

Light and Plant Growth

Ask students, "Why do plants need light to grow?" (Possible answers may include food production, energy, warmth.) Have students predict what will happen if newly sprouted greenhouse plants receive varying amounts of natural light. Germinate the same type of seed in all 18 sections of the planting trays. Once the seedlings have sprouted, remove the greenhouse lid and completely cover one of the planting trays with one or two sheets of black construction paper. (Make sure the tray is fully covered so that the plants receive as little light as possible.) Cover the second tray with sheets of white paper in the same manner. Leave the third tray uncovered. Replace the lid on the greenhouse and set in a sunny location, removing the black and white paper covers only to water as needed. After two weeks, discard the paper covers and have students compare and contrast the changes in plant growth.

Spotted Leaves

This activity investigates the effect of light on greenhouse plants with developed leaves. Have students place a small opaque sticker on top of a plant's leaf (round color-coding labels work best). Next, place another sticker on the underside of the same leaf, beneath the first sticker. Repeat this procedure on all other plant leaves. After a few days, remove the stickers and have students draw their findings. Explain to students that the area that the stickers covered became pale because the stickers blocked the light from reaching the leaves. Chlorophyll, the green substance in plants, requires the presence of light in order to make food for the plant. This process of making food is called photosynthesis.

The Greenhouse Effect

The Greenhouse Effect is the warming of the Earth's climate due to the gases in the atmosphere that trap the sun's heat. Simulate this natural phenomenon by covering the greenhouse with its lid and placing it by a sunny window. Place a thermometer inside the covered greenhouse and place another thermometer outside of the greenhouse. Have students note the differences in temperature over five days. Explain to students that the lid trapped heat inside the greenhouse, making the inside temperature hotter than the outside temperature. This is similar to what happens in the Earth's atmosphere. Gases, like the greenhouse lid, let the sun's radiation into our atmosphere but do not let the heat radiated back from the surface out of the atmosphere into space.

Different Seeds Grow Differently

Encourage students to bring a variety of seeds to class. Some seeds may include dried beans, raw peanuts, fruit pits (e.g., cherry pits), fruit seeds (e.g., apple seeds), whole spices (e.g., fennel seeds), and assorted flower and vegetable seeds from packets. Plant a different seed in each of the 18 sections of the planting trays. Label each section with its seed type. Have students track the daily growth of the different seeds for three weeks. Which seed sprouted the fastest? Which plant grew the tallest? How are the leaf structures different?

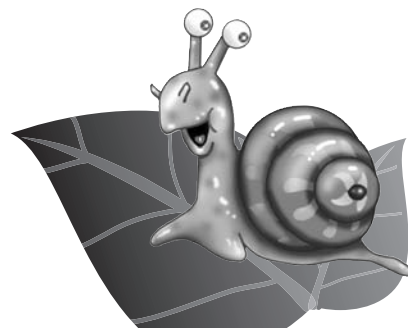
Extension: Instruct your students to dig up the plants carefully, gently loosen the soil from the roots, and study the root structure of each plant. Have the students compare and contrast the root systems of the different plants. Discuss why roots are important to plants.

How Does Soil Affect Plant Growth?

Explain to students that they will investigate how soil affects the way a plant grows. First, fill one planting tray with Wonder Soil mini wafers as described in the planting instructions. Fill the second planting tray with sand and the third planting tray with soil with a high clay content. Be sure to label each planting tray with its soil type. Next, plant the same type of seed in all the planting trays. Set the covered greenhouse in a sunny location and water as needed to keep each soil type moist. Ask students to predict in which soil the plants will grow the tallest. Have students observe, compare, and graph the plant growth over two weeks. Based on their observations, what was the optimal soil type for this particular plant's growth?

