2nd Grade 4th Week – Flowery Investigations, Get a Grip and Wind pollination game – investigating plants and adaptations

# Get a Grip

**Students in the Stem Group conduct an experiment with pea plants in root view boxes to see whether the plants climb.**

**Indoor**

**Time**
Part 1: 30 minutes
Part 2: 10 minutes
Part 3: 20 minutes

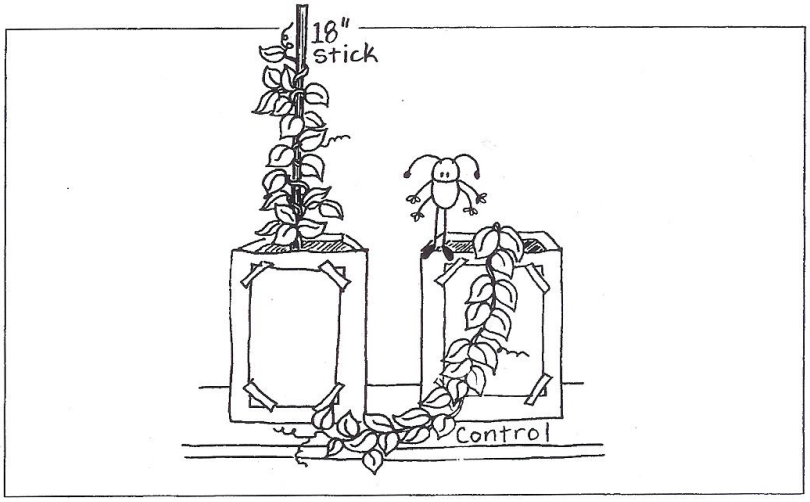
**Related Subject**
Art

**Process Skills**
Experimenting
Recording data

**Materials**
*For the Stem Group:*
- Stems List
- pea plant in root view box, to serve as a control

*For Each Stem Group Pair:*
- pea plant in a root view box
- ruler
- stick or branched twig 45 cm (or 18 inches) long
- string, coat hangers, or other staking material (optional)
- space in garden bed (optional)

*For Each Stem Group Member:*
- Lab Book, p. 136




## Outcome
Students in the Stem Group practice setting up an experiment using the Guess-Test-Tell method and report results.

## For the Teacher
In this lesson, pairs of students in the Stem Group set up an experiment to test whether plants climb, using the pea plants that were planted in the root view boxes early in the unit. Pairs can work together to build their own staking system. The experiment calls for 6 pea plants in root view boxes: 1 for each pair of students and 1 to serve as a control.

Vines are sun worshippers, but they generally need assistance to climb off of the ground. Vines that twine, such as wisteria, will wrap themselves around the nearest support the minute they touch it, the contact sending a message to cells to increase growth on one side to create a bend in the stem. Clinging vines, such as ivy, send out little rootlets or little discs on tendrils, enabling them to climb flat, vertical surfaces by means of burrowing or suction. Vines such as the pea plants being used in this experiment support themselves by sending little tendrils out from the stem, which wrap around a support and hold fast. When the vine touches the object, the tendrils are produced very quickly; it is important that the support be thin enough for the tendrils to wind around, but strong enough to support the vine as it grows.

### Teacher to Teacher

*When the Stem Group tried this experiment, none of the peas gripped the supports, so we had a brainstorming session to try to determine why. Some ideas were that we used the wrong kind of peas, or the peas needed wind to help them find the sticks. Or perhaps the peas needed sunlight instead of our classroom light, or they needed to follow the sun's apparent movement across the sky to brush up against the sticks. All were good ideas and we decided to test some of the hypotheses by putting a control and a staked plant out in the wind, another outside in the greenhouse, and another in the classroom. Unfortunately, we had an unusually hot weekend and all the plants slumped to the ground. Students were still determined to find answers to their questions, so they again began a brainstorming and experimenting session. I assured students that it is through trial and error, test and retest that scientists get answers to their questions!*

–Linda Ziegler, Mar Vista Elementary School, Aptos, CA

### Preparation

1. If the pea plant experiment is to be done in the garden, prepare a small bed for transplanting.

2. (Optional) Arrange to have a variety of potential staking materials on hand, as listed in the materials section.

