



Wisconsin Fast Plants™

Growing Instructions

Wisconsin Fast Plants™ (*Brassica rapa*) are the product of 30 years of plant breeding at the University of Wisconsin—Madison. Originally selected under continuous fluorescent light to grow and reproduce quickly for research purposes, these petite, fast-growing plants have been used for teaching biology concepts in classrooms worldwide for over 15 years. Related to crucifers (plants in the mustard family, such as broccoli, cabbage, and turnips), Wisconsin Fast Plants™ complete an entire life cycle in 40–45 days.

All biological organisms require care and attention. Wisconsin Fast Plants™ have been bred to be low maintenance. These *Growing Instructions* are designed to help you grow robust, successful Wisconsin Fast Plants™ through an entire life cycle. Plants grown under alternative conditions may take longer to complete the life cycle. At the end of the life cycle, the new seeds can be planted or stored for future classes.

For ideas about how to use Wisconsin Fast Plants™ in the classroom, refer to www.fast-plants.org.

Time needed for entire life cycle: 40–45 days
It is recommended that you plant seeds on a Monday.

Four Easy Steps for Growing Successful Wisconsin Fast Plants™:

1. Continuous Fluorescent Light

- Fluorescent lights should be on 24 hours a day.
- Choose a light system (at right).

Either light system can be ordered from Carolina Biological Supply Company (call 1-800-334-5551) or constructed from household materials and hardware store supplies (see www.fastplants.org for instructions).

The Plant Light House (catalog number 15-8997) can hold 11 growing systems. The Plant Light Bank can hold 25 growing systems (catalog number 15-8998).

- **Construct or assemble the light system** according to the instructions, then plug it in and leave it on, 24 hours a day.

2. Continuous Water and Fertilizer

- Use the nutrient solution (made from the blue fertilizer crystals that are included with kits) and the self-watering growing system to keep your plants fed and watered continuously.

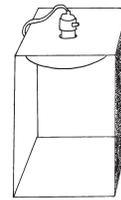
3. Consistent Room Temperature

- Optimal room temperature: 65–78 °F (18–26 °C)
- Keep a thermometer near the plants and check the temperature regularly.

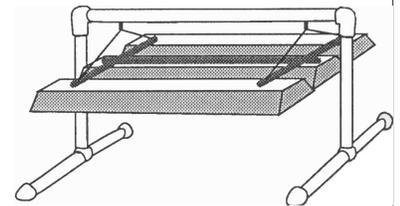
4. Potting Mix

- The plant roots need the aeration that a light potting mix provides, so use a peat/vermiculite potting “mix” (included with kits)

rather than a heavy “soil.”



Plant Light House



Plant Light Bank

These growing instructions are written for the Plant Light House, but the same growing methods apply to the Plant Light Bank.

Important note: If bulbs are used for extended periods, the plants may appear spindly and exhibit signs of delayed growth and development. Purchase new bulbs every three years.

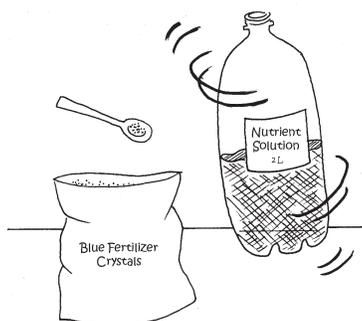


Wisconsin Fast Plants™

Step-by-Step Growing Instructions

Day 0: Assemble Growing System and Plant Seeds

Make Nutrient Solution



Make nutrient solution by adding 1/2 tsp of the blue fertilizer crystals to 2 liters of tap water. Shake well. Store in the dark.

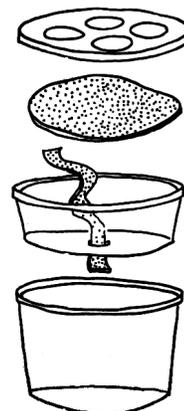
Wet Watermat



Wet the watermat and wicks thoroughly in tap water.

Assemble the Growing System

Insert the long wick through the hole in the smaller container so that all but 3-4 cm hangs down into the lower reservoir. Place the watermat in the small container so that it is covering and touching the upper 3-4 cm of the wick. Cover with the lid.



Put Potting Mix in Pots

Thread a small watermat wick through the hole on the bottom of each pot. Fill each pot with potting mix until it is level with the top of the can. Do not pack the potting mix down.

