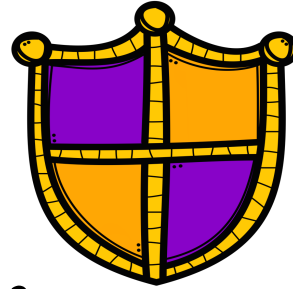
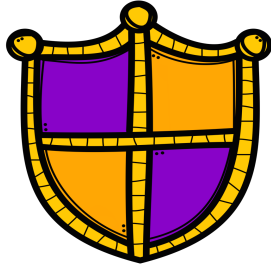


Transpiration in plants



Transpiration in plants



Big Question: How does water travel through a plant?

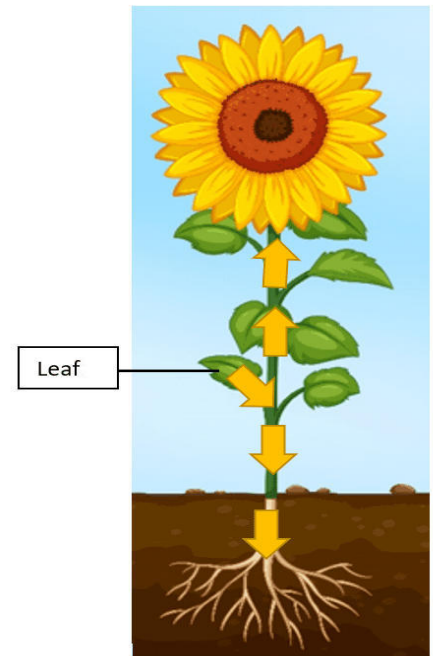
Water travels through transpiration! Transpiration is the process by which water travels from the roots, up the **xylem tissue** in the stem, and out of the leaves as water vapor. You have the skills to build a prototype for this structure. He is counting on your skills with the four P's: **problem solving, planning, perseverance, and presentation**

The Challenge

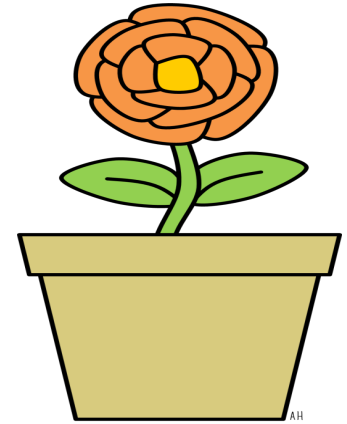
Have you ever wondered how water is transported up the stem of a plant against gravity? This transportation process is called transpiration. We can demonstrate transpiration with these easy transpiration experiments.

Your materials:

- **straws**
- **colour paper (all colours)**
- **cardboard**
- **scissors**
- **sticky tapes**
- **markers**
- **drawing board**
- **strings**



Problem Solving



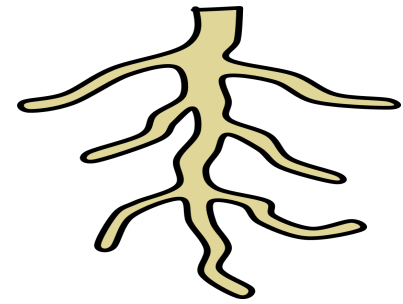
Ask:

What do you know about plant parts ?

Imagine:

What are some ideas you can try as you design your model?

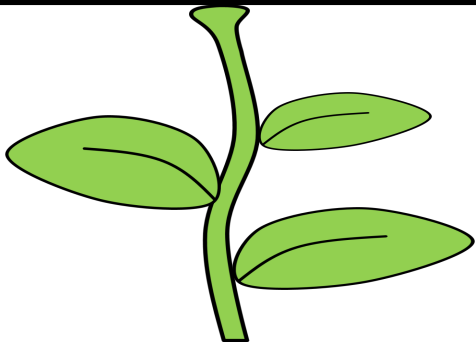
Planning



Plan : Label your steps and identify who will do each step.

2. Test your steps

A large, empty rectangular box with a black border, centered within a larger grid-patterned area. The grid is composed of light blue lines on a white background. The box is intended for users to write their planning steps and assign responsibilities.



Perseverance

Test

Test your model

How many straws you will need ?

Improve

If your model did not transports, what will you change ?

Presentation

Congratulations on persevering through this STEM challenge!

