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**L.I. To investigate how plants absorb water and grow**

### **SCIENTIFIC UNDERSTANDING: How plants transport water**

One of the reasons that even wet summers can still end in drought is the efficiency of plants at moving water from the ground to their upper reaches where it evaporates from the surface of the foliage. The process is called transpiration and it's essential for moving water to all parts of plants, even to the tops of the tallest trees.

The experiment with a stick of celery reveals that this happens through special tubes, called xylems, which take up the food colouring. The process is accelerated by evaporation from the celery leaves and you can make it go even faster by using a hairdryer on the leaves.

(See **Investigation 2**)

(From Science on the Shelves, Department of Chemistry, The University of York)

### **EQUIPMENT NEEDED**

- A glass/glass jar or clear container
- Water
- Food colouring (blue or red are best)
- A celery stick with leaves
- A teaspoon

### **INSTRUCTIONS**

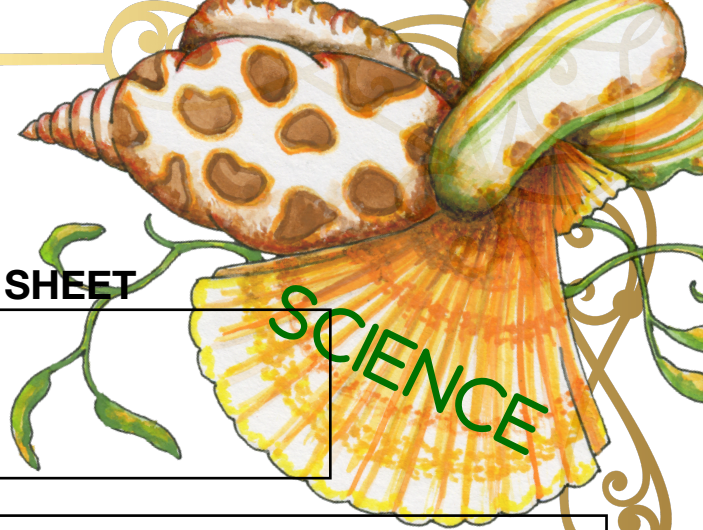
1. Pour about 3cm/30ml water into the glass
2. Stir two teaspoons of food colouring into the water
3. Cut (ask an adult to help) 1cm from the end of the celery stick that has no leaves
4. Stand the cut end of the celery in the glass

**COMPLETE THE PLANT INVESTIGATION SHEET.  
YOU WILL NEED TO LEAVE THE CELERY OVERNIGHT BEFORE  
RECORDING YOUR RESULTS**



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## PLANT INVESTIGATION SHEET



I am going to investigate

### PREDICTION:

I predict that

Using your knowledge and understanding of science **explain** why you think this will happen  
I believe this will happen because

### VARIABLES:

What will you change, measure and keep the same during your investigation?

#### VARIABLE TO CHANGE

-Independent variable

#### VARIABLES TO MEASURE

-Dependent variable

#### VARIABLES TO KEEP THE SAME

-Control variable

### FAIR TEST

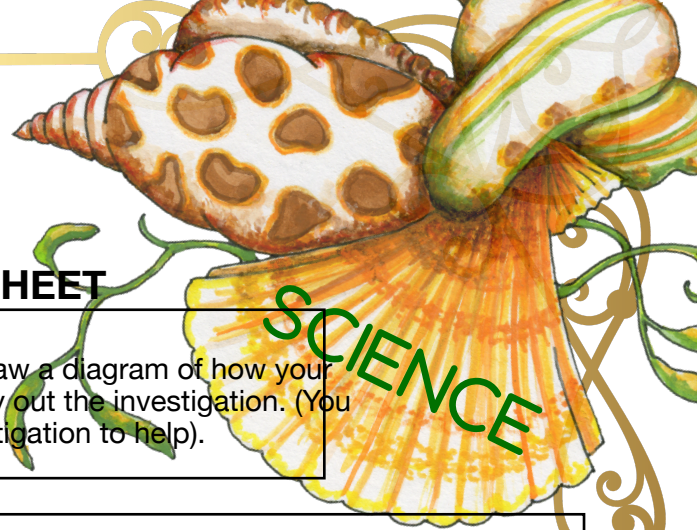
Explain how you will carry out a fair test-what equipment/features are you going to keep the same?

To make sure my investigation is a fair test, I will make sure



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## PLANT INVESTIGATION SHEET



### METHOD:

In the space below, list the equipment you will use. Draw a diagram of how your equipment will be set up. Then write how you will carry out the investigation. (You can use the basic instructions at the front of this investigation to help).

### EQUIPMENT:

### DIAGRAM:

### FIRSTLY

### THEN

### NEXT

### AFTER THAT

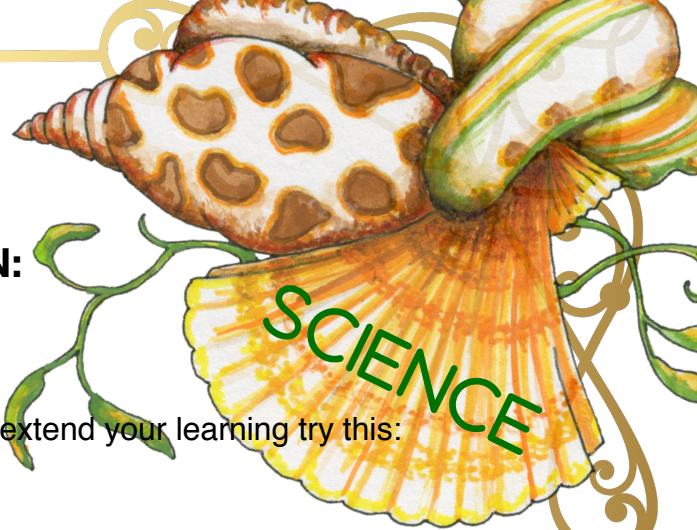
### RESULTS

After you have left your celery overnight. Record your findings here.  
What has happened? Why? Use scientific knowledge to support your findings.



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## PLANT INVESTIGATION: OBSERVATION FORM



### INVESTIGATION 2:

If you complete the first investigation and want to extend your learning try this:

### EQUIPMENT NEEDED

- 3 glasses/glass jars or clear containers
- Water
- Food colouring (blue or red are best)
- 3 celery sticks: one with no leaves, two with leaves
- A hairdryer
- A teaspoon

### INSTRUCTIONS

1. Pour about 3cm water into each glass
2. Stir two teaspoons of food colouring into the water
3. Cut (ask an adult to help) 1cm from the end of each celery stick
4. Stand one cut end of the celery in the each of the glasses
5. Use the hairdryer (with adult help) to simulate a warm, windy summer's day- 'dry' one of the celery sticks which has leaves

**Use the same investigation sheet to record this investigation. Focus on the results.**

### SCIENTIFIC UNDERSTANDING:

You can imagine with the tallest trees that each water-carrying xylem contains a continuous, thin column of water over a hundred feet in length and reaching from the roots to the uppermost leaves. The effect of evaporation at the top of the tree literally pulls this column of water up the tree. The ability of these thin columns of water to be pulled in this way – without breaking – is attributed to the special forces between the water molecules in the liquid; this is called capillary action.

(From Science on the Shelves, Department of Chemistry, The University of York)