

# EDVOTEK® Quick Guide: Quick Plants™



## What is a Quick Plant™?

The scientific name for Quick Plants™ is *Arabidopsis thaliana*. These small, weed-like plants are members of the mustard family, Brassicaceae (Cruciferae). Quick Plants™ normally grow as a rosette of leaves out of which a tall inflorescence develops. In spite of its humble appearance, *Arabidopsis* has become a superstar model organism for plant geneticists and molecular biologists.

## What is a Model Organism?

A model organism is any plant, animal or microorganism that allows us to study fundamental questions in biology that may be hard to study directly in complex organisms like humans.

## What makes *Arabidopsis* a good model organism?

- 1) Small size of plants – Large numbers to be grown in a small space in the laboratory, growth chamber or greenhouse.
- 2) Easy to cultivate – The seeds are planted on small peat pods that can be grown in plastic food containers. A plant growth incubator can be made using a box, a shop light, and aluminum foil (see pg. 3). After germination, the plants are amazingly hardy, ensuring your students will have success with the experiment.
- 3) Fast generation time – Seeds planted today will grow into mature plants in three to four weeks. This is an advantage in the classroom because students can make experimental crosses and raise several generations in a single semester.
- 4) Small, sequenced genome – Many plants have very large genomes, making it difficult to study specific genes. The Quick Plant™ genome is a very small genome consisting of 5 chromosomes. In fact, the sequence of the *Arabidopsis* genome was published in 2000, making it easy to identify and characterize mutants.



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## Growing Quick Plants™ - *Arabidopsis thaliana*

1. Hydrate peat pods in warm water for 30 minutes. Drain off any excessive water and place the prepared pods in a shallow plastic tray (e.g. a plastic food container or a small tray). Several peat pods can be put together in a small container (Figure 1).
2. Add 0.5 ml water to each tube of seeds. Use a small transfer pipet to spread the seeds evenly on the soil surface. Each genotype should be distributed between five pods. Be sure to keep track of the genotypes of the seeds in each pod.
3. Place the seeds directly under fluorescent lights or in direct sunlight from a window. Do not cover the seeds with soil or a lid; the seeds require light for germination.
4. Keep pods/seeds moist and place lights very close to pods while the seeds germinate. This will take approximately 4-7 days.
5. After the seeds germinate, be sure that the peat pods remain moist – the plants will not thrive if the soil mixture is too dry or too wet. For optimal results, mist the plants daily with a dilute (1/4 strength) solution of balanced commercial fertilizer.
6. Allow the plants to grow for 2-4 weeks before performing the experiment. For best results, the seedlings should be approximately 4-6 cm.

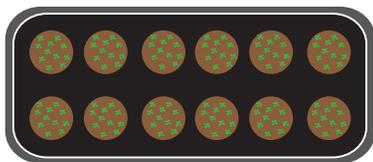


Figure 1: Seedlings in their pods.

### Helpful Hints and Notes

#### Planting the Seeds:

- To help break seed dormancy, refrigerate the seeds for 2-3 days before planting. This “tricks” the seeds into signaling that the cold season is over and that the growing season can begin.
- If not using the included peat pods, students can use a peat-based potting mix. Use light soil mixtures with ample peat moss, and sterilize before planting in order to avoid any pest contamination. Alternatively, use commercially prepared mixes, such as Metromix 350 or ProMix BX. The surface of the soil should be approximately 1 cm from the top of the pot. Be sure that the seeds are not covered by the soil because light is required for germination.
- If your classroom is dry, cover the samples with clear plastic wrap to maintain the appropriate humidity for germination. Be sure to perforate the plastic wrap to allow for airflow. Remove the plastic wrap after sprouting is observed.

#### Temperature:

- The optimal temperature range for germination and growth of Quick Plants™ is 22- 25°C.
- Before beginning the experiment, be sure your classroom maintains a constant temperature at night and over the weekend. Temperatures above 28°C and below 18°C will affect growth and development.

#### Lighting:

More than any other factor, light determines how quickly the plants will grow and develop. With proper lighting, germination should occur within seven days. Plants may take another 2-4 weeks to grow to the proper size.

- Fastest growth is under continuous fluorescent light (no day-night cycle is necessary). We recommend using workshop clamp lights, which are easily and inexpensively configured in a classroom or lab. See Appendix D for directions on creating a plant growth chamber. This lighting condition may produce compact sized plants.
- On a bright windowsill, the plants may take 1-2 weeks longer to develop, but are larger in size.
- Slowest growth occurs under low light conditions, such as a poorly lit windowsill.