As you review your final product, please answer the following questions:

- What was your **plan** and why did you use this design?

- How did you solve **problems**?

Presentation

What are some examples of how you **persevered**?

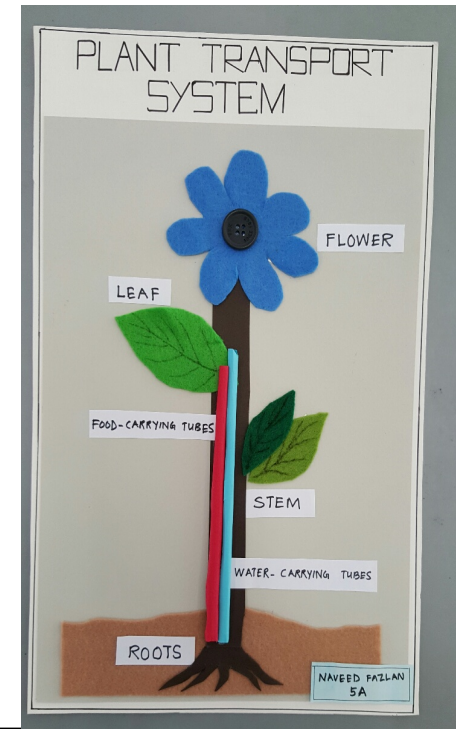
STEAM integration

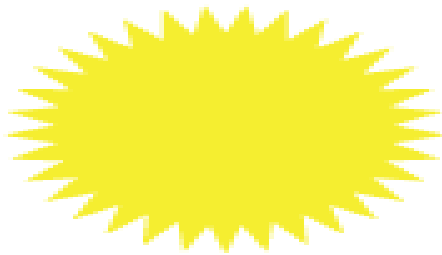
- Science** : Plants and their parts .
Plants need , transportation.
Function of each parts.
- Math** : Geometrical shapes definition.
Mathematical calculation.
- Engineering** : Stimulate a model of plant parts .
- Art** : Designing plant parts.
- Technology** : Slide show presentation about transportation in plants .

PLANT STEM MODEL



We used straws to make a very simplified model of a plant stem. The **xylem** is the centre yellow part and **phloem** the blue straws.



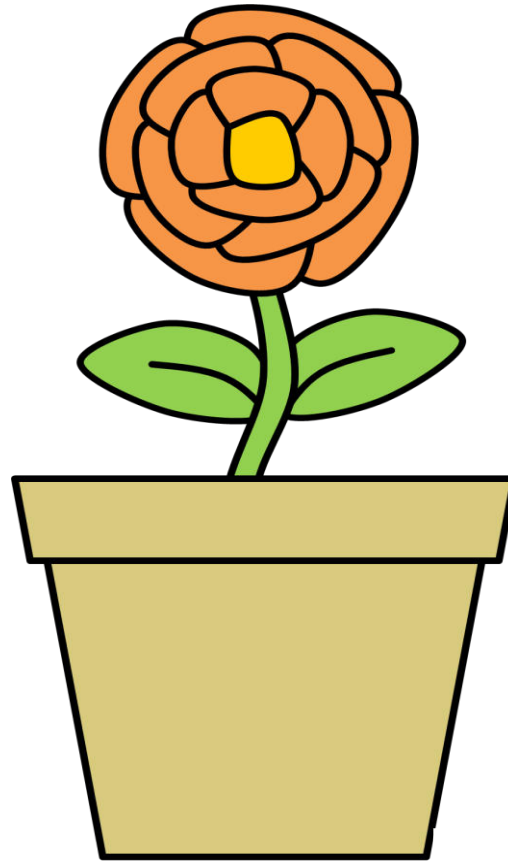


Transpiration



PLANTS

Plants are living organisms. They create and use energy, grow, and release oxygen.

