

636-2000 (74-150) Greenbox™

Setup, Operation, and General Information

Congratulations on your purchase of a Science First Greenbox™! When it comes to gardening inside your classroom, you won't find an easier to use or more capable unit anywhere. Your versatile Greenbox™ combines good design with quality materials, and thus will last for years.

The Greenbox™ is best used in areas where natural sunlight is weak or nonexistent. This can be areas of a classroom that are far from windows, classrooms on the north side of the school, or any area that does not receive an abundance of sunlight. The Greenbox™ is designed to function completely independently of the sun. A good experiment is to place two otherwise identical plants in two locations: in an area bathed in sunlight, and under the Greenbox™. Growth rates can be compared, and a discussion of indoor versus outdoor farming can take place.



The Greenbox™ can be used to teach the following concepts: photosynthesis, plant biology, plant life cycle, the scientific method, comparative metabolism, horticultural techniques, and others. It also is a good tool for class projects and long term experiments on plants. The Greenbox™ is essentially immune to decay; it can be used by a class all year long, stored for the summer, and used again for the next class. This cycle can repeat for many years. Since the same piece of equipment is being used from class to class, experimental results can be compared to data gathered by previous students. This level of long term experimentation yields higher quality data, and is difficult to obtain with other equipment.

The Greenbox™ is also a good tool to introduce students to the concept of sustainability. It can be used to show that food production does not need to be dependent on the sun or temperate weather, which means it can take place in inhospitable areas of the globe. The ultra-efficient bulb uses very little electricity yet produces high growth rates, meaning more plants can be grown for less money. The materials are almost completely recycled, reducing the energy that went into making the unit. The Greenbox™ is highly durable, needing replacement very infrequently, which further reduces its environmental impact. All of these factors show how technology can reduce resource consumption while improving functionality. In this day and age, that is an idea that must be considered.

Setup:

When you first receive the unit, check to make sure all the parts are in place. You should have the following:

- One (1) main tray.
- One (1) upper shelf. Underside has center hanging strip.
- One (1) light fixture with adjustable hanging fixtures.
- Two (2) C shaped hangers.
- Two (2) S shaped hangers.
- Six (6) seed trays. This is where you'll do your growing.
- Six (6) pads of growth medium. These hold on to water and nutrients. They also allow for hydroponics.

You may notice that you received no screws or bolts. This is by design. The Greenbox™ assembles without tools or hardware, making it very easy to put together, even by students. To assemble it, please refer to the following directions:

1. Slide pipes into the sockets in the bottom tray.
2. Assemble top shelf using sockets to fit pipes.
3. Attach C shaped pieces to the center strip under the top shelf in the desired hole position.
4. Adjust the hanging fixtures on the light assembly to match the position and use S hooks to hang.
5. Drop the seed trays into place.

That's all there is to it! Once you've gotten the hang of it, a Greenbox™ can be assembled in about two minutes. Since there are no tools required, even young students will be able to put one together on their own. When you need to take down the unit, simply follow these directions in reverse. Refer to figure 4 for the fully assembled unit.

The next step is to add plants.

Operation:

The Greenbox™ can accommodate seeds or seedlings. It can also be used with soil or hydroponics techniques.

Soil Farming:

If you are using plants in pots, no further action is needed. Simply place the pots in the main tray and activate the light. Water and feed as needed.

For seeds, place a layer of planting soil about 2 inches deep in each seed tray. Do not pack the soil too closely or proper aeration will not occur. You can leave the pad of growth medium in each seed tray before you put the soil in. This will help hold water and resist erosion. Place the seed trays in the main tray. You will want to place the light as close to the seed trays as possible in order to heat the soil. Plant the seeds at least 2.5" apart to give each plant enough room. Some seeds may require more or less room; consult the information on the seed packet. Water as required by the type of seeds you are using.

For seedlings, follow the above instructions for preparing the seed trays. Plant the seedling with at least 2.5" of room between the plants. The amount of room required does vary based on the plant, so be sure to look up the specific information for the type of plant you are using. This information can be found in horticultural manuals or the internet. Water and feed as necessary.

