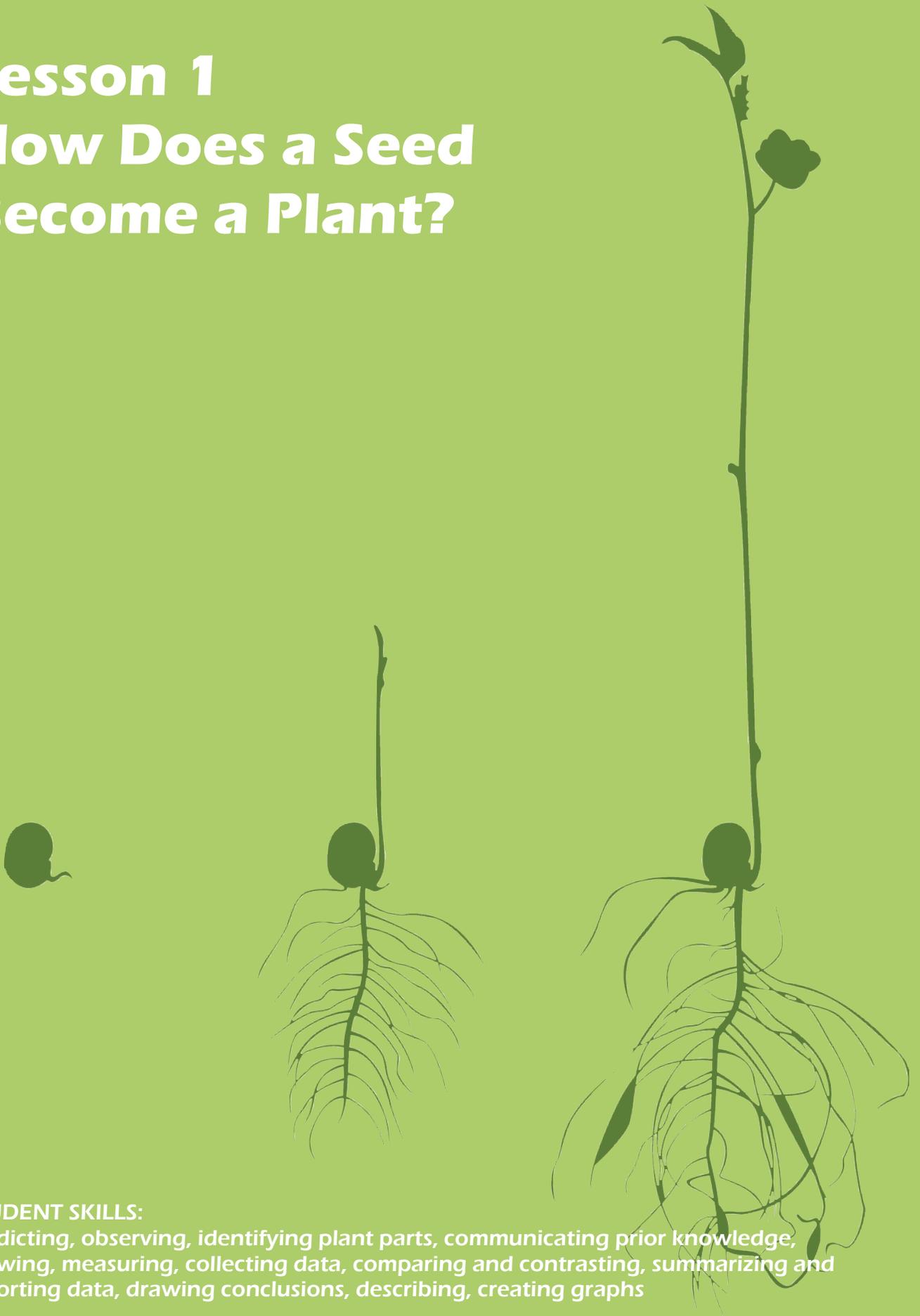


Lesson 1

How Does a Seed Become a Plant?



STUDENT SKILLS:

predicting, observing, identifying plant parts, communicating prior knowledge, drawing, measuring, collecting data, comparing and contrasting, summarizing and reporting data, drawing conclusions, describing, creating graphs

Activity 1A: What Is in a Seed?

SUMMARY: Students investigate the inside of a seed, discover the tiny plant embryo, and observe the food source that nourishes its early growth.

KIT MATERIALS:

Bags with assorted seeds, marbles, pebbles, etc.
Lima beans (soak in water overnight, 1 per student, with extras)
Kidney or pinto beans (soak in water overnight, 2 per group)
Hand lenses
Grow crate (1 per class)
5-inch pot (1 per class)
Plant label stick (1 per class)
Soil mix (1 per class)
Spray bottles (2 per class)

TEACHER TO PROVIDE:

Copies of MySci™ Activity Sheet 1A

ENGAGE

Divide the class into groups of four. Give each group a bag to sort into seeds and non-seeds. Discuss which might grow. Ask the children how seeds change into plants.

Ask the children if they have ever eaten beans before. Did they know they were seeds? Ask them what other kinds of seeds they have eaten.

Put 4 soaked lima beans and 2 kidney or pinto beans on a paper towel in front of each group of students. Have student observe and compare the presoaked lima beans to the unsoaked beans. Ask the students what they think the inside of these seeds might look like. Do they think every kind of seed looks different on the inside or are they alike in some ways?

