

Garden in a Glove – Educator Resource

Plants are an important part of our planet. They provide food, fiber, shelter, and oxygen to animals and people. Through Garden in a Glove, young scientists will be able to make observations on the characteristics and the life cycle of plants. This activity gives you and your young scientists the opportunity to learn what seeds need to germinate, grow, and produce fruit or vegetables. By maintaining a clean and healthy environment, you give the plant the best opportunity to succeed.

This project plan will provide you with step-by-step explanations, additional information, and critical thinking questions so that you and your young scientists can have the best experience with your Garden in a Glove.

Overall Concepts

This experiment is a great way to get young scientists to think critically about their food and where it comes from. As you go through the experiment with them, there are some questions below you can ask your scientists that will encourage them to appreciate plants and all the places people interact with them:

- Can you identify how plants affect our daily lives? Plants provide the food we eat – fruits, vegetables, grains, even sugar come from plants. Plants like cotton, soy, flax, and even bamboo can be made into fabric that provides clothing. Our homes are made of plants – the many types of wood in our homes provide framing, flooring, doors, furniture, and decoration. How many different kinds of seeds do you have in your pantry (sesame seeds, popcorn, dried beans, poppy seeds, cardamom, mustard, etc.)?
- What do people need to be healthy? How is this similar to what plants need to be healthy? People need food, water, and shelter to be healthy. Plants have similar needs. They get food from the soil and the sun. Plants need just the right amount of water; too much or too little can cause the plant to be unhealthy and more susceptible to diseases or stress which is similar to how people get sick. They also need a healthy environment in which to live. Storms, wind, extreme cold, or heat can have major impacts on a plant. Ask your scientists how they feel when they have to be outside on a very hot day or during a storm.
- Before you begin the experiment, ask your scientists to write down their hypothesis. What are their expectations for Garden in a Glove? How long will it take to grow the plant before you can eat the fruit or vegetable? How large do you think the plant will grow? What will it look like? What kind of leaves will the plant have? How many pieces of fruit or vegetable do you expect to get from each plant?

- During the experiment, encourage safety. This experiment is low-risk, but we should always take basic safety precautions and use proper hygiene. Are you wearing appropriate clothing to protect your skin? Should you wear eye safety for this experiment? Is your working space clear and clean? Long hair should be tied back so it does not fall into your working area. Hands should be washed before and after each experiment. When reading over the directions, identify any instructions with which an adult may need to assist. Do you have all of the materials you need and are they in good working order? Scientists do this every single day, and it is never too early to start these habits.
- Identify the materials your scientists will need to work. Is there anything they have not seen or worked with before? Make sure they are comfortable with each piece of equipment and encourage them to ask questions.
- As you go through the steps of the experiment, encourage your scientists to record observations as they put together their garden in the glove. Define a control, like the amount of water in the cotton ball or temperature of the water. Emphasize that they are creating a control. Ask your scientists about how they can determine the base of ideal conditions. Point out that they can use the control to consider other variables they can change that may produce a different outcome.

Step-by-Step

You and your scientists can follow along with Val as she completes this experiment and explains more about how seeds grow into plants:

<https://vimeo.com/MonsantoSTEM/GardenInAGlove>

Conversation Starters and Tips

On the next page are some ideas for conversations you could have with your kids to help expand their understanding of the experiment. We've included ideas and tips for each step along the way.

Step 1

Talk to your scientists about the importance of taking good notes to record data, such as dates and measurements. There are two really good reasons scientists record their work in great detail:

1. Scientists need to replicate their experiments many times to make sure that their proof of hypothesis is correct. In order to do that, they need to have detailed instructions to make sure that they get the same result each time.
2. Research is peer reviewed – this means that other scientists and agencies will go through the research to make sure that it is “good science”. This ensures the scientist has followed standard protocols that would allow a third party to replicate the study and get the same results.

*Note on steps 2-5: If your scientists have trouble placing the cotton and seeds into the fingers separately, they may wet the cotton balls, squeeze out the excess water, and place the seeds into the cotton ball. Next, ball up the cotton and carefully place it (seeds nestled inside) in each finger and thumb of the glove, matching the seeds to the labels they have written on the glove.

Step 2

Water and warmth are the two inputs that seeds need to germinate. Talk to your scientists about the importance of water to plants. How do they feel when they are thirsty? Ask them how active they are on a cold day vs. a nice warm day.

Step 3

If your scientists have difficulty pushing the cotton ball into the glove, have them use their marker or the eraser end of a pencil to push the cotton ball to the tips. Point out that the cotton comes from a plant, too. Similar to how we like to wear cotton clothes, the seeds like cotton as a great home to protect them in their early days.

Step 4

Make a pile of each seed in the work area. Talk with your scientists about what the seeds look like, and compare their sizes, shapes, and colors. Do they recognize the seeds from foods we eat? People and animals eat a lot of seeds. Think about what foods humans and animals eat that contain seeds: cucumbers, tomatoes, green beans, peanuts, sunflower seeds, almonds, etc. Think about seeds we don't eat: peach pits, avocado seeds, etc.

Step 5

If your scientists have trouble placing the cotton balls at the end of the gloves, they can use the marker to help get the cotton ball placed. Ask your scientists what they are providing the seed in the glove. The cotton provides moisture and a pliable environment for the seed to grow. The glove protects the seedlings from diseases and provides a clean home.

Step 6

Considering seeds need water and warmth to germinate, where do your scientists think is the optimal place to put their glove?

Step 7

Discuss the growth of the plants with your scientists and encourage them to make entries in their journals. Ask them questions about the similarities and differences they are seeing in the seedlings.

Step 8

Ask your scientists to think about their own growth and what they need to be strong and healthy. Make comparisons of how the inputs increase as plants and people become more mature. How have their food, clothes, and homes changed as they have grown?

Step 9

Think outside the garden. When you and your family are in parks or other areas where there are plants, ask your scientists to compare them to their plants at home. How much sun do different plants need? Are some in shade and others in the sun? When you are in the grocery store, ask them what they think their fruits and veggies need to be a healthy plant. Did you know only one ear of corn is grown on each stalk? What in the grocery store is grown on a tree? How long do you think it takes to see the first apple after planting?

Step 10

This is a great time to reflect on the experiment. Discuss the time, water, and nutrition that was required to create the garden. How much food do they think they can produce in their own garden? Think about the challenges they had during the project. Do they think farmers who provide food to the grocery stores have similar challenges on their farms?

We would love to hear from you

Do you have other ideas on how to expand upon this experiment with your young scientists?

Please contact us at: stemeducation.outreach@monsanto.com

Feel free to share on your social channels.

#CampSci

#STEM

You may locate the original version of this experiment at:

http://www.agintheclassroom.org/TeacherResources/interest_approaches.shtml