Hydroponics:

Hydroponics is the art of growing plants without soil. In traditional horticulture, the soil contains numerous mineral salts. These can be dissolved in water and carried into a plant through the roots. The plant will use these minerals to sustain itself. In hydroponics, the soil is replaced with a nutrient rich solution that contains dissolved minerals. Advantages to hydroponics include: less waste, higher yields due to fast-growing plants, lower water consumption, almost total elimination of weeds, and no chance of soil degradation. Disadvantages, especially on a commercial scale, include: higher initial cost, more expertise is required, and a generally high level of technology that may not be available to all users. The Greenbox™ is a fantastic way to introduce your students to hydroponics without costly setup or complicated technique.

You will need the growth pads that came with your unit for hydroponics growing. This material holds on to water, and keeps the minerals the plant needs from washing away. It also allows oxygen to reach the roots, which is essential for all plants. Submerging the roots of a plant, even in a nutrient solution, will kill it. The growth medium also provides a material for anchoring the roots of the plant.

Place a growth pad (included) into each seed tray, and mount the seed trays in the main tray. Drop your seeds into the trays, allowing enough room between them. It will be difficult to grow seedlings using the hydroponics method. This is because seedlings already have established roots, making it difficult to anchor them in the growth medium. The amount of room required will be dictated by the type of plant you are growing. **Note:** in hydroponics, resources are less limited for the plants. This means that plants can be placed closer together.

Next, you will need to prepare a nutrient solution. Packets of dissolvable nutrients can be ordered pre-made from many sources. When you have prepared the solution, use it to water your plants, just like if you were gardening with soil. The growth medium will hold onto this nutrient rich water, and the seeds will take advantage of it. Whenever you need to water your plants (dictated by the type of plant), simply prepare a nutrient solution and use that. This will give the plants the minerals they need, and will use less water in the process.

Greenbox™ Maintenance Tips:

- The Greenbox™ is made out of recycled ABS. This material is very durable, and will not rot or rust. It is also very easy to clean. Simply wet a rag and use a small amount of soap to wipe it clean. Unlike metals and wood,

this material can withstand wet environments essentially indefinitely. **Do not** use bleach or ketones to clean the Greenbox™

- Each seed tray is made out of styrene, which will resist the buildup of mildew and grime. You will want to wipe them clean every so often.
- The light included is rated for about 8,000 hours of use. Even if you left the light on for 20 hours a day every day, you would still get over a year of life from the bulb. Under normal circumstances, you can expect roughly 2 years of use. When the bulb burns out, you can order a new one from Science First.
- The ballast on your lamp fixture is not user replaceable. However, it will last for several years before expiring. When your fixture finally does give out, contact us for a replacement.
- You may need to replace the growth medium every six months. Replacements can be ordered from Science First. Lifespan depends greatly on use.
- The Greenbox™ is specially designed to raise the main tray up to prevent water from getting trapped underneath. Even so, every month or so you will want to clean the table surface beneath.
- For storage, the arms and upper shelf collapse to fit inside the main tray. We recommend saving the original shipping box for storage.

Tips, tricks, and general information:

- The upper shelf will support up to 40 lbs. Use it to store your watering can, spray bottle, fertilizers, and any other equipment you need. Alternatively, you can use it to hold potted plants, for even more growing area.
- You may wish to get a 24 hour timer and plug the light fixture into it. Plants grow best under 12-16 hours of light per day. They will need some dark time in order to be healthy.
- You can divide the six included seed trays into groups. For example, you could devote two to desert plants, two to temperate, and two to water-loving plants. Alternatively, you can divide them into groups to determine the effects of different fertilizers or watering schedules.
- You can use the included seed trays or put your plants in pots. It all depends on personal preference.
- Your bulb consumes only 54 watts of electricity yet produces more light than two 40 watt bulbs of the older style. This is due to the fact that we use the latest technology available. Not only are these bulbs a little easier on the environment, but they'll be kinder to your electrical bill.
- The arms are 30 inches tall. This provides ample space for growing plants. It also allows you to work on your plants without the shelf blocking your vision.
- Since you can store your supplies on the shelf, the entire unit is self contained. This means everything you need for growing will fit inside the footprint of the main tray.
- The following replacement parts are available from Science First:
 - Seed trays
 - Lamp bulbs
 - Growth pads

Warranty and Parts:

We replace all defective or missing parts free of charge. Additional replacement parts may be ordered toll-free. We accept MasterCard, Visa, checks and School P.O.s. All products warranted to be free from defect for 90 days. Does not apply to accident, misuse or normal wear and tear. Intended for children 13 years of age and up. This item is not a toy. It may contain small parts that can be choking hazards. Adult supervision is required.