EXPLORE

Ask each student to choose a lima bean to examine with a hand lens. Direct them to carefully peel the outer covering off the soaked seeds, split them open, and use their hand lenses to look closely as they separate each seed into two halves. Have students discuss with a partner the possible parts of the seeds.

EXPLAIN

Ask the students what they notice. Tell them there are four parts in a seed. Can they find them? Create a chart with columns labeled **seed coat**, **leaves**, **root**, and **seed leaf**. Lead students in a discussion of the possible functions they came up with for the seed parts. Accept

all answers and write them on the chart. If students do not come to the correct functions on their own, lead them to understand that the seed coat protects the seed, the leaves and root are the baby plant that will grow into a full-grown plant, and the seed leaf is the food that the plant uses until it grows leaves above ground to make its own food.

ELABORATE

The lima bean is the first of five kinds of seeds that the class will be planting. Have volunteers fill the 5-inch pot with soil, plant three to four lima bean seeds, insert the label with the date and name of the seed planted, and water it. The pot can be placed in the grow crate.

EVALUATE

Distribute the MySci™ Activity Sheet 1A and have children identify the seed coat, leaves, root, and stored food. Children may draw their seed on a MySci™ journal page if desired. Older children can add the function of each seed part.



NOTE TO TEACHER: You may also make some informal evaluations of student understanding while completing the EXPLAIN section of this activity.

Activity 1B: How Do Seeds Grow?

SUMMARY: Students plant a variety of seeds and then observe, measure, and compare their growth by documenting data in their journals and compiling graphs.

KIT MATERIALS:

Hand lenses
Wisconsin Fast Plants[®] student kit
Grow crate (1 per class)
5-inch pot (1 per class)
Plant label stick (1 per class)
Soil mix (1 per class)
Zipper sandwich bags (1 per student)
Pinto bean seeds, sunflower seeds,
popcorn seeds (one bag each)
Seed germination stages cards
Spray bottles (2 per class)

TEACHER TO PROVIDE:

Copies of MySci™ Activity Sheets 1B-1
and 1B-2
Paper towels
Permanent marker
Ruler
Stapler



NOTE TO TEACHER: Wisconsin Fast Plants[®] are the second type of seeds that the class will be planting. Fast Plants[®] were given this name because they complete their life cycle faster than most plants under conditions of constant light and moisture. Each student will sprout his or her own set of the other three kinds of seeds together in a sandwich bag—pinto bean, sunflower and popcorn.

ENGAGE

Begin by asking students how seeds become plants what plants need to grow. When they refer to light, show the grow crate that can be used to supply constant light. When they refer to water, show the wicking system for the Fast Plants[®], which can keep the soil evenly moist. When they refer to air, explain that the seed/plant will not be covered in an air-tight container.

Show students the tiny size of the Fast Plants[®] seeds. Discuss the importance of planting these tiny seeds close to the surface. (Note: see the instructions that accompany the Fast Plants[®] student kit for more detailed directions on planting and care of Fast Plants[®].) Plant the Fast Plants[®] seeds.

EXPLORE

Say, “Now we are going to start some other kinds of seeds. Before seeds grow into plants, they need to germinate, or get started.” Demonstrate the following process: fold a paper towel so it fits across the bottom and up two-thirds of a plastic sandwich bag. Place it in the bag, run a row of staples across the bag one inch (about one thumb length) from the bottom, add just enough water to moisten the towel. Add three pinto bean seeds, three sunflower seeds, and three popcorn seeds to the bag.

Have each student set up a seed bag according to your example. Organize materials by having one student distribute bags while another student distributes paper towels. Set up a station where students can staple bags, add water, and write their names using the permanent marker. Have another station where students can add the three kinds of seeds. (Note: rinsing the pinto bean seeds for several minutes in a solution of one part bleach to ten parts water before distributing to students will help prevent bacteria and mold.)

Designate a wall or bulletin board where bags may be taped or pinned for easy observation. Discuss students’ predictions about what will occur. If they suggest seeds will sprout, ask whether or not all three kinds of seeds will sprout at the same time, and whether or not all the seeds of one kind (e.g., sunflowers) will sprout simultaneously.

Decide how often students will record their observations of plant growth on graph paper or on Activity Sheet 1B-1. An interval of two or three days between formal data collection sessions will produce measurable changes, even if students choose to look at their plants on a daily basis. (Note: set the first data collection to be completed when at least one kind of seed has sprouted, probably about three to four days after setting up experiments.) Two activity sheets have been included to record observations of the plants in the grow bucket and the plants in the bags. Students will use a new copy of the sheet on each observation day.

On each observation day, direct students to make a drawing of what they see and to measure any growth that has occurred on Activity sheets 1B-1 and 1B-2. (Note: students may raise questions such as “If all three sunflower seeds sprouted and they are different heights, which measurement should I record?” You may wish to use this opportunity to integrate related math curriculum goals. Depending on grade level, students may choose the middle or tallest plant, or may calculate the average height of each kind of plant.)

When students have finished recording data on each observation day, ask them to summarize their observations by comparing the different kinds of seeds and the plants that are developing from them. Possible questions include: Which seed sprouted first? Which plant is the tallest? Which has the biggest leaves? In what ways do the plants differ?

Have students complete Activity Sheets 1B-1 and 1B-2 on three observation days. (Note: at some point some seedlings may reach the top of the bag, particularly if they are growing in a dim area and the stems have stretched in search of more light. If necessary, the bags may be left slightly open. Students may need to check the paper towel to be sure it is still moist, especially over a weekend.)

