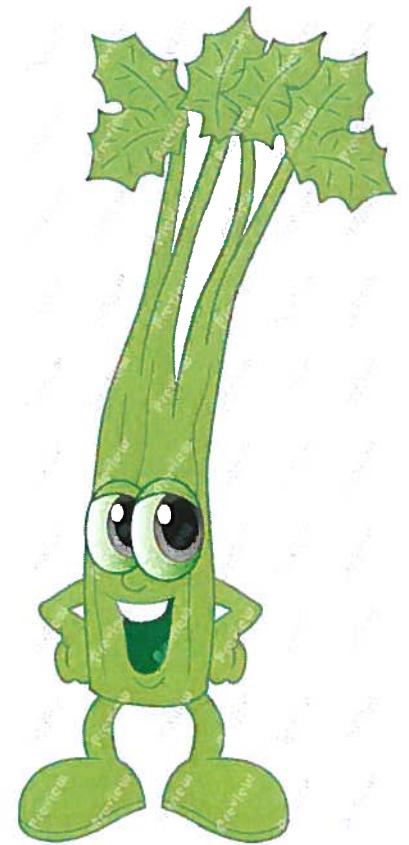


# Celery Super Highway



DATE:

NAME:

CLASS:

**ASSESSMENT CHECKLIST 12**

# Scientific Drawing

(Communication and Teamwork)

Element	Assessment	
	Self	Teacher's
1. Appropriate and accurate details of structure are shown.	<input type="checkbox"/>	<input type="checkbox"/>
2. The drawings show an appropriate number of views of the object so that all of it is represented in the drawings.	<input type="checkbox"/>	<input type="checkbox"/>
3. Drawings use firm, continuous lines and dark areas with stippling.	<input type="checkbox"/>	<input type="checkbox"/>
4. All drawings use the same scale, which is shown clearly. The scale is metric.	<input type="checkbox"/>	<input type="checkbox"/>
5. Accurate details of colour, pattern, texture, and/or other physical characteristics are shown.	<input type="checkbox"/>	<input type="checkbox"/>
6. If appropriate, the relationship of the object to its surroundings is shown and is accurate.	<input type="checkbox"/>	<input type="checkbox"/>
7. If appropriate, the relationship between the structure and function of the object is shown and is accurate.	<input type="checkbox"/>	<input type="checkbox"/>
8. A text accompanies the drawing and explains the science that the drawing is intended to show.	<input type="checkbox"/>	<input type="checkbox"/>
9. Labels are used accurately.	<input type="checkbox"/>	<input type="checkbox"/>
10. Labels are printed to the right of the diagram, with straight lines to the indicated part.	<input type="checkbox"/>	<input type="checkbox"/>
11. Drawings are neat and presentable.	<input type="checkbox"/>	<input type="checkbox"/>
12. Drawings use the space of the paper well.	<input type="checkbox"/>	<input type="checkbox"/>

**ASSESSMENT RUBRIC 2**

# Science Drawing Rubric

**Goal** • Assess your scientific drawings so that you can develop ways to improve them.

**What to Do**

- Study each of the expectations listed in the first column, and decide which level matches your scientific drawings. Circle your level in ink for each expectation.
- On the back of this master, list your plans for improving your scientific drawings.

**Performance Indicators**

- At Level 1, work needs to improve a lot.
- At Level 2, work meets the minimum standard.
- At Level 3, work is satisfactory.
- At Level 4, work is excellent.

<b>Performance Criteria</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>
<b>Respect of Conventions</b> <ul style="list-style-type: none"> <li>• drawing large enough to be clear</li> <li>• figure is on left</li> <li>• labels are on right</li> <li>• name &amp; date are in top left corner</li> <li>• description is printed neatly below drawing</li> <li>• shows dark areas with stippling</li> </ul>	One of the following: – My drawings are too small or too large. – I do not set up my page as required.	My page is set up okay, but the labels are not all on the right side and are not as neat as they could be.	My page layout follows requirements, but my printing could be clearer and my labels more complete.	My page is laid out as required and provides an attractive presentation.
<b>Accuracy</b> <ul style="list-style-type: none"> <li>• is 2-dimensional image is complete and accurate</li> </ul>	My drawings are not always accurate.	My drawings are fairly accurate but could include more information.	I use clear, continuous lines to draw what I observe, but sometimes shade rather than stipple.	I consistently make clear, accurate, well-labelled drawings.
<b>Completeness</b> <ul style="list-style-type: none"> <li>• drawing has all required elements</li> <li>• labels are complete</li> </ul>	<b>One of:</b> – My drawing lacks some elements or details. – My labels are incomplete	I do not include all of the relevant details.	I include most details and most labels.	All details are included; all labels are clear and complete.