3. Plan to work with Stem Group members as they set up their experiment. Then encourage them to monitor it on their own.

### Getting Started

Ask students for ideas about what stems do to keep a plant healthy and help it grow.

**What are different ways stems help plants grow? In what ways does a stem help the leaves reach toward the sun? Have you ever seen a vine plant that couldn't stand up? How can a stem on a vine plant help the plant survive?** Add students' ideas and comments to the Stems List. Encourage students to give reasons for their answers. **How could we set up an experiment to see whether pea plants climb?**

### Part 1


### Action

1. Take the Stem Group on a tour of the school grounds, looking for plants that climb. Ask them to observe these plants carefully and to note what plant parts help the plant climb. Ask them why this type of plant might climb. Return to the classroom.

2. Divide the Stem Group into pairs. Give each pair a pea plant in a root view box, a ruler, and a 45-cm (or 18-inch) stake. Discuss whether students will be transplanting their peas in the garden or keeping them inside in the root view boxes.

3. Have students use the lab sheet as a guideline for setting up a Guess-Test-Tell experiment. First, ask students what question they will be testing. Questions should be written on the lab sheet. (For example, "Will these peas climb a stake? How?")

4. Discuss what tests students will conduct. Allow pairs to brainstorm their ideas for testing to see whether peas climb and if so how. Tell them to record the steps in the Test section

of the lab sheet. (For example, "We will put a stake next to the plant. For comparison we will have one control plant without a stake.")

5. Discuss what students think will happen in the experiment. Tell them to record their predictions on the lab sheet. (For example, "The peas will climb the stake by winding around it.")

6. Discuss the control in the experiment (the unstaked plant). Discuss the variables that will need to be kept the same in order to ensure a fair test (same exposure to light, window cover in place on both boxes, both boxes propped, and so on).

7. If students have planted their peas in indoor boxes rather than outside, have pairs label their plant and put it on the windowsill. Be sure students have added their staking system to their test plant.

8. If students are transplanting pea plants into the garden, use the control plant to demonstrate the proper handling of seedlings. Make sure that all plants are transplanted in the same way.

9. Students should draw pictures on their lab sheets, showing their plant and their staking system. Be sure they label the pictures with the date. Set up a monitoring and watering schedule for the Stem Group.


### Assessment

Review students' ideas about the experimental set up.

**What are you testing in this experiment? What are some of the predictions you have made? How are you going to keep track of what happens in this experiment? Why do you think the pea plant may climb the stake?**

## Part 2


### Action

Students monitor the plants for changes. Tell them to examine the tendrils along the stem closely and discuss their function.

### Assessment

Ask students to compare their predictions with the progress of the experiment so far.

**What is happening to the control plant? What is happening to the plants with the stakes? How does what is happening compare with what you expected?**

## Part 3


### Action

1. When results of the experiment are apparent, have students fill in the Tell section of the lab sheet and draw a final picture. Encourage pairs to compare and discuss their results.

2. Allow time for the Stem Group to prepare a report on its experiment. They will present the report to the class as part of the last lesson of the unit.

### Assessment

Ask students to compare their predictions with the final results of the experiment.

**What did you learn in your experiment? What happened to the plant that was staked? How does a pea plant climb? What parts help it climb? How might this help a plant survive? What will happen to the plant that is not staked?**

### Digging Deeper

- Suggest that students try to train their pea plants to grow up a variety of materials, such as slippery nylon string, and in a variety of directions, such as along horizontal bars.

- Grow different types of climbers, including twining honeysuckle or clinging Virginia creeper or ivy, to compare how these plants attach themselves to supports. A local nursery can help advise you on suitable climbers to plant in your region.