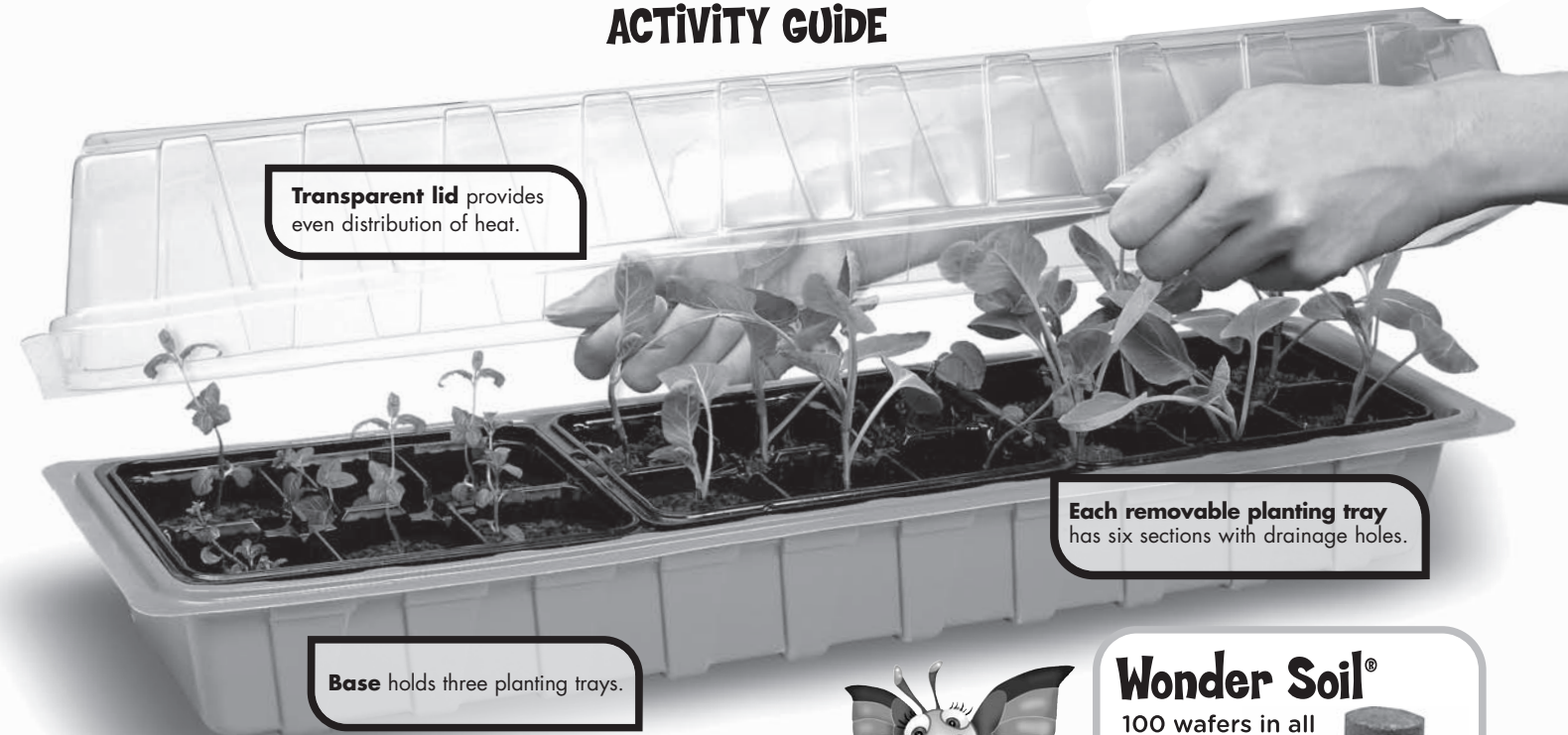
Crowded Plants

Plants require living space to survive. This activity will compare the growth of plants in crowded and uncrowded living conditions. Plant a single seed in each section of one planting tray. In the second planting tray, plant two seeds one inch apart in each section. Plant five seeds closely together in each section of the third planting tray. Cover the greenhouse and provide the same amount of water to all the trays. Have students observe and record the differences in plant growth over 10 days. Which tray grew the tallest plants? Which tray displayed the slowest growth? What is population density? What effect does overcrowding have on individual plant nutrition?



GEO SAFARI Sprout & Grow™ GREENHOUSE

ACTIVITY GUIDE



Transparent lid provides even distribution of heat.

Each removable planting tray has six sections with drainage holes.

Base holds three planting trays.



Wonder Soil®
100 wafers in all



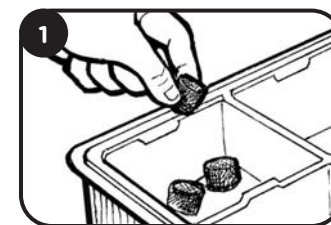
2 bags Of Wonder Soil® mini wafers included!

Nutrient-enriched Wonder Soil wafers expand quickly with water. Wafers contain coir pith, an eco-friendly soil conditioner that is polymer fortified for better water absorption and faster plant growth.

Your Sprout & Grow™ Greenhouse

CHILDREN WILL EXPLORE THE WONDERS OF GROWING PLANTS and discover new "sprouts" of information as they cultivate their own windowsill greenhouse garden. In just a few days, budding young gardeners will get an up-close look at their seeds sprouting and growing into vibrant, healthy plants right before their eyes. The Sprout & Grow Greenhouse will provide year-round seed starting and planting observation in a self-contained, controlled environment.