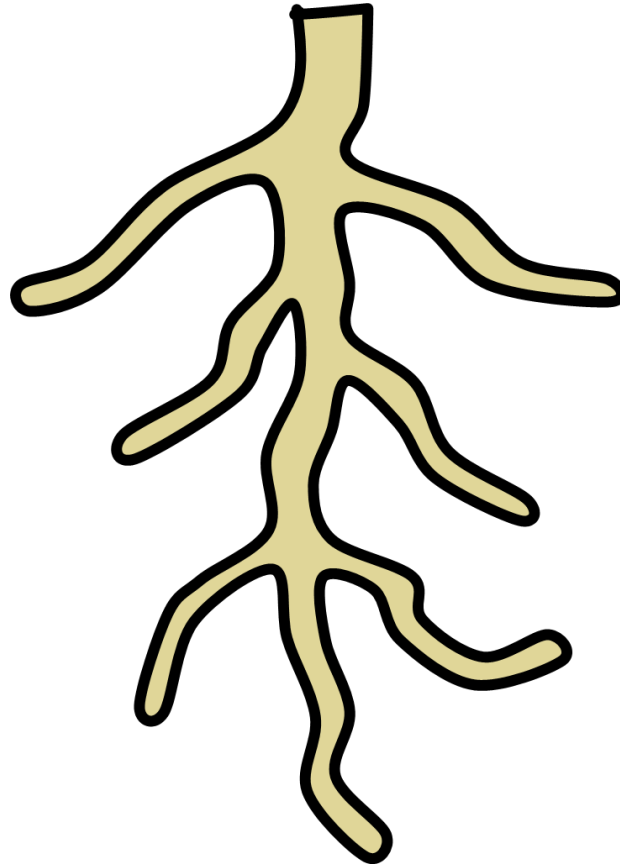


Plants use water, air, minerals, nutrients and sunlight to live.

roots

The roots of a plant are what hold the plant into the ground.

They are hair-like and white in color.



Roots soak up water and nutrients from the soil like a sponge!

stem

The stem of a plant holds the plant upright.

The stem is usually green and cylinder-shaped like a straw.

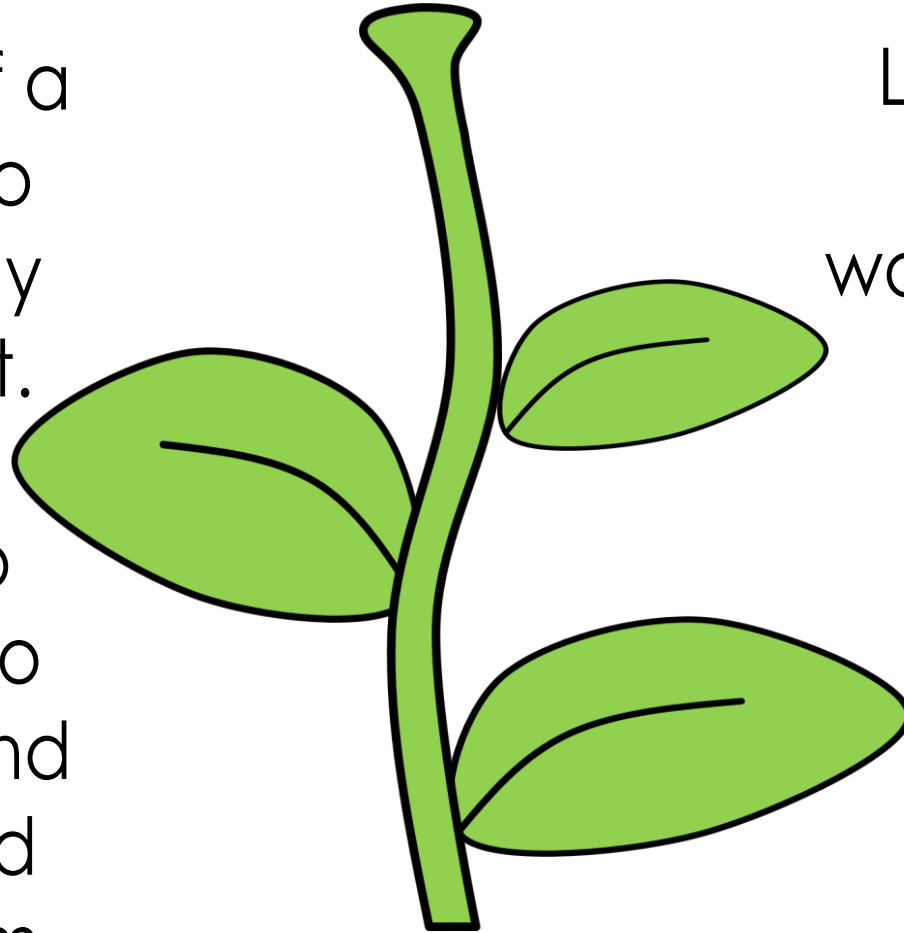


The stem carries water and nutrients, up and down, and to other parts of the plant.

leaves

The leaves of a plant help to make energy for the plant.

