BioEd℠

Making a White-Light Seed Growth Chamber

BCM Baylor College of Medicine

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 ISBN: 978-1-888997-77-4

ISBN-13: 978-1-888997-77-4

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Teacher Resources from the Center for Educational Outreach at Baylor College of Medicine.
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ACKNOWLEDGMENTS

The authors gratefully acknowledge the support of Bobby R. Alford, M.D., Jeffrey P. Sutton, M.D., Ph.D., and William A. Thomson, Ph.D. We especially acknowledge the valuable contributions of Louis Stodieck, Ph.D., of BioServe Space Technologies.

Plants in Space Teacher's Guide is supported by National Space Biomedical Research Institute through NASA NCC 9-58, and by Houston Endowment Inc., and the Howard Hughes Medical Institute.

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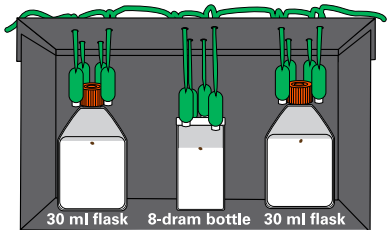
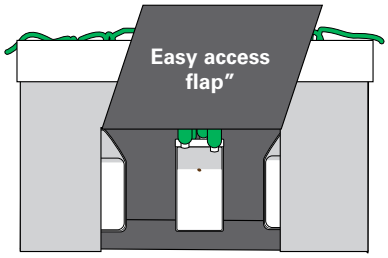
A Philanthropy Endowed by Jesse H. and Mary Gibbs Jones

Photo of 30-ml flask viewed through an easy access "window" opening in a growth chamber created from a shoebox and white LED holiday lights. Photo by Travis Kelleher © Baylor College of Medicine.

EXPERIMENT CHAMBER



Chamber interior, shown with one side of shoebox and one side of lid removed.



Closed chamber with viewing access flap raised. Not to scale.

Illustrations by G.L. Vogt and M.S. Young © Baylor College of Medicine.

Making a White-Light Seed Growth Chamber

There is no single blueprint for creating a controlled-lighting seed growth chamber. Students may design and construct chambers according to their own plans. However, for the investigation to work, all experiment chambers must provide the following.

- LED lights and mechanism to support four LED lights clustered near each seed flask or seed container.
- Dark enclosure that blocks all outside light from reaching inside the growth chamber. (Plants should be exposed to outside light only very briefly, and only during observation and data collection. Observations should be made in dim light or red light to minimize the effects on the outcomes of the experiment.)
- Easy access opening with flap to examine plants and collect data (Complete examinations and data collection as quickly as possible to minimize the amount of light entering the chambers.)

Some plant experiments on the Space Station have been conducted using white light enriched with blue light (blue wavelengths range from 400–490 nm). White holiday LED lights are a suitable, low-cost alternative for the classroom. Illustrations of a chamber made using a shoe box and white LED holiday lights are provided to the left.

MATERIALS

- Standard-size cardboard shoe box with removable lid
- Black tape (to hold lights in place on the lid and cover insertion holes to keep out external light sources)
- Pair of scissors or knife
- Ruler
- White LED holiday light string (see "Safety Issues")
- Access to electrical outlets

SETUP

If boxes and lids do not have dark interiors, cover the interior with black construction paper or black paint.

Optional: If a chamber is made from other materials, such as a clear soft drink bottle, the bottle will need to be covered with a black box.

SAFETY ISSUES

Be sure to use LED holiday lights, not incandescent holiday bulbs. Incandescent lights produce heat that may become a fire hazard, injure the growing plants and/or soften the agar agar or gelatin. LED lights do not produce heat and are safe for the plants.

PROCEDURE

1. Use scissors to poke 12 holes in one end of the shoe box lid to accommodate 4 LED lights per flask (see top illustration). Insert LED lights into the holes.
3. On one end of the shoe box, cut out a squared U-shaped access flap to allow for viewing plants without exposing them to exterior lighting.
3. Cover the shoe box with the lid, with lights on the opposite end of the access flap.
4. Set chambers near an electrical outlet and away from windows. ■