For more information on Cornell Cooperative Extension, the Master Gardener Program or starting your own plants, please call the Cornell Cooperative Extension office!

Clinton County
6064 State Route 22
Plattsburgh, NY 12901
518-561-7450
http://www.cce.cornell.edu/clinton/ (or essex)

Essex County
PO Box 388
Westport, NY 12993
518-962-4810

Amy D. Ivy, Extension Educator
Plan developed by: Thea and Bob Fry
Adapted for use in Clinton/Essex Counties by:
Charles A. Howard, Clinton County Master Gardener
Tammy Mierop, Essex County Master Gardener
Cutting the PVC Pipe

Information and precautions when measuring and cutting the PVC pipe.

1. Know how to read the tape measure you use to measure your pvc.
2. "Measure Twice, Cut Once". Don’t worry if your cut ends are a little crooked. They will not be seen, once you put your growlight stand together.
3. Always cut the small pieces first. It’s easier to hold the pvc pipe while cutting.
4. When cutting the lengths of pipe, we have provided a place for you to put a check by the piece you just cut. This way, you are assured that you have cut all the required pieces.

Please note: The following pipe dimensions are assuming that a piece of pipe will insert 7/8" into the fitting. If this is not the case, a slight variation will have to be made on the two top long pieces in order to make the growlight stand square.

For a Single Light or Two Shoplight Stand — 28" high:

1. From one 10' pipe length, saw one 3" piece, two 8" pieces, and two 49" pieces.

   ---- 3" piece
   ---- 8" piece
   ---- 8" piece
   ---- 49" piece
   ---- 49" piece

2. From a second 10' pipe length, saw two 3" pieces, and four 28" pieces.

   ---- 3" piece
   ---- 3" piece
   ---- 28" piece
   ---- 28" piece
   ---- 28" piece

3. From a third 10' pipe length, saw four 1 5/8" pieces, one 3" piece, two 8" pieces, and two 40 3/4" pieces.

   ---- 1 5/8" piece
   ---- 1 5/8" piece
   ---- 1 5/8" piece
   ---- 1 5/8" piece
   ---- 8" piece
   ---- 8" piece
   ---- 40 3/4" piece
   ---- 40 3/4" piece
   ---- 3" piece

4. From the remaining 10' pipe length, saw four 17" pieces.

   ---- 17" piece
   ---- 17" piece
   ---- 17" piece
   ---- 17" piece
Building a Shoplight Growlight

Materials Needed

(3) 10’ long 3/4” PVC pipe (Four [4] are needed if building any of the alternative stands)
(8) 3/4” PVC Tee (non-threaded)
(8) 3/4” PVC 90° elbow (non-threaded)
(4) S hooks (1” size)
(2) 2 1/2 feet of chain (loops large enough for S hooks) (less is needed for 28” high stand)
(1) 48” cool white fluorescent bulb (34 watt) (marked F40CW)
(1) 48” daylight (warm) fluorescent bulb (34 watt) (marked F40WW)(1)
(1) 48” fluorescent shop light (2 lamp) —

(Most of the new ’40 watt” bulbs are energy efficient bulbs and are actually 34 watt bulbs. Some shoplights are not designed to operate these bulbs)

Tools Needed

Hacksaw (or tubing cutter)
Miter box (helpful for making straight cuts)
Tape Rule
Pencil
Mallet (a hammer will work if care is given)
Sandpaper

Suggestions Before Starting

1. As when beginning any project, read over the instructions first to get an overview of the construction plans.
2. Remember the old adage, "Measure twice, cut once." By practicing this, you can save time and cut down on wasted material.

Alternatives to Consider:

What we will make — The shoplight growlight frame featured in this plan is a workable size for most applications. It is about 28 inches high and of sufficient width for a single (2-tube) shoplight.

Some alternatives to consider:

☐ As easy alternative is to increase the width to hold two shoplights. This will provide a 16-18” wide growing area.
☐ In some situations, such as providing light to more mature plants, additional height is needed. An increase in length of the upright pieces can accommodate this need.
☐ If you have special needs, changes can be made in width or height to accommodate these needs.

NOTE: The following pages include some alternative sizes for your consideration.
Cutting the PVC Pipe

Please note: The following pipe dimensions are assuming that a piece of pipe will insert 7/8" into the fitting. If this is not the case a slight variation will have to be made on the two top long pieces in order to make the growlight stand square.