Leaves also have veins to carry food and water to and from the stem.

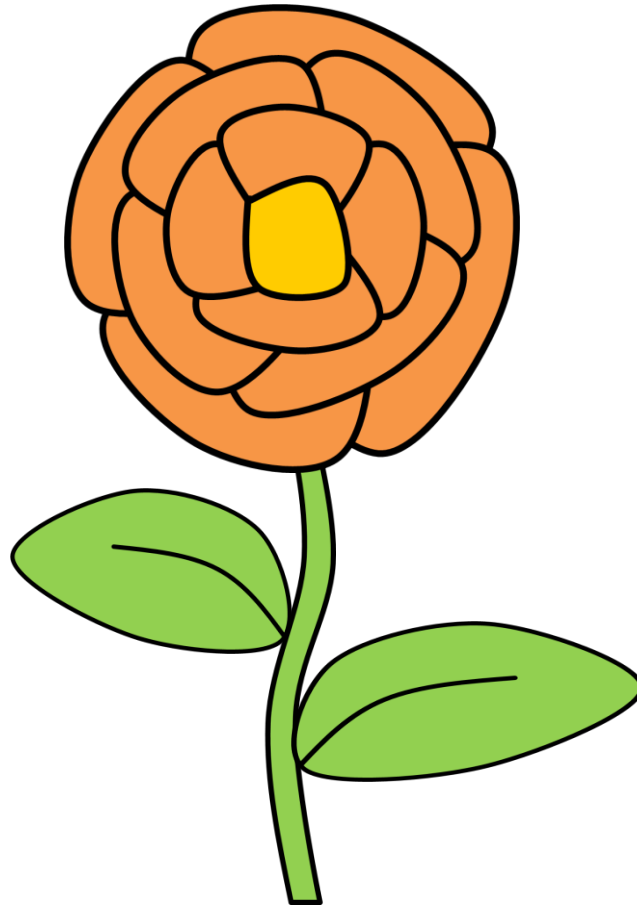


Leaves use sunlight, water, and air to create plant.

flower

The flower of a plant makes the seeds.

The flower is colorful and smells good to attract insects.



Flowers also create nectar to attract insects.

Insects help spread the pollen from the flower.

