth volunteers, or other untrained personnel. Develop a good rapport with the housekeeping and maintenance staff of your facility.

See separate Appendix A: Finding information about plants poisonous to humans.

End