Lesson 1: How Does a Seed Become a Plant?

EXPLAIN

When students complete their drawings and measurements on the second and third observation days, ask them to compare their results with their predictions and with their drawings and measurements from previous days. Discuss their findings. Discuss similarities and differences among seeds and sprouts. Possible questions include: Is the tallest plant from their last observation still the tallest? Did the biggest seed make the biggest plant? How would they describe the leaves of the plants? What stages of germination did students observe?

ELABORATE

Give student pairs a set of laminated seed germination stages cards. Ask students to think about their observations of their own seeds and then to work as a team to place the cards in the order in which the various stages of development occur. Once students have finished, discuss as a class the correct order of development.

Ask the children if where they put the bags might make a difference in their development. What would happen if they put a bag in a closet? A refrigerator?

EVALUATE

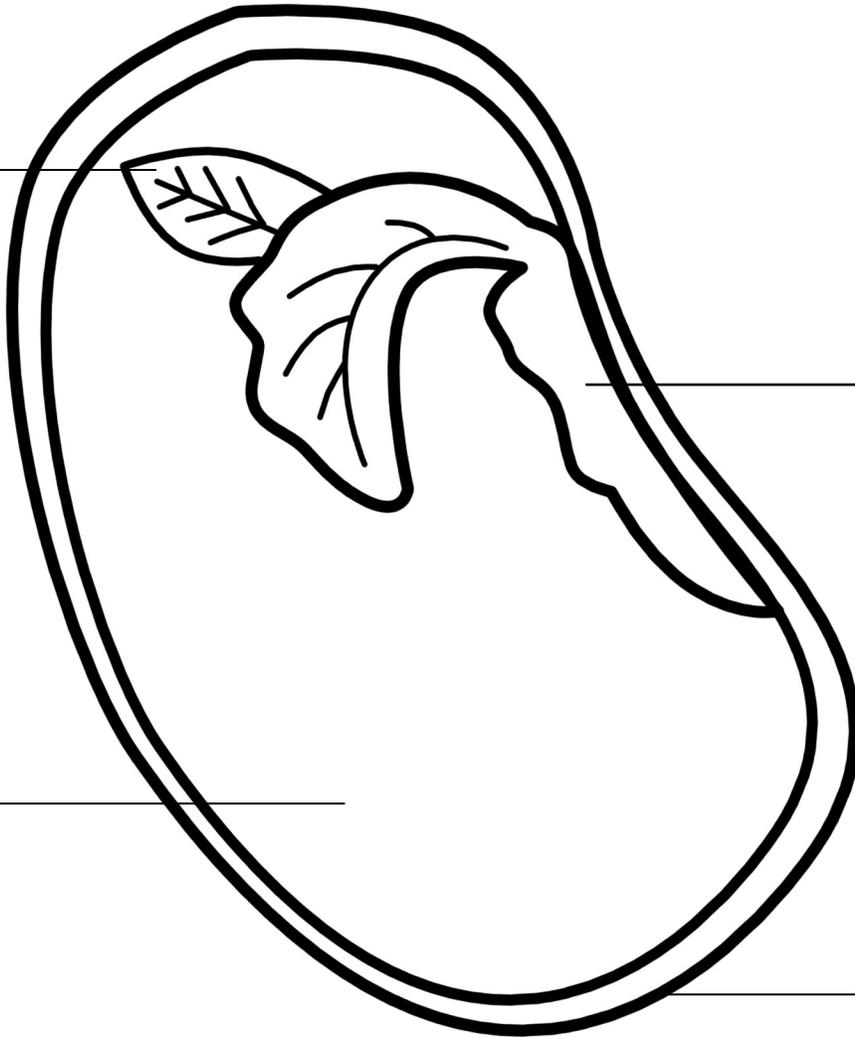
With the data from the three sessions, students might create a bar graph that shows the growth of one of their plants over all three observation sessions. Alternatively, they might create a set of three bar graphs that show the height of each kind of plant on each day.

Activity Sheet 1A

Name _____

Date _____

Label the seed parts using words from the Word Bank below.



Word Bank:

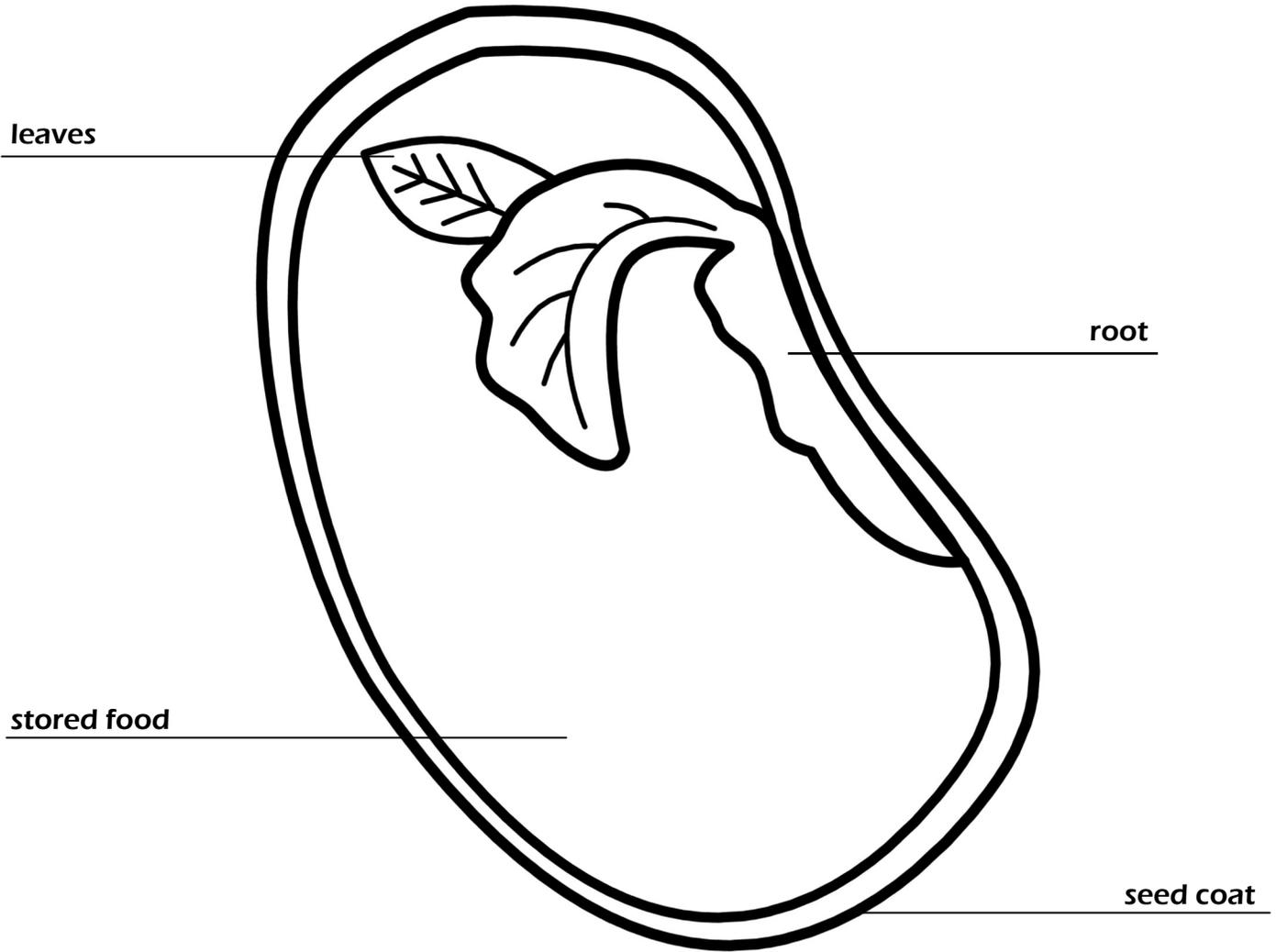
seed coat

root

leaves

stored food

Activity Sheet 1A Answer Key

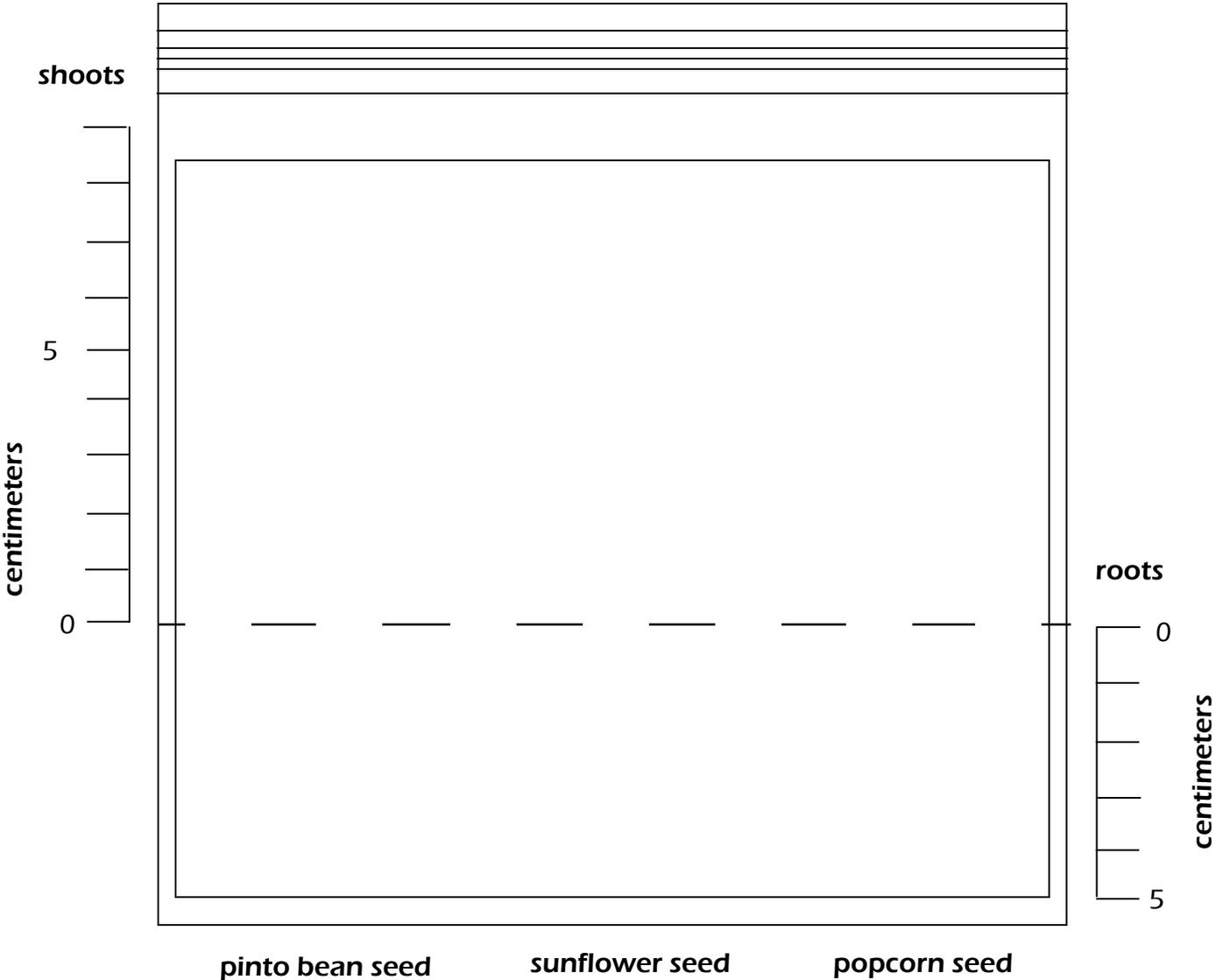


Activity Sheet 1B-1

Name _____ Date _____

Draw a picture of the seeds and plants above each label. If it has sprouted, measure the plant(s) and show its height in centimeters using the ruler.

