



# The Book Planter



## Ag in the Classroom

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### *The Dog Who Saved the Bees*

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Cybil Preston needs a dog. But not just any dog. She needs a dog to help her with her work. Cybil is a beehive inspector who works to ensure the health of commercial beehives. Hundreds of hives are shipped across the country as farmers need bees to pollinate their crops. Without the bees, there wouldn't be foods like apples, almonds, and

strawberries. But the bees must be healthy to be shipped, and there's a deadly disease, foulbrood, that is highly contagious. If even one infected hive left the state, entire bee populations could be wiped out. Dogs, with their ultrasensitive sense of smell, can sniff out even the tiniest scent of foulbrood in a hive. A well-trained, focused detection dog can inspect 50 hives in 10 minutes. Work that would take Cybil an entire day to do. When Cybil meets Mack, an unruly and lonely dog, she wonders if she has found her canine colleague. Can rambunctious Mack be trained to meet this important challenge?

#### Activity 1 – Engage: Honey Taste Test <sup>1</sup>

1. Provide a sample of honey on a cracker or spoon for students to taste. Encourage them to use adjectives to describe the taste and sweetness that they are experiencing.
2. Ask the students, "How do you think honey is made? Where does it come from?"
3. Write the word "bee" on the board. Ask the students to brainstorm connections bees have to food, plants and agriculture. As a class, create a list, mind map, or a word cloud about bees that can be posted in the classroom as a tool that can be referred back to throughout the lesson.

#### Activity 2:

Watch a video about [Mack the Bee Dog](https://www.youtube.com/watch?v=FsqFAdibT44) on YouTube.

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Ask students to answer the following questions based on what they learned from the video:

- What does a beehive inspector do? (inspect beehives to check for bee health or problems)

- How does Mack help the beehive inspector? (he can check hives in a shorter amount of time)
- What types of crops are discussed in this video? (almonds, apples, cucumbers)
- What percentage of the world's almonds are grown in California? (80%)
- What states are these bee colonies going to? Maryland, Virginia, West Virginia, California)
- What is American foulbrood? (a harmful bacteria)
- What does it smell like? (it has a foul smell like a dead animal)
- What special award did Mack receive?

### Activity 3: Let's Learn About Almonds<sup>2</sup>

1. Tell students, "We learned about a very important crop in California," then ask, "What was that crop?" (Almonds)
2. Ask, "Do almonds grow in North Carolina?" Tell students, "Almonds could possibly be grown here, but they are not commercially grown in North Carolina like they are in California. There are a few growers of almonds in North Carolina."
3. Ask students, "What do plants need to grow?" Add student ideas to the board. The list should include: sunlight, water, air, nutrients, and soil. Trees (how almonds are grown) are considered plants and need the same thing.
4. Put a year-long timeline on chart paper or on the board; label seasons and months. Give students a copy of *The Almond Life Cycle Worksheet*, and let them follow along as you determine at what point the life cycle stages go on the timeline. For example:
  - a. Almond trees are dormant in winter – between November and February
  - b. Trees bloom in the spring, pollination occurs before bloom
  - c. Almond kernels are developing in March to June
  - d. During summer, hullsplit occurs
  - e. In late summer, harvest begins and transportation to the processing plant begins.
5. Have students complete their worksheets.
6. Next, have students work in groups to conduct an experiment on what plants need to grow. Use the Desktop Garden instructions below as a guide for growing in the classroom. Have students make observations daily for several weeks and record their observations and drawings in a journal. Include date, temperature, growth measurements, and any other observations including drawings. Once the experiment is completed, have students present their findings to the class. Possible experiments include:
  - a. Group 1: Plant seeds in different soil types and compare growth.
  - b. Group 2: Plant seeds in different locations with different amounts of sunlight and compare growth.
  - c. Group 3: Plant seeds in different locations with different temperatures (inside, outside, in a refrigerator) and compare growth.
  - d. Group 4: Plant seeds and use different amounts of water and compare growth.