---

# Transporting the Essentials

---

A plant's roots, as you have seen, are efficient absorbers of water and nutrients from the soil. Transporting these materials up to the leaves for photosynthesis, as well as transporting food back down from the leaves after it has been produced, are other tasks to be performed. Just how does a plant transport materials from roots to leaves, and from leaves to all other plant parts? These "waterworks" of the plant are investigated in this Topic.

*This micrograph is a highly magnified view of the cells making up stem tissues in a plant.*

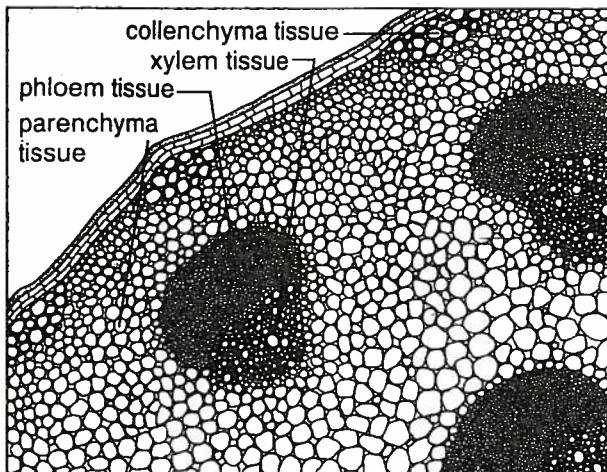


Think about the last time you ate a piece of celery. What were your immediate sensations as you bit into the celery?

- When you chew celery, thousands of cells called **parenchyma tissue** are crushed, producing the sound you hear. These are thin-walled, bubbly, living cells that store food in green plants.
- **Xylem tissue (vessels)** made up of thick-walled, dead cells transport water and nutrients from the roots to the leaves of the celery.
- **Phloem tissue** made up of small living cells transports food produced in the leaves up and down the stem, supplying cells with needed food.
- **Collenchyma tissue** made up of thick-walled, living cells strengthens the stems (stalks) of the celery.

These cells and tissues carry out the same functions in all plants.

Now use a microscope to observe more closely what it was you sensed when you last ate some celery.



Name:

Date:

## Examining Cells

### Problem

What gives celery its crunch?

### Materials

fresh celery placed in red food colouring overnight  
single-edged razor blade  
glass microscope slide  
cover slip  
microscope