My seeds and plants look like this on _____;
TODAY'S DATE



The seeds are alike and different from each other because

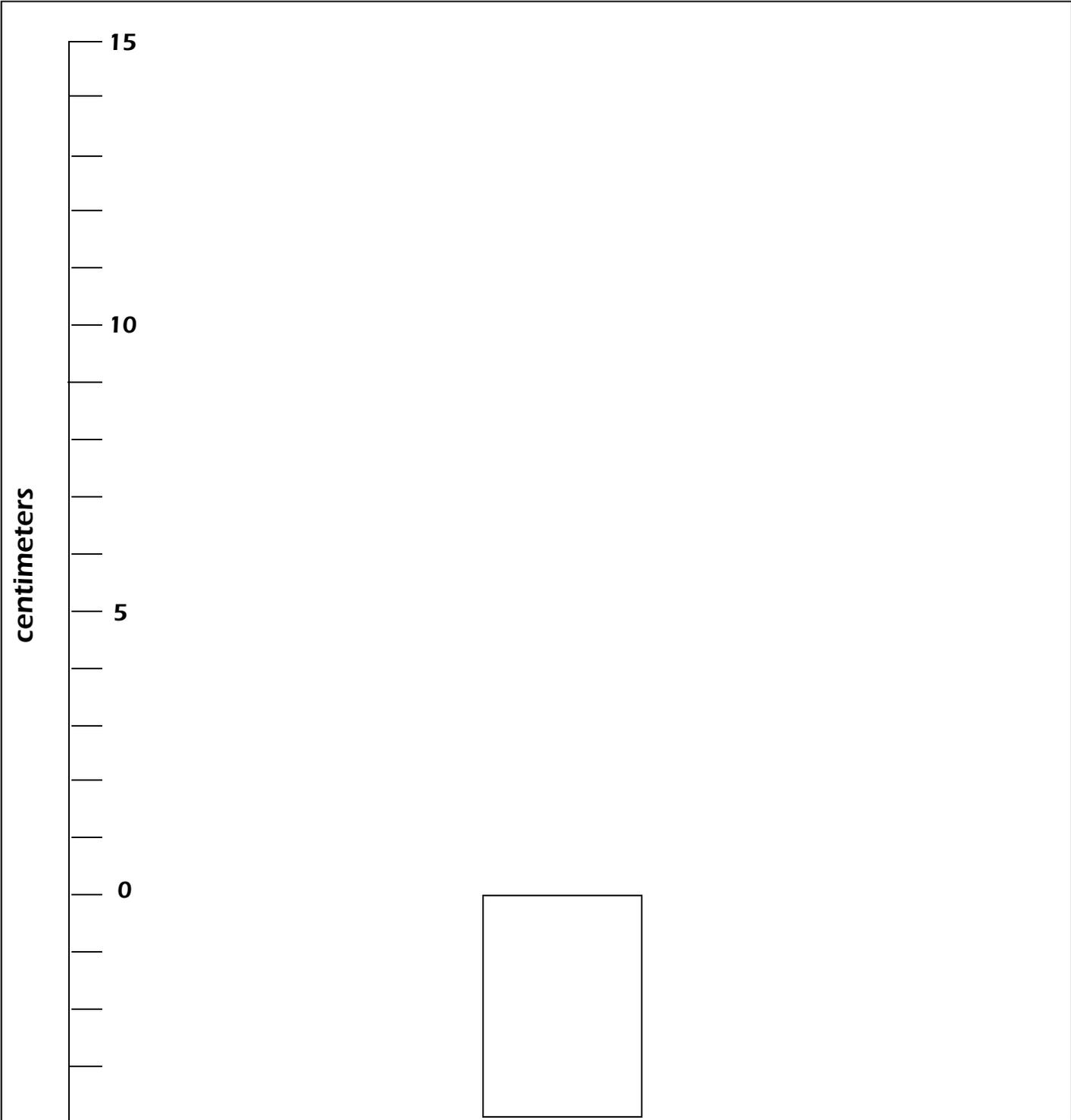
Activity Sheet 1B-2

Name _____ Date _____

The _____ looks like this on _____

FAST PLANT OR SEED

TODAY'S DATE