Also note: It is generally easier to cut the shorter pieces of pipe first because the longer lengths of pipe are easier to hold.

For a Single Light — 36" high:

1. From one 10' pipe length, saw two 49" pieces, two 8" pieces and one 3" piece.
2. From a second 10' pipe length, saw three 36" pieces and three 3" pieces.
3. From a third 10' pipe length, saw one 40 3/4" piece, one 36" piece, two 8" pieces, and four 1 1/8" pieces.
4. From the remaining 10' pipe length, saw one 40 3/4" piece.

For Two Shoplights — 36" high:

1. From one 10' pipe length, saw two 49" pieces, one 17" piece and one 3" piece.
2. From a second 10' pipe length, saw three 36" pieces and three 3" pieces.
3. From a third 10' pipe length saw, one 36" piece, three 17" pieces, and four 1 1/8" pieces.
4. From the remaining 10' pipe length, saw two 40 3/4" pieces.

For a Single Light — 28" high:

1. From one 10' pipe length, saw two 49" pieces, two 8" pieces and one 3" piece.
2. From a second 10' pipe length, saw four 28" pieces and two 3" pieces.
3. From a third 10' pipe length, saw two 40 3/4" pieces, two 8" pieces, one 3" piece and four 1 1/8" pieces.

For Two Shoplights — 28" high:

1. From one 10' pipe length, saw two 49" pieces, one 17" piece and one 3" piece.
2. From a second 10' pipe length, saw four 28" pieces and two 3" pieces.
3. From a third 10' pipe length, saw two 40 3/4" pieces, two 17" pieces, and one 3" piece.
4. From the remaining 10' pipe length, saw one 17" piece and four 1 1/8" pieces.
Pipe Pieces Needing to Be Cut

<table>
<thead>
<tr>
<th>Name of Pipe Piece</th>
<th>Number of Pieces Required</th>
<th>Single Light 36&quot;</th>
<th>Two Shoplight 36&quot;</th>
<th>Single Light 28&quot;</th>
<th>Two Shoplight 28&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long Base Piece</td>
<td>2</td>
<td>49&quot;</td>
<td>49&quot;</td>
<td>49&quot;</td>
<td>49&quot;</td>
</tr>
<tr>
<td>Base Cross Piece</td>
<td>2</td>
<td>8&quot;</td>
<td>17&quot;</td>
<td>8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td>Side Support Piece</td>
<td>4</td>
<td>36&quot;</td>
<td>36&quot;</td>
<td>28&quot;</td>
<td>28&quot;</td>
</tr>
<tr>
<td>Top Long Piece **</td>
<td>2</td>
<td>40 3/4&quot;</td>
<td>40 3/4&quot;</td>
<td>40 3/4&quot;</td>
<td>40 3/4&quot;</td>
</tr>
<tr>
<td>Top Cross Piece</td>
<td>2</td>
<td>8&quot;</td>
<td>17&quot;</td>
<td>8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td>Top Extender Piece</td>
<td>4</td>
<td>3&quot;</td>
<td>3&quot;</td>
<td>3&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>Fitting Connectors</td>
<td>4</td>
<td>1 5/8&quot;</td>
<td>1 5/8&quot;</td>
<td>1 5/8&quot;</td>
<td>1 5/8&quot;</td>
</tr>
</tbody>
</table>

** Note: This length is based on the pipe sliding into the fitting a distance of 7/8". This may vary with the manufacturer, causing this length to change slightly.

Assembling the Shoplight Growlight Frame

The Base

1. Information and precautions when attaching PVC pipe and fittings:
   - Generally when PVC pipe is cut with a saw there are some rough edges. These can be smoothed with a piece of sandpaper. A slightly crooked cut will not affect results.
   - Each fitting is designed with an internal ridge. The pipe should slide into the fitting so that the end of the pipe slides against this ridge.
   - The pipe does not slide in easily. It can be easily started but then it has to be tapped with a mallet (or hammer) the remaining distance.
   - Several taps with a mallet (or hammer) is usually sufficient. It is generally better to tap the pipe fitting rather than the pipe itself.
   - Generally PVC pipe is chemically bonded to the fitting with a special cement. For this project however, the fittings fit tightly enough so that you do not need any glue. This also allows for the Shoplight Growlight stand to be disassembled (or partially disassembled) for storage when not in use.