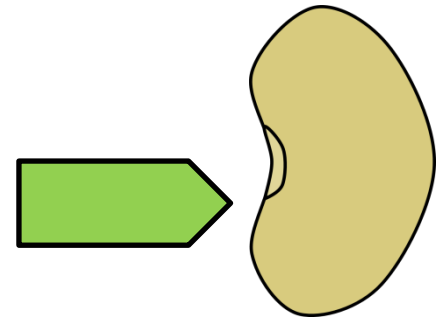
seeds

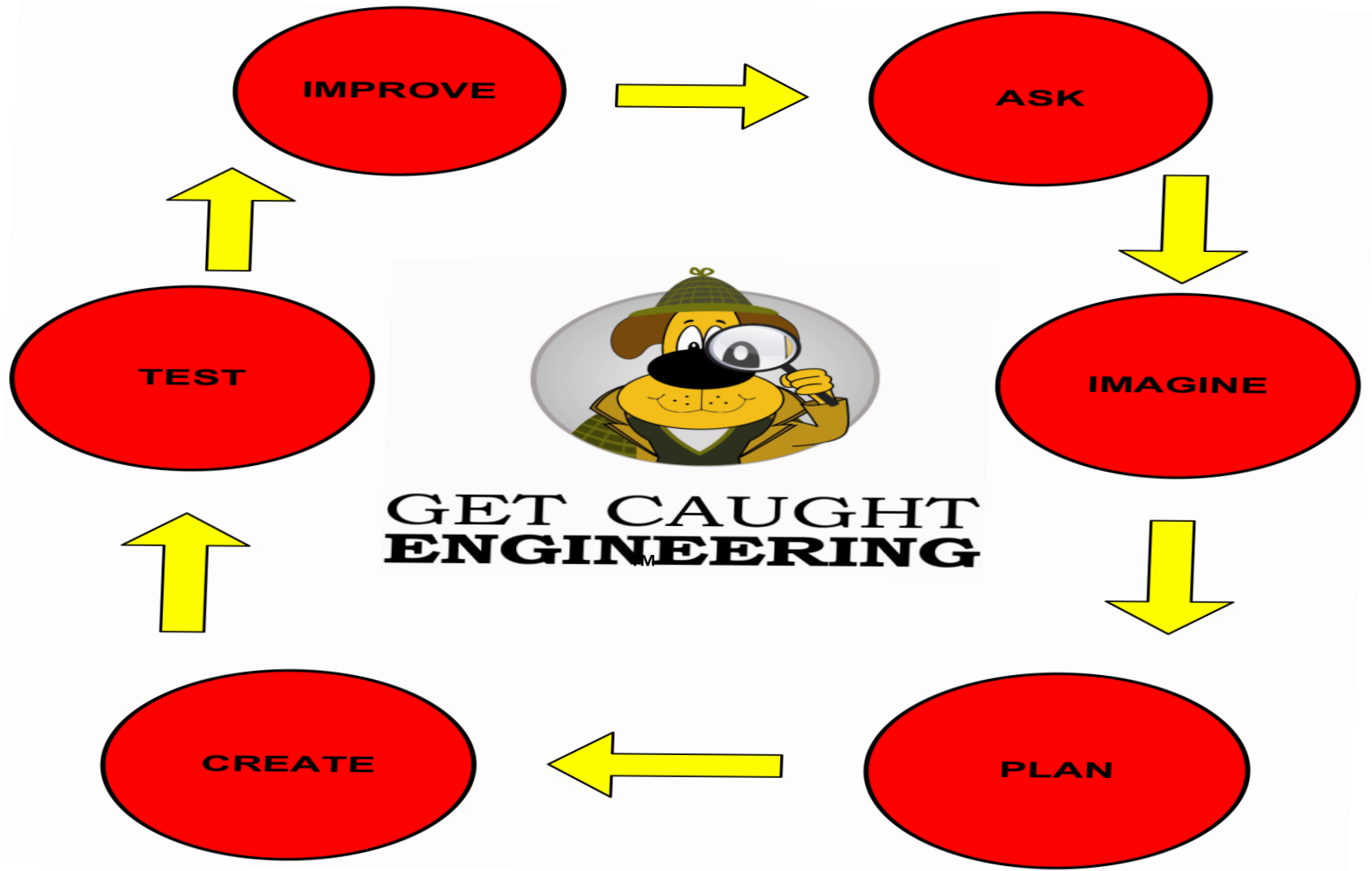
The flower of a plant makes the seeds.

Seeds begin the cycle of that same plant all over again.



Seeds can
animals, and
water.





Facilitator

- ◆ Supervises and makes sure that all group members are on task
- ◆ Encourages participation
- ◆ Has final say in arguments

Reporter

- ◆ Records detailed notes on ideas and progress
- ◆ Revises notes as needed from tests of prototype

Materials Manager

- ◆ Gets materials and tools for group
- ◆ Makes sure materials are kept neat
- ◆ Supervises clean up

Presenter

- ◆ Presents finished work to class
- ◆ Leads discussion of group's work

Reader

- ◆ Reads the problem to the group
- ◆ Leads discussion of ideas

Time Keeper

- ◆ Monitors the time
- ◆ Helps to keep the group on task

STEM Lesson Checklist

	Self-Assessment - Developing (1) - Satisfactory (2) - Outstanding (3)
1. Aligned to Grade-Level Standards The lesson is aligned to appropriate state and/or national math, science, technology, and engineering standards.	
2. Multidisciplinary A true STEM lesson must integrate science, technology, engineering, and mathematics.	
3. Addresses Authentic Challenges The lesson presents students with real-world challenges or problems with practical and meaningful implications.	
4. Integrates 21st Century Skills The lesson encourages students to develop creativity, critical thinking, problem solving, and teamwork.	
5. More Than One Solution The lesson includes problems or challenges that have more than one possible solution.	
6. Uses the Engineering Design Process Any design, construction, or prototyping follows the steps of the engineering design process.	
7. Hands-On The lesson encourages hands-on manipulation of technology or materials to solve a problem or engineer a design.	
8. Integrates Technology The lesson incorporates technology in a way that is seamless and appropriate, simplifying rather than complicating the lesson.	
Overall Score	