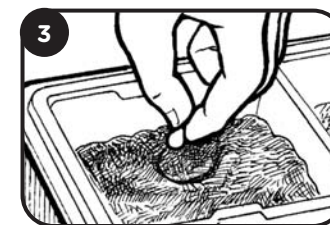
Planting Instructions



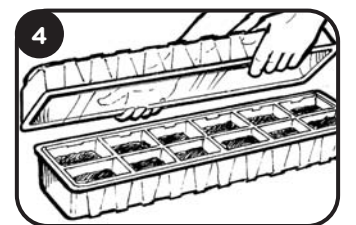
Place three Wonder Soil mini wafers into each section of the planting tray.



Slowly pour 1 1/4 tablespoons of water for each wafer. Wait a few moments for the wafers to expand then stir and spread the soil.



Poke a small hole* in the top of the soil and place a seed** in each hole.



Cover the greenhouse with the transparent lid.



Suggested Placement

It's usually best to place your greenhouse in a location where it will get maximum sunlight, such as near a south-facing window. Placing the greenhouse near a north-facing window or a shady area is best for plants that require little light. Do not place the greenhouse close to heating or cooling vents.

Caring for Your Plants

Water the young plants to keep the soil moist but not muddy - overwatering the soil will make the seeds rot. The polymers in Wonder Soil are highly water-absorbent and keep the soil moist even though the top layer may appear dry. Test the soil moisture by sticking a finger about 1 inch (2.5 cm) into the soil. If the soil is dry, water the plant.

The two small air holes on the lid help control humidity by allowing some fresh air to circulate through the greenhouse. However, moisture may condense inside the lid, particularly on warm, humid days. If too much moisture gathers inside the lid, uncover the greenhouse for a few hours to allow additional ventilation.

Depending on the types of plants you choose to grow, the seedlings will usually germinate (sprout) in less than a week. Fast-growing seeds, such as green beans, may germinate in one to three days. Remove the lid once the seeds have sprouted to a height of about 4 inches (10 cm). Check the soil's moisture level daily and water if needed.

Repotting Your Plants

Once a plant has outgrown its tray section, carefully remove the plant and transplant into a larger pot or into a garden. As the plant continues to grow, the stems may require some support. Use a stick or gardening pole to create a support for the young plant.

Cleaning Your Sprout & Grow™ Greenhouse

When you are ready for a new planting project, you will need to clean your Sprout and Grow Greenhouse. Run water into the planting trays to loosen the soil and rinse the planting trays and base.

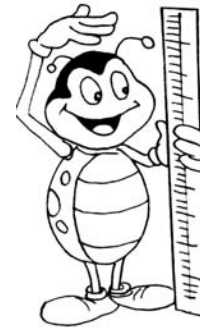
GREENHOUSE FACTS

Greenhouses...

- keep plants warm
- stabilize humidity levels
- help seeds germinate more quickly
- protect growing plants from pests and environmental elements
- allow plants to grow any time of year

Name: _____

Watching Plants Grow



Prediction

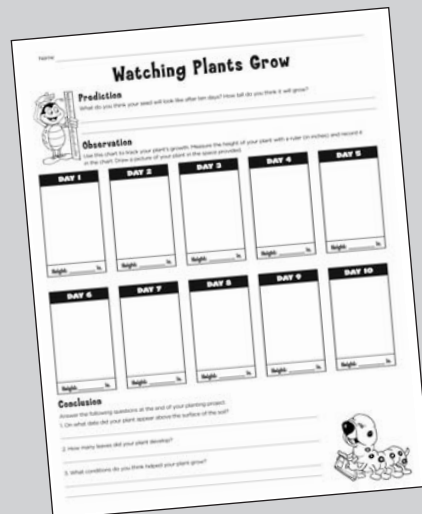
What do you think your seed will look like after ten days? How tall do you think it will grow?

Observation

Use this chart to track your plant's growth. Measure the height of your plant with a ruler (in inches) and record it in the chart. Draw a picture of your plant in the space provided.

DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
Height: _____ in.	Height: _____ in.	Height: _____ in.	Height: _____ in.	Height: _____ in.
DAY 6	DAY 7	DAY 8	DAY 9	DAY 10
Height: _____ in.	Height: _____ in.	Height: _____ in.	Height: _____ in.	Height: _____ in.

Activities



Watching Plants Grow

Assign a freshly planted seedling to a student or a small group of students. (You may choose to have students plant their own seeds following the instructions on page 1.) Reproduce the Watching Plants Grow worksheet. Have students measure the daily growth of their plants with a ruler and record their findings for 10 days. You may wish to have a camera available so students can take daily photos of their plants and compare the results. Discuss and answer the Conclusion questions at the end of the planting period.

Conclusion

Answer the following questions at the end of your planting project.

1. On what day did your plant appear above the surface of the soil?

2. How many leaves did your plant develop?

3. What conditions do you think helped your plant grow?