2. Gather the following pieces of pipe together:
   - (2) Long Base Pieces (all 49")
   - (2) Base Cross Pieces (either 8" or 17")
   - (4) Fitting Connectors (all 1 5/8")
   - (4) 90° elbows
   - (4) Tees
3. Connect one 90° elbow to one of the *long base pieces*. Connect a second elbow to other end of the same piece in the same direction as the first elbow. Connect elbows to the second *long base piece* in the same manner. Carefully tap all pipe ends into the fittings (See diagram below)

![Diagram of elbow connections]

4. Place one of the *fitting connectors* into one end (*not the center opening*) of a Tee and tap it into position. Repeat this procedure with the remaining three *fitting connectors* and three Tees. (See diagram below)

![Diagram of connector placement]

5. Connect the Tee unit to the 90° elbow and gently tap into place. Repeat the procedure with the remaining Tee units keeping proper alignment as shown in the diagram below.

![Diagram of Tee units in place]

6. Using the two *base cross pieces*, attach them to the other Tee ends to complete the base. Make sure the completed base sits flat on a surface. If it doesn’t sit flat, twist the base slightly so that the base does sit flat. The base should look like the diagram below.

![Diagram of completed base]
The Sides

1. Gather the four side support pieces (either 36" or 28") of pipe together:

2. Place the completed base on the floor and insert one end of a side support piece into the middle entrance of a Tee. Tap the pipe gently to insure it slides fully into place. Repeat this procedure with the remaining three side support pieces. (See diagram below)

The Top Support

1. Gather the following pieces of pipe together:
   - (4) 90° elbows
   - (4) Tees
   - (4) Top Extender Pieces (3")
   - (2) Top Cross Pieces (either 8" or 17")
   - (2) Top Long Pieces (40 3/4")

2. Place one end of a top extender piece (3") into a 90° elbow. Tap the fitting gently to insure it goes all the way into the fitting. Repeat this procedure with the remaining three top extender pieces and three 90° elbows. (See diagram below)

3. Place the open end of a 90° elbow on the top of one of the side support pieces. Place it so the extender piece is facing inward. Tap in lightly to make sure it is fully in place. Repeat this procedure with the three remaining side support pieces.

4. Using the center opening of a Tee, place it on one end of a top cross piece and tap it into place. Repeat this procedure so that each end of both top cross pieces is inserted into the center opening of a Tee. (See diagram below)

5. Attach each of the top cross piece assemblies to the side support pieces as shown in the diagram below. Make sure to tap each joint firmly into place.
6. Insert one end of a top long piece (40 3/4") into the remaining end of the Tee. Insert the other end into the remaining end of the Tee lengthwise from it. Do not tap it into place. Repeat this same procedure with the remaining top long piece.

7. After both top long pieces have been properly placed, turn the growlight frame on its end and tap firmly to make sure the pieces have been fully inserted into the Tees.

8. Your Shoplight Growlight Frame is fully completed and should look like the diagram below: Parts can be slightly twisted to insure that the frame will sit flat on the floor.

Hang the Shoplight

1. Gather the remaining pieces of the project together:
   (1) 48" (2-tube) shoplight (unboxed and assembled if necessary)
   (1) 48" cool white fluorescent tube (F40CW)
   (1) 48" warm (daylight) fluorescent tube (F40WW)
   (2) S hooks
   (2) extra chain as needed (generally 2-18 pieces are needed for the 28" stand)

2. Loop the chain around a top cross piece (8" or 17") and close the loop by connecting the end of the chain to one of its links with an S hook. Similarly loop the other piece of chain around the other top cross piece. With S hooks provided with the shoplight, attach the lower end of the chains to the slots in the shoplight.

3. The distance between the top of the plants and the shop light can be adjusted by changing the length of the loops. The additional chain is generally necessary for the tall (36") stand.

Other Options

1. A timer can be added to turn your grow lights on and off.
2. A plywood or plexiglass or even cardboard top can be added for storing supplies.
3. A plastic sheet can be suspended over the entire unit to help plants survive extended periods without watering.
4. If space is limited, plans can be modified to use a 24" fluorescent shoplight.

Supplementary Resource

Your local Cornell Cooperative Extension office has some excellent material on starting seeds indoors. Stop in or call the office to obtain a copy of this material.