# EED 480Celery Experiment



**Objective**

Students will recognize and learn that stems take in water (through the process of capillary action for upper grades) . Water has properties (cohesion and adhesion that enable it to rise up through the stem and color the leaves.

**Big Idea**

Can you change the color of celery? How do you think water gets to the top of a giant tree??

**Setting the Stage:** Students need to understand characterization of organisms. Plants have different functions in growth, survival, and reproduction.  It is important that students have the opportunity to investigate how plant parts function in order to grow and survive. If students gain a clear understanding of plants function and structure, they can assist with plants growth, survival, and reproduction. In this lesson, students learn that the stem takes in water for the plant.  They place celery stem in colored water overnight to make an observation on the following day.

**Next Generation Science Standards**
The lesson focuses on 2 LS1-1, plan an investigation to determine if plant needs sunlight or water to grow. The students need to understand how the parts of a plant function in order to investigate if plants need water to survive.

 **Science and Engineering Practices in the Next Generation Science Standards**
This lesson address SP 8: obtain, evaluate, and communicate information. During the investigation, students will ask their peers questions about the plant, and they will write and communicate their group's results. It is important that students work collaboratively to communicate in written and oral form.

**Structure and Function**

In this lesson, the students understand that the celery is a stem, and the stem is designed to take in the water and nutrients. This is important for students to know because they learn that plant parts are structured in a way to support the life of a plant. In addition, from prior knowledge with the Water on a Penny experiments, they understand that water has a unique property not shared by other substances.

 **Background Knowledge:**

Students have already learned that plants have roots, stems, leaves, and flowers. They know that plant parts function in different ways to help plants grow, survive, and reproduce.  Students collaborate in groups using the scientific method and science process skills (observe, infer, form a hypothesis, predict, draw conclusions, and communicate).  I establish safety procedures during all science and technology investigations.

**Materials:**

A Stalk of Celery

Red, Blue, Green, and Yellow Food Coloring

5 Tall Clear Cups with 3/4 of water

Plastic knife

**Roles**:

Materials Manager/Traveler (SPY)

Checker

Recorder/Reporter

Observer/Illustrator

**The instructor/ facilitator begins this activity by assigning the materials manager/spy, checker, recorder/reporter, illustrator/observer.  The materials managers will be provided with the celery lab sheet that enable their teams to follow along in their roles.**

**THE 5-E FRAMEWORK**

**ENGAGE** **CHECKER**

5 MINUTES

Lead your team in recalling how the water on a penny displayed an ability to dome on the penny—and the activity on water molecules forming and joining.

 **EXPLORE**

15 MINUTES

Developing Questions

Lead your fellow students in understanding that they will conduct an *investigation*: "How does water travel up a stem?"  Students collaborate in groups.

**Observe and ask questions**- What questions do they have about the items?  **RECORDER**

Record responses on the lab sheets.  Groups are permitted to share their questions, so other groups can see and hear their peers' responses—Traveler (Spy).

[Warning for younger students: 1. *Think Ahead  2. Be neat. 3. Be careful. 4. Do not eat or drink things*].

**Form and record the hypothesis**- Problem-posing, "What will happen when we soak celery stalks in colored liquid?" [Students are asked: write a hypothesis using an "IF and Then" statement].

5 MINUTES: Timed so students can stay focused on completing the task.

**EXPLAIN ALL
Plan a fair test**

**7 MINUTES**

 Students are asked: What things will you need to do the test? What steps will you take to do the test? ( [Planning Our Fair Test, student video)](https://betterlesson.com/lesson/resource/3116731/planning-our-fair-test). **Do the test.**  Once the facilitator observes the steps that students will take to do the test, they are green lit to follow their plan to complete.  **ELABORATE** Inform the students that the colored water must be bright in order to see the change in the stem.

**DAY TWO**

 If you take the stem out, what do you think will happen? I permit the students to share. I inform the students that the experiment takes time and we have to wait overnight to make an observation.

**ILLUSTRATE ILLUSTRATOR**

**On the lab sheet provided, draw and color pictures of the results of your lab experiment.**

**EVALUATE**

10 MINUTES

**Draw conclusions. Communicate results. (Day 2) -**On the next day, students observe the celery.  Use a plastic knife to cut the bottom of celery about 1 inch, so they can see how the food coloring has travelled through the stem.  Have them record their findings on their lab sheet.

 Each group is then given an opportunity to share their findings with the class. It is important that students share what they know about how the water defied gravity by telling or showing others the bottom and top of their celery stalk. This permits them to work on the science process skill, communicate.

Then display images of trees pulling water (and nutrients) from their roots (ground water) to their branches and leaves.

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| celery.jpgTEAM NAME: ­­­­­­­­­­­­­­­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_SCIENTIST: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ONE QUESTION WE HAVE ABOUT THE ITEMS?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  A HYPOTHESIS WE HAVE ABOUT WHAT WILL HAPPEN AFTER THE CELERY STALK SOAKS IN THE COLORED WATER?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ WHAT SCIENTIFIC PROCESS IS OCCURRING?Explain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  |



DAY TWO OBSERVATION:

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ILLUSTRATION OF THE RESULTS

CELERY

WHAT DID YOU CLAIM ABOUT HOW YOUR CELERY WOULD REACT?

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WHAT SCIENTIFIC PROCESS DO YOU THINK OCCURRING?

Explain Your Evidence: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Processing the Celery Experiment**

**National Science Teaching Standards Met by the Celery Experiment**

Students need to understand characterization of organisms. Plants have different functions in growth, survival, and reproduction.  It is important that students have the opportunity to investigate how plant parts function in order to grow and survive. If students gain a clear understanding of plants’ function and structure, they can assist with plants’ growth, survival, and reproduction. In this lesson, students learn that the stem takes in water for the plant.  They place celery stem in colored water overnight to make an observation on the following day.

***DISCIPLINARY CORE IDEAS***

The **Science** lesson focuses on **NGSS 2 LS1-1,** plan an investigation to determine if plant needs sunlight or water to grow. The students need to understand how the parts of a plant function in order to investigate if plants need water and sunlight to survive.

***SCIENCE AND ENGINEERING PRACTICES***

This lesson addresses SP 8: obtain, evaluate, and communicate information. During the investigation, students will ask their peers questions about the plant, and they will write and communicate their group's results. It is important that students work collaboratively to communicate in written and oral form. *What other science and engineering practices can you argue your students are addressing??*

***CROSS-CUTTING CONCEPTS*

# Structure and Function**

In this lesson, the students understand that the celery is a stem, and the stem is designed
 to take in the water and nutrients. This is important for students to know because they learn that plant parts are structured in a way to support the life of a plant.

**Background (Prior) Knowledge:**

Before leading this lesson your students have already learned that plants have roots, stems, leaves, and flowers. They know that plant parts function in different ways to help plants grow, survive, and reproduce.  In this lesson students collaborate in groups using the scientific method and science process skills (observe, infer, form a hypothesis, predict, draw conclusions, and communicate).  I establish safety procedures during all science and technology investigations.