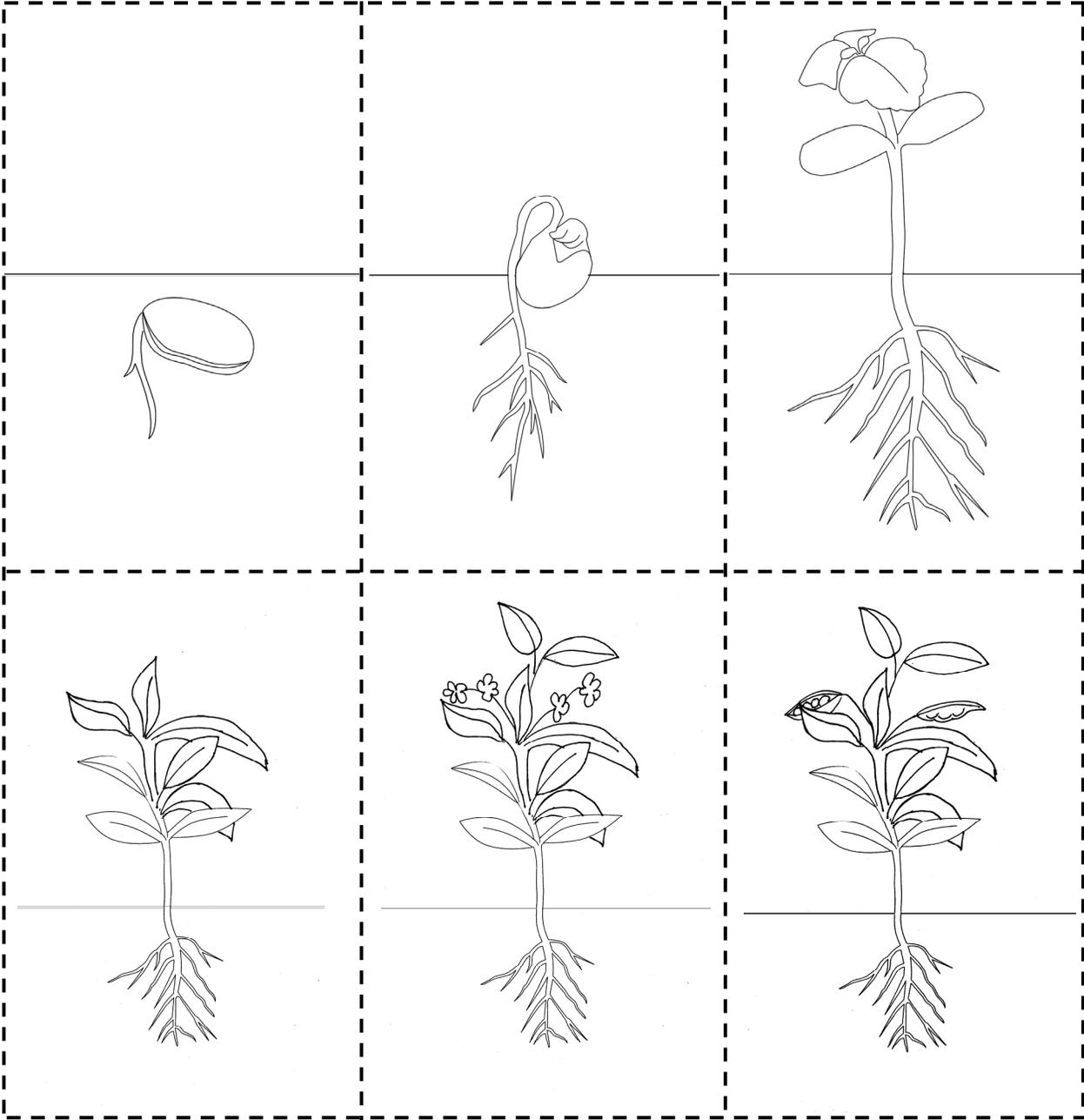


Activity Sheet 1B-3

Name _____

Date _____

Cut apart the cards.



Activity Sheet 1B-4

Name _____

Date _____

Cut apart the cards.

A bean seed starts to grow.

**Roots grow down.
A shoot grows up.**

Leaves grow on the stem.

The plant gets bigger.