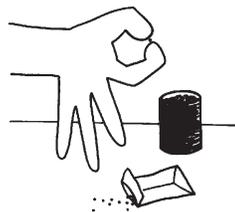


Wet the Potting Mix



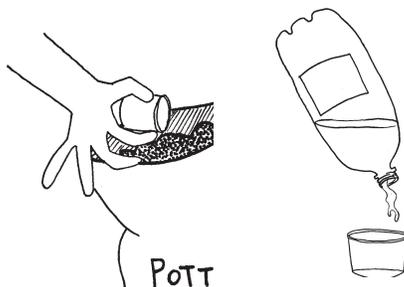
Gently pour water over the potting mix until it runs out the bottom of the pot.

Plant the Seeds



Place 3-4 seeds on top of the wet soil. Distribute them evenly. Do not press them down. Label pots with name and date.

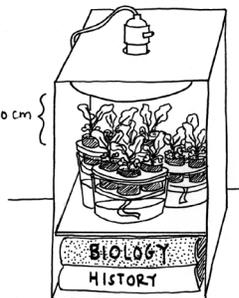
Cover Seeds with Potting Mix



Cover the seeds with a thin layer of potting mix. Do not pack it down. Pour Nutrient Solution over the top until it runs out the bottom. Fill reservoirs with Nutrient Solution.

Put Pots in Plant Light House

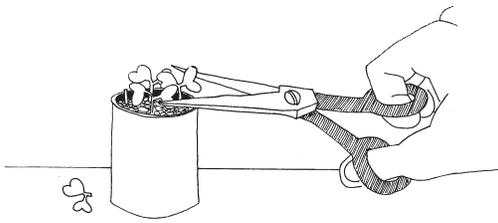
Place the pots in the growing system. Press the pots down so that the wick on the bottom of each pot is touching the wet watermat (but do not press the potting mix). Place each growing system into the Plant Light House. Prop the growing systems up so the top of the pots is 10 cm below the light. Turn on the light, and leave it on 24 hours a day.



Reminder:

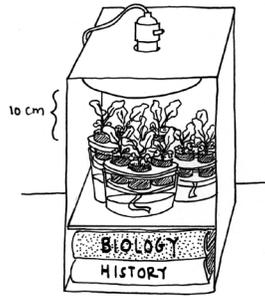
Keep the light on 24 hours a day.
Replenish the nutrient solution often.
Monitor the room temperature.

Day 4: Thin the Plants



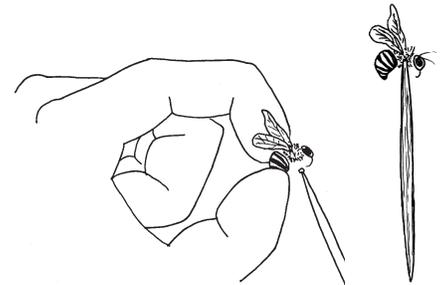
After the plants germinate, remove all but one or two plants per pot to prevent crowding. This is called **thinning**.

Days 5-12: Tend the Plants



Replenish the nutrient solution often—a big growth spurt is coming! Every other day, adjust the growing systems so the top of the plants is 10 cm from the light.

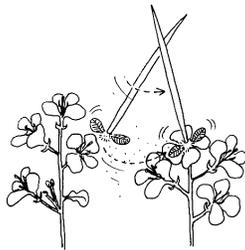
Day 13: Make Beesticks



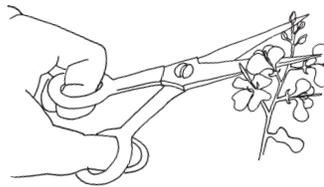
Place a drop of glue on the tip of a toothpick. Poke the toothpick into the tip of the thorax (mid-section) of a bee. Let the beestick dry overnight.

Days 15-17: Pollinate Flowers

Brush the bees into the flowers to pick up and distribute pollen. Transfer pollen back and forth among several plants. (Wisconsin Fast Plants™ do not self-pollinate.) Pollinate the flowers for 2-3 days. Look at the bees to see if they are picking up pollen. (For more information on pollination and making specific crosses,



Day 18: Terminate Buds



One day after the final pollination, cut off any new flowers or buds so the plant can channel its energy toward seed growth. **Do not** cut off flowers that were pollinated.