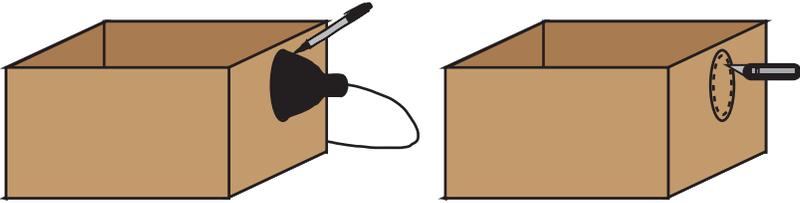
#### Watering:

- Quick Plants™ are amazingly hardy after germination. Water plants as needed to avoid water stress and to prevent fungal growth on the soil surface.
- If contamination does appear, allow the surface of the pods to dry and scrape the fungus from the soil surface with care.

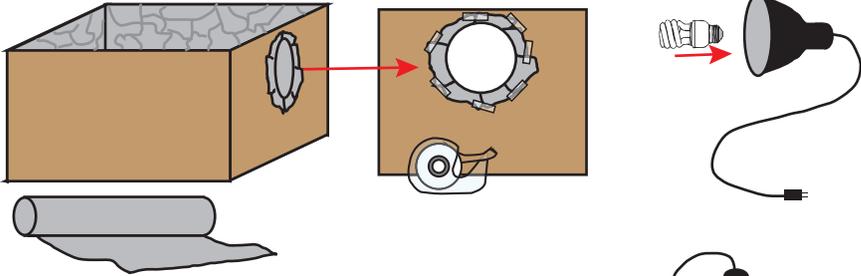
## Creating a Plant Growth Chamber

A plant growth chamber can help ensure success with Module I of this experiment.

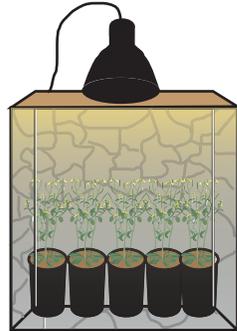
1. Place the reflector lamp on the top center of one of the sides of a small cardboard box. Use a marker or pen to trace a circle around the lamp.
2. Cut a circle 1 cm smaller than the traced circle.



3. Use aluminum foil to line the inside of the box. Use extra pieces to cover the hole. Tape foil in place.
4. Screw the CFL bulb into the lamp.



5. Place the lamp over the hole. Secure with tape.
6. The plant growth chamber is ready to go! Use a small box or riser to adjust the proximity of the potted seeds to the light depending on the seed type and the lighting requirements.



### Materials Needed:

- Open top cardboard box (12x12x12 or similar)
- Marker
- Aluminum foil
- Tape
- Reflector lamp
- 23W Compact Fluorescent bulb (CFL bulb)
- Razor or sharp knife

# Related Products

Browse all of our products and full range of equipment on our website:  
[www.edvotek.com](http://www.edvotek.com)

## Quick Plant™ Seeds - Brassica

Cat. # 1225 50 seeds

Cat. # 1226 200 seeds

## Wild Type Seeds - *Arabidopsis Thaliana*

Cat. # 1251 150 seeds

Cat. # 1252 300 seeds

## Dwarf Type Seeds - *Arabidopsis Thaliana*

Smaller, more compact

Cat. # 1255 150 seeds

Cat. # 1256 300 seeds

Cat. #S-41

## Which Quick Plant™ is the Mutant?

Gregor Mendel studied pea plants over the course of many years to understand inheritance. Now your students can use 3 different genetic strains of Brassica Quick Plants™ to see the genetic ratios for themselves.



Cat. #515

## M36 HexaGel™ Electrophoresis Apparatus

The latest in electrophoresis design! Our newly reengineered M36 Electrophoresis Apparatus supports up to six groups of students. Produces excellent results in 30-40 minutes and includes a lifetime warranty. Made in the USA.

Cat. #502/504

## M12 Complete™ Electrophoresis Package

The latest in versatile electrophoresis design! Our newly reimagined M12 Complete™ Electrophoresis Package supports up to two groups of students in two standard length gel trays for experiments that require less separation, or one long gel tray for experiments that require more. Produces excellent results in 30-40 minutes and includes a lifetime warranty. Made in the USA.



Cat. #509

## DuoSource™ 150 75/150 V Power Supply

The DuoSource™ 150 is a great value and runs gels quickly in only 20-30 minutes (at 150 V)! Can operate two M6Plus units, two M12 units or two HexaGels. Made in the USA.



Cat. # 590

## Edvotek® Variable Micropipet

This best selling Variable Micropipet is designed for volumes ranging from 5 to 50 µl. It is sturdy, easy to use, highly accurate and uses standard micropipet tips. The volume is selected by twisting the top. The lightweight design and tip ejector makes operation fast & easy. A tool and instructions are included for self-calibration.



Many more sizes are available on our website: [www.edvotek.com](http://www.edvotek.com)