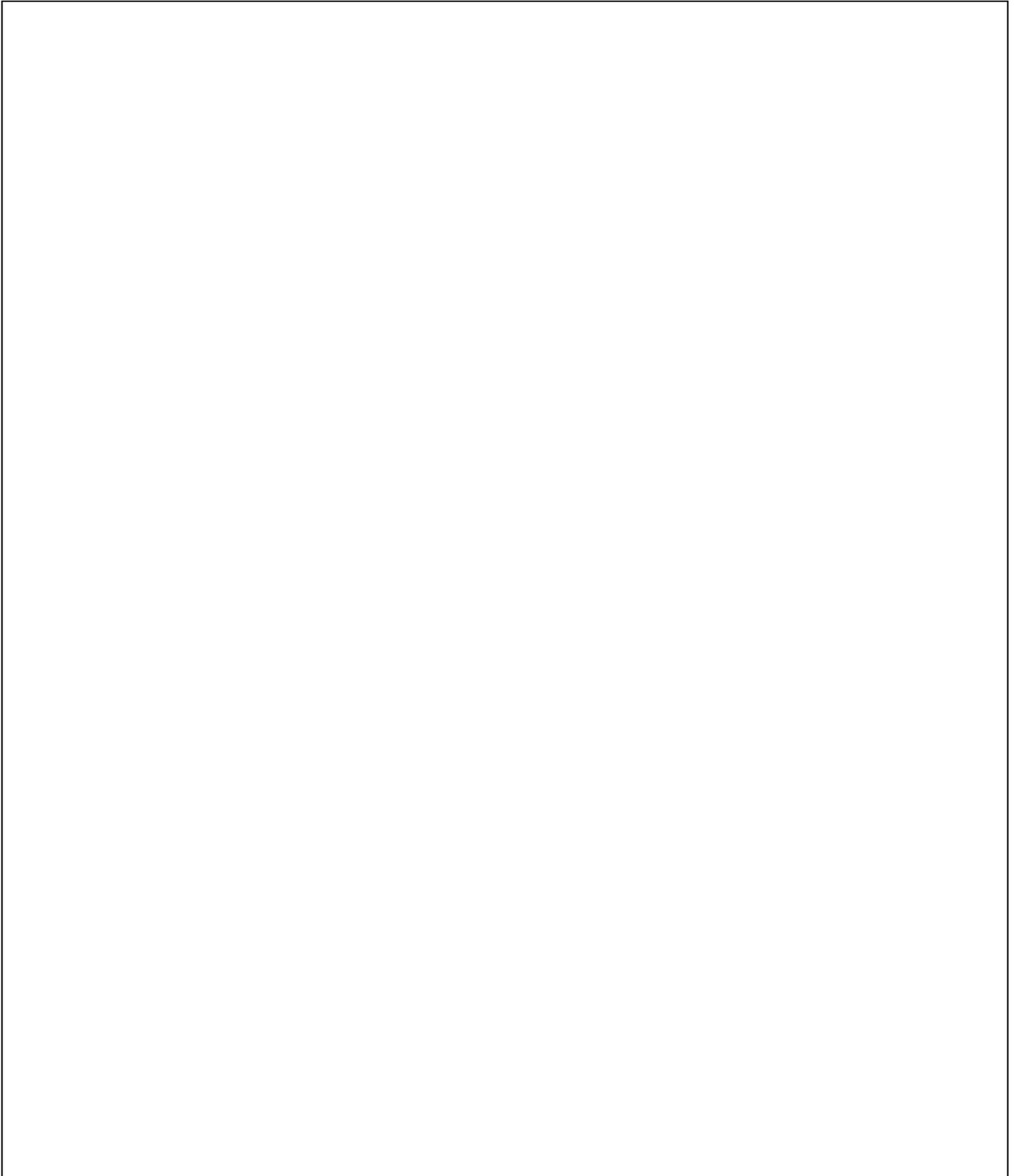
Blossoms grow on the plant.

