A Jury-Rigger’s Guide to Seed Starting

I had all kinds of problems starting seeds inside a few years back, so I volunteered at the local greenhouse, potting, watering, etc. I befriended the owner and worked my butt off nights and weekends for free, and I learned a lot about growing from seeds and cuttings. I didn’t have the deep pockets it would require to set up an operation like they had, but I was able to achieve similar results by being creative.

Temperature: My plants all have very beefy stems and are pretty much root-bound when I transplant. I start all my plants on an unheated sun-porch in mid-February when outside temperatures are 0F/-18C to 20F/-7C. I run an electric heater so I can maintain a minimum of 40F/4C temperature. I plug it into a $12.99 thermostat controlled receptacle from Tractor Supply, so it turns on at 35F/2C and off at 45F/7C. Growing at 40F/4C is slow and puts the energy into roots and stems. Daytime temperatures reach 60-70F in the sunshine.

Tray Warmers: I also use homemade tray warmers to keep the soil about 85F/29C. Actually, they are used electric blankets from Salvation Army for $5.00 each, set on No.7. I use twin blankets, folded lengthwise (30" × 78"), and place them on the bench, and cover with plastic to keep them dry. It will heat 6 to 7 trays on it at the same time. I took a lot of heat about the fire hazards, but they have performed fine and safely. They are required by OSHA to be UL approved, so they have a ground-fault circuit which prevents electrocution or bursting in flames. They have to be safe because too many people spill glasses of water on them in the middle of the night. If you can afford commercial tray warmers, then by all means use them.
Humidity Domes: I use the tall humidity domes. They are a bit pricey at $6.00 each but they really work well in holding moisture and heat. I have 12 of them, which is just enough to fit on two electric blankets folded in half. Once the seedlings are about an inch to 1.5" tall I will remove the dome in order to get air circulation. The 3" tall domes will work as well and they are only $3.50.

Seed and Soil Prep: I always use a professional potting medium for germinating seeds. Seedlings don't require nutrients from soil until the first true leaves form. I prefer Sun-Gro Metro-Mix 360 Professional potting medium, though I have also used Miracle Gro Moisture Control Potting Soil. I try to avoid Jiffy starting Coir pucks, just because it is very difficult to control the moisture. I find that they're either saturated like a sponge or dry as a cork, and there's no middle ground. Coir Disks do work, though it just takes a little more monitoring of moisture. I always take my seeds and spread them out on a paper towel the day before planting. I mist the seeds, cover with another paper towel and mist again. I stack several layers of seeds between layers (labeling them). I place the stack in a warm area such as on top of the refrigerator for 24 hours. I don't usually try to sprout in the paper towels, although you can. For my first repot to a larger container, I use fine-screened compost mixed with perlite. I should mention to avoid peat moss for transplanting peppers, because it can slow the growth of the plant.

Air Circulation and Exercise: When the Starts get four real leaves, I run fans for several hours a day to get the leaves moving around (this builds bulky stems and reduces mildew). Greenhouses used to hire people to run broom handles over the tops of plants. Plants have growth responses to changes in their environment. Exposure to direct wind will cause the plant to grow beefier stems (thigmomorphogenesis). You don't want to blast them but give them enough of a breeze to gently sway the leaves. Poor air circulation can cause damping-off. If you've ever had a plant die because the stem shriveled to the size of a thread where it entered the ground, this is damping off disease. This can be avoided by getting air circulating to evaporate the surface moisture at the top of the soil.

Feeding your Starts: I try not to spray water on the plants so as to minimize the chance of damping off. I bottom-water, filling the lower tray with about 1/4" of water. I wait until the starts are about 3" (7.6cm) tall with at least 4 real leaves before I start feeding them. If you are not concerned about non-organic fertilizers, I would suggest Jack's Classic 20-20-20 All-Purpose, and 10-30-20 Blossom Booster. Jack's is one of the better non-organic choices. I use three different organic homebrew liquid fertilizers, 11-1-13 for seedlings, 7-6-7 for foliage growth, and 6-11-7 for blossoming. Each mix is rich in micronutrients. I feed in the greenhouse with 11-1-13. High Nitrogen and Potassium with low phosphorous promotes bulks stems and compact plants. Whenever I transplant I feed with 6-11-7 for a week to minimize transplant shock and promote root growth. I then switch to 7-6-7 because I want to feed for stem and root growth, not fruiting, at this stage. As soon as I see blossoms I switch to 6-11-7 for two weeks to promote blossoming and fruit development. Finally, I alternate between 7-6-7 and 6-11-7 through the end of the season.
My Organic Homebrew Liquid Fertilizer:

**MIX 1 BULK** - Greenhouse Mix for Stocky, Beefy Stemmed Plants
Applied weekly from 4 leaves through planting out.
High N, Low Phosphorous, High K = 10.6%N - 0.75%P - 13.%K - 1.9% Ca - 1.1%Su - 0.3%Mg
3 tsp Blood Meal
1 tsp Sulfate of Potash
2 tsp Rabbit Manure Tea Dried (high Micronutrients)
1 tsp Kelp Powder
1 Gallon Water

