Horticulture: Seed Starting

Mid-Valley
STEM-CTE HUB

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Horticulture: Seed Starting

The Horticulture: Seed Starting Kit introduces students to plant growth, horticulture, and agricultural science through hands-on seed germination and cultivation. Using grow lights, heat pads, trays, and environmental monitoring tools, students investigate the conditions plants need to thrive while collecting real-world data on temperature, light, and growth. Students can grow a variety of plants—including cilantro, cucumbers, lettuce, and zinnias—while exploring plant life cycles, environmental factors, and sustainable growing practices.

Grade Level

3rd - 12th

Group Size

2–4 students per group; 8 - 10 per growing station.

Time Duration

2–6 weeks depending on plant variety and learning objectives

Content of Kits

Components

- 3 Heat pads
- 3 grow lights
- 3 trays/domes
- 3 Digital thermometers
- 3 Digital luminance meters
- Natural seedling pots
- Seeds (cilantro, cucumbers, lettuce, zinnias)

NOTE: Educator must source their own soil.

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Usage

Getting Started

1. **Inventory and Assemble the Growing Stations**

Begin by unpacking the kit and confirming that all components are present, including the heat pads, grow lights, trays and domes, digital thermometers, luminance meters, seedling pots, and seeds. Assemble each growing station and place it on a stable surface near an electrical outlet.

2. **Prepare the Seedling Pots**

Fill the seedling pots with an appropriate seed-starting medium according to your classroom plan. Plant seeds at the recommended depth and lightly water the growing medium to create a moist, but not saturated, environment for germination.

3. **Set Up Environmental Controls**

Position the heat pads beneath the trays and place the grow lights above the seedlings. Use the thermometers and luminance meters to monitor growing conditions and make adjustments as needed to maintain a healthy environment for plant growth.

4. **Establish Observation and Data Collection Routines**

Create a schedule for watering, monitoring environmental conditions, and recording plant growth. Encourage students to collect data on germination rates, temperature, light levels, and plant development throughout the investigation.

Storage

- **Clean and Dry Equipment Before Storage**

After use, empty and clean the trays, domes, thermometers, and luminance meters. Allow all components to dry completely before packing them away to prevent mold, mildew, or damage.

- Store Electronics and Seeds Properly

Keep the grow lights, heat pads, thermometers, and luminance meters together in a dry location where cords and sensors will not be damaged.

Troubleshooting

- **Seeds Are Not Germinating**

If seeds fail to sprout, check that the growing medium remains consistently moist and that temperatures are appropriate for germination. Review planting depth recommendations, as seeds planted too deeply may struggle to emerge.

- **Seedlings Are Tall and Weak**

If seedlings appear stretched or "leggy," they may not be receiving enough light. Move the grow lights closer to the plants or increase the amount of daily light exposure while monitoring conditions with the luminance meter.

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Activity Guide

Beginner

What Do Seeds Need to Grow?
Students investigate the basic needs of plants by planting seeds and observing germination over time. Students collect data and identify the conditions necessary for healthy plant growth.

Oregon Science Standards Alignment
2-LS2-1 & 3-LS1-1

Procedure

1. Plant cilantro, lettuce, cucumber, or zinnia seeds in seedling pots.
2. Predict how long it will take seeds to germinate.
3. Place pots under grow lights and on heat pads.
4. Observe seedlings daily and record changes in a journal.
5. Measure seedling growth and discuss what plants need to survive.

Intermediate

Light and Plant Growth Investigation
Students design an investigation to determine how light intensity affects plant growth. Using the grow lights and luminance meters, students collect quantitative data and compare results.

Oregon Science Standards Alignment

- MS-LS1-5 & MS-LS1-6

Procedure

1. Plant identical seeds in multiple pots.
2. Place groups of seedlings at different distances from the grow lights.
3. Use the luminance meters to measure light levels at each location.
4. Measure plant height and health over several weeks.
5. Analyze the relationship between light intensity and plant growth.

Advanced

Optimizing a Greenhouse Environment
Students act as horticultural scientists and use environmental data to determine the ideal growing conditions for seedlings. Students analyze temperature, light, and growth data to make evidence-based recommendations.

Oregon Science Standards Alignment

- MS-LS1-5 & MS-LS1-6

Procedure

1. Establish multiple growing stations with different temperature and light conditions.
2. Use thermometers and luminance meters to collect environmental data.
3. Measure germination rates, plant height, leaf development, and overall health.
4. Compare results across growing stations.
5. Develop recommendations for creating an optimal seed-starting environment.

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Learning Extensions

STEAM Connections: Engineering - Math - Science

Learning Objectives:

- Investigate the conditions required for seed germination and healthy plant growth.
- Collect and analyze data related to temperature, light intensity, germination rates, and plant development.
- Explain how environmental factors like light, water, and temperature affect living organisms.
- Observe and describe the stages of a plant's life cycle from seed to seedling.
- Use scientific tools to measure and monitor growing conditions.
- Develop evidence-based explanations about plant growth using observations and data.

Career Connections:

- **Horticulturist –** Grows and studies plants used in gardens, landscapes, and food production.
- **Greenhouse Manager –** Oversees plant production and environmental conditions in greenhouses.
- **Agricultural Scientist –** Researches methods to improve crop growth, sustainability, and food production.
- **Botanist –** Studies plants, their structures, growth patterns, and ecosystems.
- **Agronomist –** Investigates crop production and soil management practices.
- **Urban Farmer –** Produces food in community, school, or urban growing spaces.
- **Environmental Scientist –** Studies interactions between living organisms and their environments.

Essential Employability Skills:

- Observation and Attention to Detail
- Critical Thinking
- Communication
- Collaboration
- Problem Solving
- Responsibility

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Resources and Accessibility

Safety Guidelines

- **Use Electrical Equipment Safely**

Keep grow lights, heat pads, and electrical cords away from water sources. Inspect cords before use and ensure students do not handle electrical equipment with wet hands.

- **Practice Safe Planting Procedures**

Wash hands after handling soil, seeds, or plant materials. Clean up spilled water or soil promptly to prevent slips and maintain a safe learning environment.

Accessibility

- **Provide Multiple Ways to Participate**

Students can contribute by planting seeds, measuring growth, recording data, photographing observations, creating drawings, or analyzing results. Offering a variety of roles allows all learners to participate meaningfully.

- **Use Visual and Hands-On Supports**

Support learning with plant life cycle diagrams, labeled plant parts, data charts, and direct observation of seedlings. Providing information through visual, tactile, and verbal methods helps make concepts accessible to diverse learners.

Library Catalog

Library Resources

Feedback

QR to feedback survey