**The blossoms make seeds.
The seeds grow in pods.**

MySci™ Journal Drawing Page

Name _____

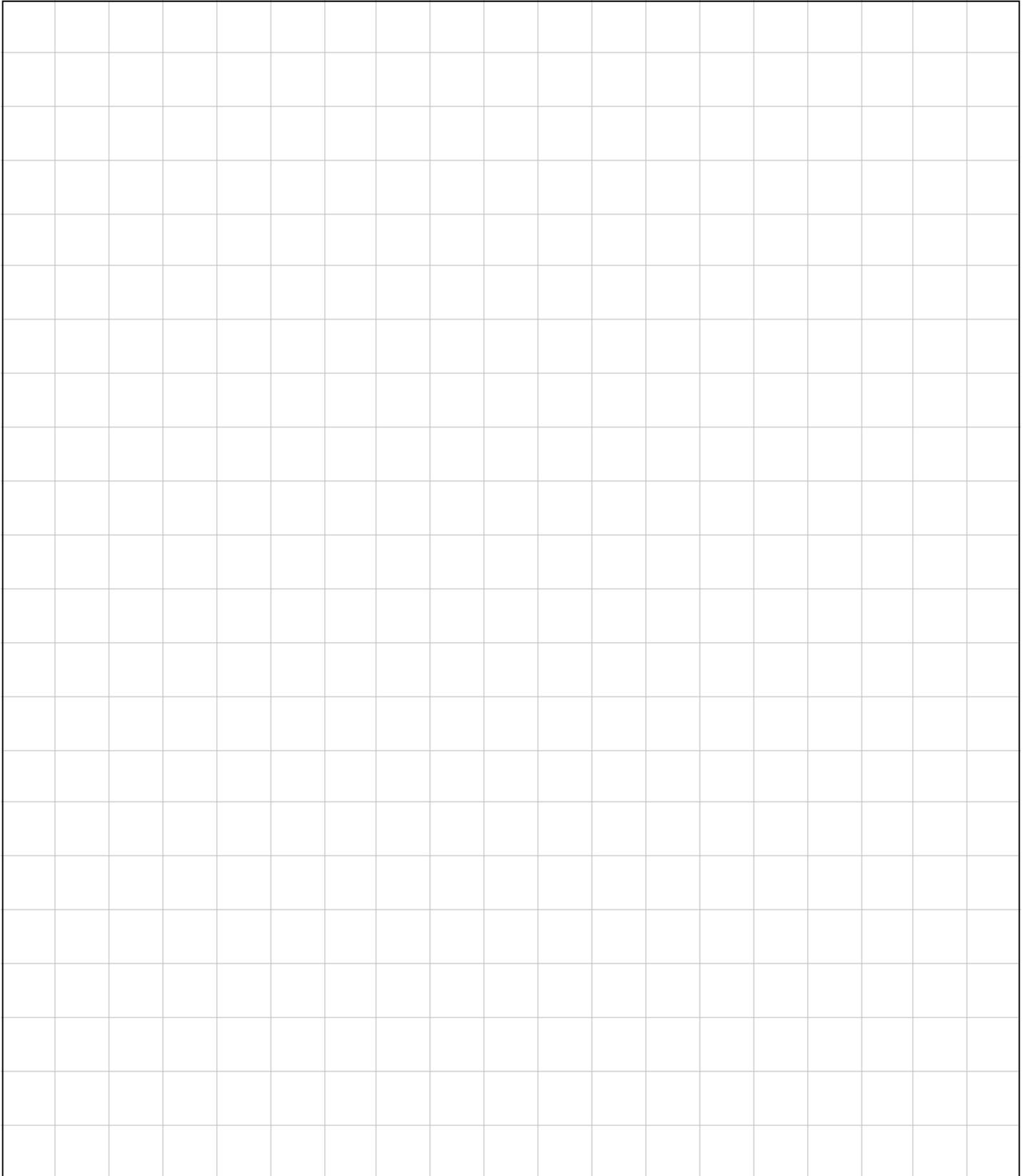
Date _____

A large, empty rectangular box with a thin black border, occupying the majority of the page below the name and date fields. It is intended for a student to draw a scientific illustration or diagram.

MySci™ Journal Graph Page

Name _____

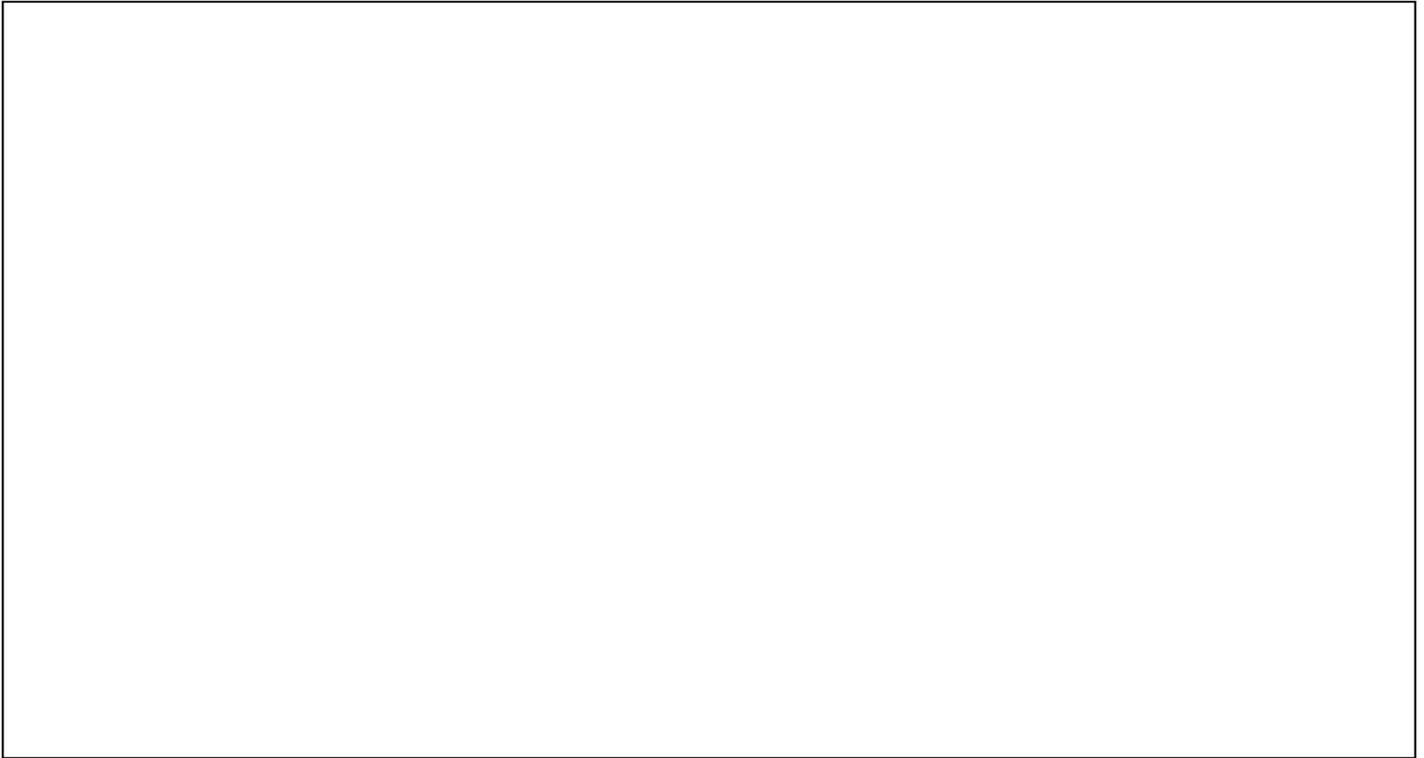
Date _____



MySci™ Journal Writing and Drawing Page

Name _____

Date _____



Four sets of primary-ruled lines for writing. Each set consists of a solid top line, a dashed midline, and a solid bottom line.

MySci™ Journal Writing Page

Name _____

Date _____

Journal writing area with multiple sets of horizontal lines. Each set consists of a solid top line, a dashed midline, and a solid bottom line.