### Procedure

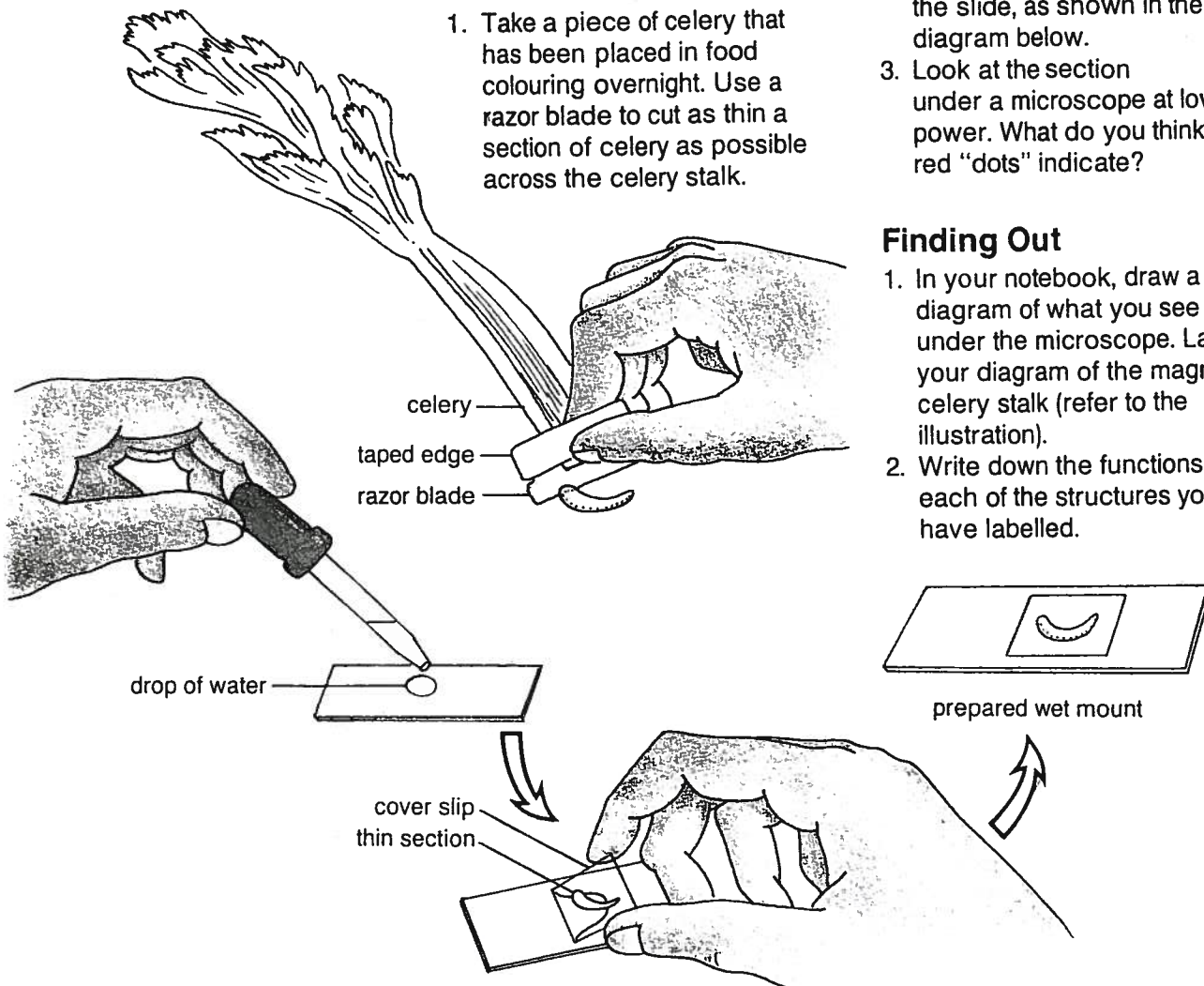
1. Take a piece of celery that has been placed in food colouring overnight. Use a razor blade to cut as thin a section of celery as possible across the celery stalk.

**CAUTION:** A razor blade is extremely sharp. Be very careful when you cut the thin section of celery! As an extra precaution, cover the non-cutting edge of the razor blade with masking tape.

2. Place your section in a drop of water on a microscope slide. Then add a cover slip to the slide, as shown in the diagram below.
3. Look at the section under a microscope at low power. What do you think the red "dots" indicate?

### Finding Out

1. In your notebook, draw a diagram of what you see under the microscope. Label your diagram of the magnified celery stalk (refer to the illustration).
2. Write down the functions of each of the structures you have labelled.





## FINDING OUT (on lab sheet) #1 Drawing

### Celery Superhighway

Complete this activity to find out how water and nutrients travel through stems.

#### Materials



blue or red food colouring  
500 mL beaker  
celery stalk with leaves (with 1 cm cut from base)

water  
magnifying glass or microscope

#### Procedure • Performing and Recording

1. Add food colouring to water.
2. Place the celery in coloured water.
3. Set the celery in bright light overnight.
4. The next day observe the cut end of the celery. Record your observations.

#### What Did You Find Out? • Analyzing and Interpreting

1. What are the coloured tubes in your celery?

### Find Out **ACTIVITY**



2. Why did step 4 instruct you to place a stalk cut from the base of the celery into the water?
3. How might your results change if you bent the celery stalk in half before placing it in the food colouring? Write a prediction for the results of such a trial.

#### Extension

4. How can you increase the flow of water to the leaves? Rewrite at least one of your ideas as a problem that you could test.
5. **Design Your Own** The celery you used in this activity does not have its roots. Why did water move up the stem? How could you find out if your idea is correct? Design an investigation to answer this question.

What did you find out? ~~\_\_\_\_\_~~

1.)

2.)

3.)

4.)

5.)