**Desktop Gardens<sup>3</sup>:** Create a tiny garden for your students' desktops! Add small toys, rocks, labels or marbles to this oasis in a lid.

Materials:

- Clean lids (Teacher note: You'll need to collect lids ahead of this activity.)
- Paper towels
- Seeds (use mustard seeds or cress seeds. They are speedy growers and will sprout anywhere as long as they are damp)
- Aluminum foil or cardstock to block light
- Water

Instructions:

1. Take a clean lid from a peanut butter jar, or use a plastic soup-cup lid.
2. Fit paper towel into lid, covering any tiny holes.
3. Moisten paper towel with water.
4. Sprinkle seeds on the area where you want growth to occur.
5. Cover the lid with a thick piece of cardboard or aluminum foil to block the light and allow seeds to germinate.
6. Check your garden every day until you see little shoots growing, then remove the cover. Be sure to keep the paper towel damp.
7. Once the seeds have sprouted, let them grow by regularly watering the desktop garden. Decorate with small cars, rocks or even marbles.

**Sources**

1. <https://agclassroom.org/matrix/lessons/686/>
2. <https://agclassroom.org/matrix/lessons/421/>
3. <https://cdn.agclassroom.org/ca/resources/bites/desktop.pdf>

**K-5 Subject Areas: English Language Arts, and Science**

**English Language Arts**

- RI.K.1 With prompting and support, ask and answer questions about key details in a text.
- RI.K.2 With prompting and support, identify the main topic and retell key details of a text.
- RI.K.4 With prompting and support, ask and answer questions about words in a text
- .RI.1.1 Ask and answer questions about key details in a text.
- RI.1.2 Identify the main topic and retell key details of a text.
- RI.1.4 Ask and answer questions to help determine or clarify the meaning of words and phrases in a text.
- RI.1.5 Know and use various text features to locate key facts or information in a text.
- RI.1.7 Use illustrations and details in a text to describe its key ideas.
- RI.2.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.
- RI.2.7 Explain how specific images contribute to and clarify a text.
- RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
- RI.3.2 Determine the main idea of a text; recount the key details and explain how they support the main idea.
- RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.
- RI.4.2 Determine the main idea of a text and explain how it is supported by key details; summarize the text.
- RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
- RI.5.2 Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.

**Science**

- PS.K.1 Understand how objects are described based on their physical properties and how they are used.
- LS.K.1 Understand the characteristics of living organisms and nonliving things.

- LS.K.2 Understand characteristics of organisms that make them alike and different.
- LS.1.1 Understand the basic needs of a variety of plants and animals in different ecosystems.
- LS.4.1 Understand the effects of environmental changes, adaptations, and behaviors that enable organisms to survive in changing habitats.
- LS.5.2 Understand the interdependence of plants and animals within their ecosystems.

# the Almond Life Cycle

## VOCABULARY

**dormant:** Once the almonds are harvested and the cold weather sets in, the trees go to sleep for the winter. During that time, the trees are storing up their energy for the spring.

**bloom:** Soft pink-and-white flowers cover the almond trees during spring for the bees to come and pollinate.

**hullsplit:** Once the trees have been pollinated, the almond hull (soft green outside covering) splits open to let the almond shell naturally dry.

**harvest:** During late summer and early fall, the almonds are removed from the trees by mechanical shakers.

Producing almonds is a year-long process. Almond growers pay special attention to the almond trees to make sure they are thriving all year long. Almond trees begin their cycle in a **dormant** state, which usually lasts from November to February. Once spring arrives, the almond trees burst into **bloom** and the bees come to pollinate. From March to June, the almond kernel is developing and hardening. In July, once the kernel has grown to its full potential, it goes into the **hullsplit** phase. In late summer, the almond trees are **harvested** and transported to the processing plant to be shipped around the world.

## ACTIVITY

Use the vocabulary as a tool to fill in the missing words in the almond life cycle.