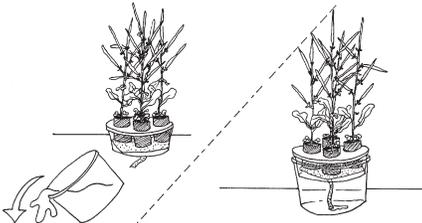
Days 19-36



Reminder:

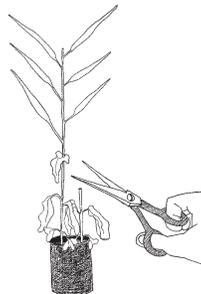
Keep the containers full of nutrient solution until day 37.

Day 37: Stop Watering



Twenty days after final pollination, remove plants from the nutrient solution and allow them to dry for **one full week** in their pots until they are brown and crispy.

Day 44: Harvest Seeds



Cut off the stems and seed pods with a scissors.

To harvest a few seeds, or if small children are harvesting seeds:

Place seed pods between two pieces of clear tape with the ends folded over. Crush the pods inside the tape, then peel open to get the seeds.

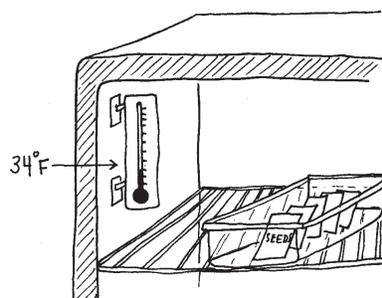


To harvest many seeds:

Place the stems and pods in a paper bag and crush them inside. Pour the contents into a dish, blow off the chaff, and pick out the seeds.



Seed Storage



Store the seeds in a dark, cool, dry place... or plant them for another experiment or activity.

Clean Up



Soak the reservoirs, pots, watermats, and wicks for 10 minutes in a solution made up of 95% water and 5% bleach. Scrub, rinse, and let air dry.

Tips and Troubleshooting

All biological organisms require care and attention. Wisconsin Fast Plants™ have been bred to require only minimum maintenance, but occasionally problems occur. This section offers tips for growing successful plants, as well as troubleshooting suggestions. For more tips, suggestions, or classroom investigation ideas, see www.fastplants.org.

Problem	Possible Reasons	Solutions
Poor Germination	Seeds planted too deep in pot..... Potting mix was compacted during planting Potting mix was not sufficiently watered after planting Seeds washed out of pot Room temperature is too high or too low	Replant. Replant. Try watering from the top of pots until water drips from below. Replant. Adjust temperature.
	<i>If seedlings do not appear within 4 days after planting, start over.</i>	
Plants Grow Slowly	Too cold Not enough light Not enough food or water	Make sure the school temperature isn't lowered on weekends. Move plants away from drafty windows or air conditioners. Keep the light on 24 hours a day. Bulbs have been used for more than three years. (If bulbs are used for extended periods, the plants may appear spindly and exhibit signs of delayed growth and development.) Prop plants up to within 10 cm of the lights, using books. Replenish the nutrient solution often.
the		Verify that watermats and wicks are moist and touching each other. Are the wicks positioned correctly in the bottom of each pot so that they are touching both the potting mix and the round watermat? Is long watermat strip reaching into the nutrient solution in the bottom reservoir? Were the watermats and wicks wet thoroughly? If the reservoir ran dry and the plants are wilting (but not yet crispy)
	you may be able to save them. Water the pots from the top to re-saturate the potting mix and re-establish the capillary action of the watermats. Be sure that the wicks are dripping and the potting mix is thoroughly moistened.	
Plants are Spindly	Not enough light Not enough food Too many plants per pot.....	See above. See above. Remove all but 1-2 plants per pot (best done at day 4).
Plants Tip Over	Tall plants	Stake the plants, using the wooden stakes and ties (days 11–20).
Plants Wilt	Not enough water.....	See above.
Plants Die	Not enough food or water Old watermats..... Plants were damaged during handling	See above. Soak for 5 minutes in a 5% vinegar solution to clean; rinse thoroughly. Start over.
Seeds are Not Produced	Inadequate pollination..... Room temperature too high.....	Was pollen transferred among many different plants? (Wisconsin Fast Plants™ do not self-pollinate.) Was pollination done on days 15-17 using a beestick? Was pollen (yellow dust) visible on the beestick? Adjust temperature. (Plants may lose ability to produce pollen at high temperatures.)