**MIX 2 BLOOM** - Mixture for Transplant Shock & Blooming
Applied immediately after transplant to Garden
High Phosphorus = 6.2%N - 11.2%P - 6.6%K – 17%Ca - 2.3%Su - 0.25%Mg
1 tsp Blood Meal
2 tsp Bone Meal
2 tsp Rabbit Manure Tea Dried (high Micronutrients)
0.5 tsp Sulfate of Potash
1 Gallon Water

**MIX 3 FOLIAGE** - Balance Mix for Pre-Blossom Garden Plants
Applied weekly from plant out until blossoming
Balanced Nutrients = 6.9%N - 6.0%P - 6.9%K – 9.9%Ca - 3.2%Su - 0.3%Mg
2 tsp Blood Meal
2 tsp Bone Meal
0.5 tsp Sulfate of Potash
2 tsp Rabbit Manure Tea
1 tsp Kelp Tea Dried
1 Gallon Water

**Lighting your Starts:** The real key is to give them lots of light. I run my lights so the plants have an 18 hour day. You don't need fancy grow-lights unless you're growing professionally, because most don't really work that well. I'm a retired Optical Engineer and did extensive grow-light research documenting their effectiveness. Most growlights have peak wavelengths well outside of "PAR", or the plant's wavelength requirements. A simple T8 two or 4- tube florescent with daylight 32-watt bulbs will produce great plants indoors. Keep your lights within 12" (30cm) maximum above the top of the plant. Try to pick a bulb with as close to 6500 Kelvin color temperature as possible. If you have long spindly seedlings, this is primarily a result of not enough light.
**Stress-Free Transplanting:** When you transplant from a multi-cell tray to a larger pot, try not to disturb the roots. I make a tool, by taking one of the cells and filling it with Bondo body putty and stick a popsicle stick in it for a handle. When I'm preparing a larger pot, I use the "popsicle" to leave an indentation in the soil exactly the shape of the seedling block.

When I remove the potted seedling from the cell, I simply drop it into the indentation. Since it fits perfectly, I don't have to disturb the roots. I gently smooth the top and the seedling is transplanted without stress. Every time you disturb the roots of a seedling, you stunt the growth for a week or more.

**Regular Transplanting to larger Pots:** I save plastic Yogurt Cups and cottage cheese cups all summer long, enlisting friends and neighbors to save theirs for me too. I drill two 1/4" (6mm) holes in the bottoms, and I have great pots for regular transplanting to a larger pot. I recently got a great deal on fifty 12-oz plastic cups for $1.39 at a Wholesale Party Supply Warehouse store. I drill a hole in the bottom and pot up my plants in them. I never use peat pots, again, because it sucks the moisture out of the soil very quickly. As soon as the roots fill the pot, transplant to a larger pot. Be sure to thoroughly clean your pots between uses. I sterilize mine in a dishwasher to minimize transmitting diseases. When transplanting you should always add a liquid fertilizer with a high Phosphorous (P) content to reduce transplant shock. I prefer Jack's Classic 10-30-20 Blossom Booster. You need to put the majority of the plant's energy into developing root structure and bulky stems. That way when you transplant, they grow like crazy.
**Hardening-Off your Plants:** Whenever you start plants inside, you will need to harden-off the plants before planting out. Hardening is 10% about acclimating to temperature and 90% about building resistance to the sun’s UV Light. Direct exposure to the sun’s UV will cause the leaves to sunburn and turn white.

Proper hardening is not an easy task, especially for people who work outside the home. Most people start out by placing plants in the shade, then moving them to partially sunny areas for an hour or two, and then back into the shade, etc. All it takes is one distraction and you could lose all your plants from sunburn. The small portable greenhouses are all UV-coated to block UV light, so you can’t harden in these. Any greenhouse plastic is UV coated to make it last several years in the sun. It has absolutely nothing to do with protecting the plants from UV.

Here's the trick to fool-proof hardening. The first step is to purchase a 10’×10’ 4-mil clear plastic dropcloth from Home Depot or any paint store. Make sure it is at least 3-mil thick material, and it can be clear or translucent. Greenhouse film blocks 98%-99% of UV light, while normal poly film blocks significantly less. A 4-mil thick clear plastic material will block about 25%-30%, and 6-mil plastic blocks 35%-40% of UV light. Ultraviolet (UV) light is the harmful rays that give you a sunburn at the beach, so the plastic sheet acts like a good sunblock, preventing plants from sunburning. I picked up a roll of 4-mil 84” × 72” clear plastic bags on Craigslist. Depending how many plants you have to harden, I would suggest that you make a plastic covered lean-to. I took a plastic patio table and turned it upside down, then covered it with clear plastic with duct tape. Keep the North side open so you have access to water you plants and good air circulation. Here's an even simpler hardening tent using 2 lawn chairs and some duct tape.
As I started more and more plants, I covered an old 10'x10' $39.00 screenhouse frame with plastic. Now I use 6-mil translucent plastic covered 10'x20' portable carport frame for my hardening hoop-houses that I picked up on Black Friday for $125 each.

You don't need deep pockets to grow healthy plants, just resourcefulness, creativity, and persistence. I don't claim to be an expert on anything, but this works for me.

Happy Growing ...