- Encourage students to research different types of vegetable plants that can be grown on trellises, such as cucumbers and squash. Suggest that they design a garden using as many upright, supported crops as they can and then analyze how the space-saving affects yield.

### Teacher Reflections

- Did students need more help with any part of the experimental process?

- Did all group members participate in the various tasks?

- Did students understand the difference between the control plant and the test plant?

# Get a Grip

Names_____Date_____

_____

**Question:** _____

_____

**GUESS:** (What do you think will happen and why.)

_____

_____

Test

Control

**TEST:** (Describe the experiment)

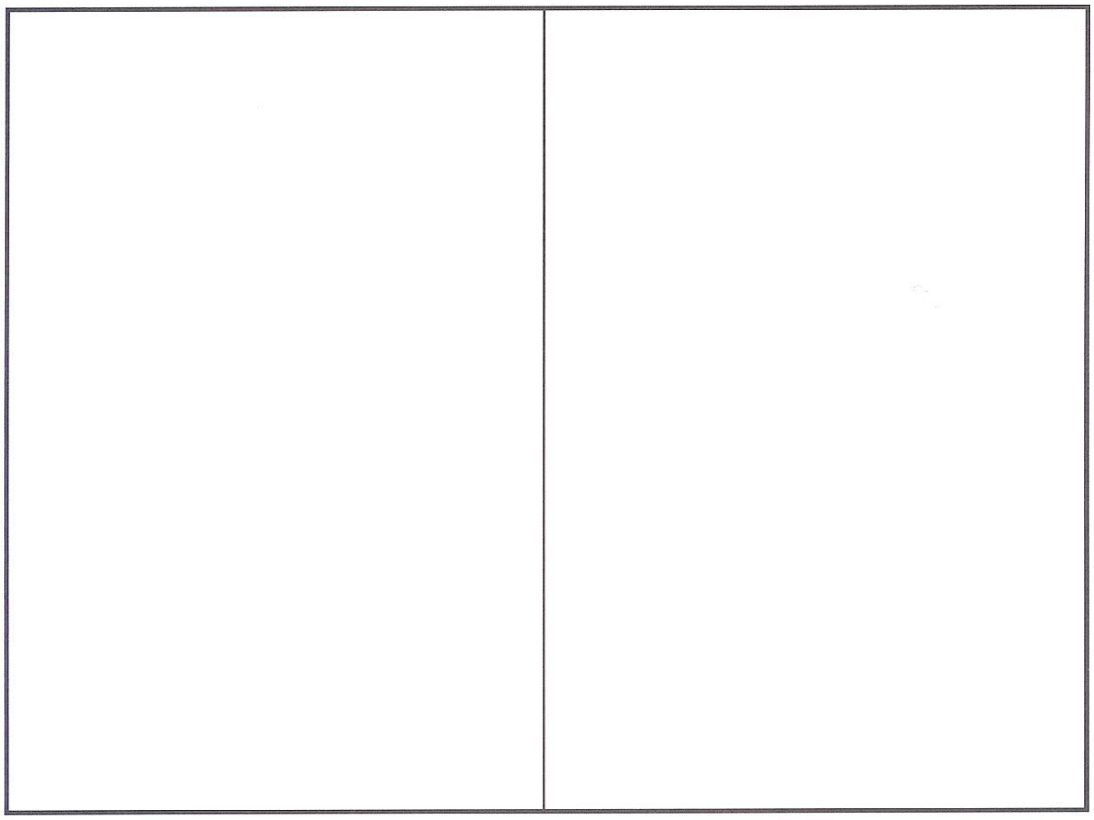
**1. Our test:** _____

**2. Our control:** _____

**3. Steps we will take:** _____

_____

**TELL:** (What we observed.) Date_____



Test Control

Why do some plants climb?

_____

_____

_____

_____

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