



Teacher

LAB MANUAL



Wheat Planting & Growth Lab Manual - Teacher Version

Purpose: Use this manual as a teacher's guide to the wheat planting and growth activity included in the Fields of Learning Wheat Anatomy & Growth lesson. See the student version for student instructions, note taking and scientific observations.

Grade Level: Grades 6-8

Note: Can be scaled up or down as needed.

Activity Duration: Planting: 45-60 minutes in class | Observation: 10-15 minutes in class

Objectives:

- Students will understand the timeline for wheat production, including germination, tillering, heading and maturation.
- Students will be exposed to the Feekes Scale of Wheat Development.

Materials:

- Wheat seeds
 - Reach out to a local seed dealer to purchase wheat seed. If you don't know a seed dealer, contact your local Texas A&M AgriLife Extension office for suggestions. If you cannot find a seed rep in your area, try contacting a local grain handling facility.
- Potting soil
- 1.5 in. deep plastic cups or 4 in. or 6 in. plastic/clay pots
 - Clear cups allow students to observe root growth. If using a clear cup, place inside a solid container to block light from roots until needed for observation.
 - If you plan to grow wheat to maturity, it is recommended to plant seeds in a larger container or the ground, if possible. Small cups or pots may tip as wheat reaches full height.
- Watering can
- Marker
- Labels (optional)
- Ruler

Planting:

- Ensure cups or pots have small holes for drainage in the bottom of the container. If cups/pots do not have drainage holes, punch, cut or drill holes in the bottom.
- Fill cups or pots 2/3 full with moist planting soil. There should be at least 0.5 in. of space below the lip of the cup.
 - For a paper cup with a 1.5 in. depth, plant 2-3 seeds per cup. For 4 in. or 6 in. pots, plant 6-8 seeds per pot.
- Label pots with student's name or the names of all those in a group.
- Place containers in a pan or tray to catch drainage water.
- Place the containers and drainage tray in a well-lit area that will remain at room temperature.
 - If you do not have natural sunlight, you can use artificial grow lights. Grow lights can also be used to supplement natural light.

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- Water as needed. Soil should be kept moist, but not overly wet.
- If wheat was planted in a smaller container, the plants may need a fertilizer application. Make sure the fertilizer is high in nitrogen and apply twice during the growing season.
- After three months of proper care, the wheat plants should have produced a head (spike). Once the head is fully developed, stop watering.
 - Note that this timeline is faster than winter wheat grown in a traditional farming operation, which can take 8-10 months, depending on geography and weather conditions.
 - For faster germination, seeds can be germinated in a wet paper towel before planting. Germination can take 6-8 days.

**Planting instructions adapted from California Wheat Commission Wheat2School® program. See the Wheat2School® planing manual for additional planting instructions (i.e. garden box, small plot or field. (<https://www.wheat2school.com/planting-manual>))*

Monitoring Growth:

- One week after planting, have students do an initial observation. Following the first weekly observation, allow students to observe plant growth every 2 weeks. Attempt to observe plant growth on the same day of the week for consistent monitoring.
- Instruct students or groups to record observed growth in their lab manuals (included in student version).
 - Students should note plant height, number of leaves, root length (if using clear cups), growth stage/Feekes stage and plant health.
 - Descriptions and photos of each growth stage/Feekes scare are included in the student manual and the flash cards.
 - These videos may be helpful in identifying later stages:
 - Feekes 6 (<https://www.youtube.com/watch?v=iukwznx4DPk>)
 - Feekes 7 & 8 (<https://www.youtube.com/watch?v=PZ7Lvsux1y8>)
 - Feekes 9 & 10 (<https://www.youtube.com/watch?v=OHGhq0qSM1o>)
 - Wheat Flowering (https://www.youtube.com/watch?v=ybZVW_YbhxY)
 - Make as many copies of the growth journal page as needed.
 - If possible, allow students to take photos of wheat plants to create a visual catalog of observations.

Cross Connections:

Science:

- Concepts Reinforced:
 - Plant structures and functions
 - Photosynthesis
 - Germination
 - Plant responses to environmental conditions
 - Scientific investigations
 - Data collection and analysis

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- Ecosystems and agriculture
- Classroom Applications
 - Conduct a controlled experiment
 - Observe and record plant growth
 - Measure variables such as height, leaf number and root length
 - Graph growth over time
 - Develop evidence-based conclusions

Math:

- Concepts Reinforced:
 - Data analysis
 - Graphing
 - Measurement
 - Percentages
 - Mean, median and range
 - Interpreting tables
- Classroom Applications:
 - Measure plant height in centimeters
 - Calculate average plant height
 - Determine germination percentage
 - Create line graphs showing plant growth
 - Compare growth rates
 - Calculate weekly growth

English Language Arts

- Concepts Reinforced:
 - Procedural writing
 - Informational writing
 - Scientific explanations
 - Reflection writing
 - Vocabulary development
- Classroom Applications
 - Keep observation journal
 - Write hypotheses
 - Explain results using evidence
 - Compare informational texts
 - Present findings to classmates