

Engineer a Greenhouse

Overview:

Youth will use the engineering design process to design, build and test a model greenhouse.

Goals:

- Explain how greenhouses are used.
- Use the Engineering Design Process to design, build, and test a greenhouse

Time Required: 1.5 hours

Materials:

- Paper plant models (best printed on cardstock) available at: <https://4-h.org/clover/activities/engineer-a-greenhouse/>
- Scissors
- Popsicle sticks
- Chenille sticks
- Masking tape
- Plastic wrap
- Tissue paper
- Rubber bands
- Paper clips
- Poster putty
- Hot glue gun (with adult supervision)

**Feel free to modify the list with craft materials you have available.*

Procedure:

1. Before beginning, review the Engineering Design Process.
2. Ask students if they have ever been to a greenhouse. What did they notice?
3. Tell students, “Greenhouses are designed so that botanists can easily grow plants year-round”. Ask students what kinds of plants they would like to grow in a greenhouse.
4. Students will work with their groups to choose which plants they would like to grow in their greenhouse. Choices include: Peppers, Tomatoes, Lettuce, Strawberries, Corn, Eggplant, Carrot, Cauliflower, Broccoli, and Blueberries.
5. Encourage groups to choose at least 3 different plants and have no more than 6 plants total in their greenhouse. Record the plants (kind and how many) they chose to use on their worksheet.

For example they could choose 2 cauliflower, 2 broccoli, and 2 carrots or they could choose 1 blueberry, 2 strawberry, and 1 tomato.



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6. Have students select their plants and construct the 3-D models.
7. Tell students, “Remember the first step in the Engineering Design Process is to Identify the problem.” Ask students, “What problem are we trying to solve?”
8. Have students record the problem in their Mission Notebook.
Build a greenhouse large enough for the paper plants to grow.
9. Next, show students the materials they have available to build their greenhouses. Give them some time to brainstorm some ideas. What materials might they want to use?
10. Ask students to think about how we will know if we build a successful greenhouse. What criteria do we need to meet? Have students record these criteria in their greenhouse.
 - *must be a stable, free-standing structure*
 - *have room for all selected plants to grow*
 - *made of transparent materials to allow light to enter*
11. Have students sketch a picture of their design on their worksheet. Label their sketch to show what materials they plan to use.
12. Have students build their greenhouse.
13. Once students are finished with the build, test the greenhouse by putting the 3-D plants inside. Does your greenhouse meet the criteria? If not, redesign!
14. Have students complete the questions on their worksheet.

Adapted from the following lesson:

- 4-H Engineer a Greenhouse activity: <https://4-h.org/clover/activities/engineer-a-greenhouse/>

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