EASTER BREAK CHALLENGE – CELERY DYE EXPERIMENT

AIM: To observe the transpiration pathway in plants.

HYPOTHESIS: The dyed water will enter the celery through the exposed xylem vessels where it also travels up the plant. Then when it arrives to the leaves the water evaporates and travels through the leaf then exists through the stoma.

METHOD:

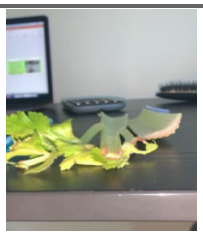
1. Get and pair of spatulas, an elastic band, sellotape and move near a wall.
2. Using that equipment set it up like this.

3. Using a liquid measuring cup and fill it with 600 ml of water:
4. Pour the water into a mason jar.

5. Add 12 drops of food coloring to the mason jar and mix.
6. Place the mason jar under the end of the spatulas.

7. Cut the end of a celery stem with a knife:
8. Put the cut end of the celery into the colored water and using the spatulas clamp the celery stem upright:
9. Leave for an hour and observe.
10. Leave for 24 hours and observe.

RESULTS:

TIME	*AFTER 1 HOUR*	*AFTER 24 HOURS OUTTER*	*AFTER 24 HOURS INNER*
PICTURES			
OBSERVATION	*No noticeable change has occurred.*	*The ends of the leaves, as well as the smaller branches, the top, and end of the stem, were tinted red.*	*Although much of the middle cross-section of the stem was red, there were smaller spots that were significantly redder than other parts of the cross-section.*

CONCLUSION:

Inner celery: Although much of the middle cross-section of the stem was red, there were smaller spots that were significantly redder than other parts of the cross-section. These redder spots are xylem vessels as the xylem vessel transports water up the plant and this water was dyed red. Therefore the vessels contain red-dyed water and the xylem uptook this water giving it this reddish tint.

Overall: Firstly, the red-dyed water entered the plant through the hollow lumen of the xylem vessel. The red hyed ends of the celery prove this and this supports my hypothesis. Then it continued to travel up the lignin-containing vessel until it reaches the leaf. The evidence for this is the red-dyed xylem vessels we see in the cross-section that was cut in the middle of the plant once again this supports my hypothesis. Finally, the water moves through the leaves through osmosis this maintains the concentration gradient from vessel to leaf thus there is a constant flow. The water molecules evaporate of the surfaces of the mesophyll, into the air spaces then out through the stoma. The tinted leaves suggest the dye molecules from the water were left behind thus it had this color. This rejects part of my hypothesis as the water first goes through the leaf and then evaporates.