Objective: Students will investigate and explain how INTERNAL structures of organisms have adaptations that allow specific functions. (7.12A)

10 Amazing Plants
Adaptations determine how a species moves, obtains food and reproduces.
Recall...that a Stimulus

• **A stimulus is something that causes a reaction**

• **External stimulus** comes from **OUTSIDE** the organism

• **Internal stimulus** comes from **WITHIN** the organism

• **Stimulus explained**
Movement: Plant Tropisms

- Tropisms are responses to a stimulus
- Plants are not able to physically move if the place they are growing becomes less than optimal
- For example: A tree is growing near a lake that floods, that tree cannot move, even though its roots may be flooded
- However, there are some responses (called tropisms) that plants CAN do
Phototropism

- Plants have the ability to detect where conditions are better and then they can alter their growth so that they can “move” in the right direction.

- Phototropism is when plants grow towards the light.

- Why do you think they turn towards the light?
How do they do this?

- Plants don’t actually move, they GROW in the direction of the light!
- Pretty cool huh?

Auxin causes cell elongation.
Geotropism

- Geotropism is the response of a plant to gravity
- Roots exhibit “positive” geotropism, while stems and leaves exhibit “negative” geotropism
Thigmotropism

- The way a plant grows or bends in response to touch

- [Thigmotropism video](#)
Hydrotropism

Hydrotropism is when plants grow toward water

Plant Survival
How plants obtain food

- Photosynthesis -

\[ 6\text{CO}_2 + 6\text{H}_2\text{O} \xrightarrow{\text{Light}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \]

- They are known as **autotrophs** (remember that term?)
How Plants Reproduce

- Sexually – through seed production from flowers or cones
  Ex. Lily plant

- Asexually – by budding
  Ex. Potato plants

https://www.youtube.com/watch?v=UQnscSrIsMw
Plants have an entire internal structure that helps them gather energy and necessary things for survival.
1. Xylem In Plants

- Part of a plant's vascular system that transports water and minerals from the roots to the rest of the plant and furnishes support.
- The xylem makes up the major part of a stem or root and the wood of a tree.
Xylem In Plants

Plant Transport System

Plant Structures and Adaptations

Xylem vessel:
- One-way only
- Water and minerals
- No end walls between cells
- Thick walls stiffened with lignin

Phloem vessel:
- Water and food
- Cells have end walls with perforations
- Two-way flow
2. Roots/Bulbs

- Food is stored in the roots, often this is called a “bulb”
- Food is stored so that the plant can use it to grow a new stem and leaves in the spring
There are as many different ways to attract pollinators as there are pollinators!
Forces that affect plants

7.7C forces that affect motion in everyday such as the emergence of seedlings, turgor pressure and geotropism
Seed Emergence

• Occurs during germination

• When the seed begins to absorb water into the seed tissues, the pressure builds up and the outer seed coat bursts

• Turgor pressure is what is pushing on the seed coat
Once the seed begins to emerge from the soil... how does it know up from down?

Geotropism may be a positive response to gravity – roots grow down and stems up.
A look at Turgor Pressure

- What it looks like in action:

- **Turgor pressure**

- In your own words, write what turgor pressure is in the space provided
Exploring Adaptations
Further -

- At the end of your notes, there is empty space. We will use this space for this activity - title it:

“Plant Leaf Adaptations”

Write the question: “Which leaf surface adaptation repels water the best?”

We are going to make a plant leaf simulation. Based on need, plants have evolved to either absorb water or to repel it.

Think about what a plant needs in the desert vs. pond environment.
Cactus vs. Water Lily
<table>
<thead>
<tr>
<th>Leaf Type</th>
<th>Trial 1</th>
<th>Trial 2</th>
<th>Trial 3</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wax paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Waxy leaf</td>
<td></td>
<td></td>
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<tr>
<td>Felt or wool</td>
<td></td>
<td></td>
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<tr>
<td>Fuzzy leaf</td>
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<tr>
<td>Construction</td>
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<td></td>
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<tr>
<td>paper</td>
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</tr>
<tr>
<td>Uncoated leaf</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

*Scale 1-3
1 = very wet, 2 = slightly wet, 3 = somewhat dry
Procedure:

- Find a tray and put it with your group
- Fill up your beaker with water and make sure you have a small measuring cup
- For each trial, you only need 10 ml of water
- You will pour 10ml of water over each “leaf”, do 3 trials for each leaf type. *Pour water OVER bowl, if you spill, clean it up IMMEDIATELY!
- Enter data collected.
Findings

What did you find? Answer each question by writing your response to it on your page. (in complete sentences)

1. Which leaf absorbed the most water?

2. Which leaf repelled the most?

3. Imagine one of the plants in its natural environment. How does this leaf adaptation help it to survive?