SPRING SCIENCE EXPERIMENTS FOR 4TH AND 5TH GRADE

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STAYING FRESH

STAYING FRESH

Name: _____ **Date:** _____

Everyone loves fresh cut flowers. However, if you don't care for them properly, they can quickly turn into a droopy mess. Florists will often give you a packet of "flower food" meant to keep your flowers vibrant for up to a week. Adding these packets to water works great. You can also get some of the same effects from everyday household items, too. Let's look at a variety of options and what exactly they're doing to preserve your fresh cut flowers.

The flower treatments that your florist uses work so well because they focus on three things. They are the three keys to the flowers' health. First, these treatments nourish the flowers. They do this by providing nutrients in the form of sugar. Second, these treatments contain an acidifier. This lowers the pH level of the water by raising its acidity. Why's this important? Lowering the pH allows a plant to better soak up water. The more water it soaks up, the more nutrients it absorbs. Third, these treatments contain some kind of substance to fight off harmful bacteria in the water. This is usually some kind of bleach. You can see why these professional flower treatments are recommended. They do it all!

What if you don't have any? Well, you can mix different substances that accomplish each of the tasks above. Some people will add a sugared soda to their water. This will provide the nutrients the flowers crave. The downside is that the sugared soda can cause harmful bacteria to grow. Therefore, you also need to add a little bleach. What about lowering the pH? Some people have had success using ground-up aspirin. Some citrus sodas, such as 7-UP or Sprite, can actually add sugar and lower the pH at the same time. This is why many people like them for these kinds of tasks.

Other popular mixtures that check all three boxes are sugar, lime juice, and bleach, as well as a concoction of sugar and apple cider vinegar. Whether it's a professional mix or a homemade one, the three needs are the same. You need nourishment, a low pH, and something to kill the bacteria. Get those working together, and your flowers should thrive.

What are the three keys to keeping a flower fresh and healthy for as long as possible?

STAYING FRESH

Name: _____ **Date:** _____

Objective: to determine if different liquids affect how long cut flowers will stay fresh

Materials Needed:

flower freshness tracker (printable)
labels (printable)
tape
8 clear bottles, jars, or glasses
8 flowers
tap water
distilled water
Sprite
2 T baking soda
2 T bleach
2 T sugar
2 T vinegar
a penny

Directions:

1. Make a hypothesis that answers this question: In which liquid do you think the flowers will remain the freshest?
2. Prep the flowers by trimming the stems so that they will easily fit into their clear containers.
3. Cut out the labels for the clear containers.
4. Fill one container with Sprite and attach the, *Sprite* label. Then fill one container with distilled water, and attach the *distilled water* label
5. Fill the other six containers with tap water.
6. Attach the *control* label to one of the containers with tap water.
7. Add the following to the remaining five containers, and attach the labels:
    - 2 T baking soda
    - 2 T bleach
    - 2 T sugar
    - 2 T vinegar
    - a penny
8. Each day for nine days, mark the results on the flower freshness tracker.

STAYING FRESH

Name: _____ **Date:** _____

Use the data from your experiments and what you learned from the text to answer questions #1-2.

1. Which liquid mixture kept the flowers fresher longer? What conclusion can you draw about this liquid?

2. Which liquid mixture failed to keep the flowers fresh? What conclusion can you draw about this liquid?

Use the text to answer questions #3-5 after completing your experiment.

3. What could be added to the sugar water to improve the results?

4. What properties of the Sprite caused it to keep the flowers fresh longer?

5. What could be added to the bleach to improve the results?

STAYING FRESH

Name: Answer Key **Date:** _____

Use the data from your experiments and what you learned from the text to answer questions #1-2.

1. Which liquid mixture kept the flowers fresher longer? What conclusion can you draw about this liquid?

2. Which liquid mixture failed to keep the flowers fresh? What conclusion can you draw about this liquid?

Use the text to answer questions #3-5 after completing your experiment.

3. What could be added to the sugar water to improve the results?

Lime juice and bleach or apple cider vinegar

4. What properties of the Sprite caused it to keep the flowers fresh longer?

Sprite is a citrus soda that adds sugar and lowers the pH.

5. What could be added to the bleach to improve the results?

Lime juice and sugar

Flower FRESHNESS TRACKER

	Day __	Day __	Day __	Day __	Day __	Day __
control						
bleach						
distilled water						
baking soda						
penny						
Sprite						
sugar						
vinegar						

control
bleach
distilled water
baking soda
penny
Sprite
sugar
vinegar

SEED RACE

SEED GROWTH

Name: _____ **Date:** _____

What personally helps you thrive? Think about activities or foods that give you energy, the people you like being around, and the places that excite you. Odds are that your list of responses is different than what any one of your friends would say. That's because we each react to our environments in different ways. The same is true for other organisms, including plants.

You've planted four different kinds of seeds in the same conditions. They have the same light, the same soil, and the same water. Why are some growing more quickly then? Like us, each kind of plant has different needs. Each has an *optimal environment* for thriving, meaning that each has a best possible set of conditions. The conditions have to be right for the particular seed to activate, or *germinate*, in the first place. Then the conditions have to be right for it to grow in a healthy way.

For plants, there are several different factors that affect germination and growth rate. One important factor is temperature. If it's too hot or too cold, a seed might grow slowly or not at all. Seeds also need the right amount of water. Different plants have different kinds of roots and store water in different ways. Therefore, each needs a different amount of moisture in the soil. Again, too much or too little will cause the plant to not perform at its best. Plants also need different amounts of air to germinate and grow properly. Even with two identical seeds, if the soil is packed more tightly around one than the other, their growth rate might be affected. Lastly, plants need different amounts of light. Just like with people, too much or too little natural light can have a big effect.

These are some of the key factors that can influence a plant's growth rate.

1. Based on what you read, what are the factors that affect the growth of seeds?

2. If a seed grows well under the conditions we plant, what can we conclude?

SEED RACE

Name: _____ **Date:** _____

Objective: to determine which seed will grow the fastest in the same conditions

Materials:

- Clear plastic cups
- Potting soil
- Seeds – I use three quick sprouting seeds (radish, cantaloupe, and basil) and also cucumber
- Drill or Dremel
- Wooden craft sticks
- Tape
- Printable cards
- Aluminum foil pan or tray
- Water

Directions:

1. Prepare your markers by taping each card to a wooden craft stick.

2. Poke one small hole in the bottom of each cup to provide drainage. I used a Dremel tool for this.

3. Place the cups into a tray. An aluminum foil pan works great for this.

4. Fill each cup with potting soil to within 1/2 inch of the rim.

5. Place a wooden craft stick marker into each cup.

6. Add a few seeds into each cup, but make sure you add them into the correct cup with the proper marker.

7. Top the seeds with 1/4 inch of soil.

8. Lightly water the soil.

9. Set the tray in a sunny location and check back in a few days. When the soil begins to feel dry, lightly water it again.

SEED RACE

Name: _____ Date: _____

Seed	Notes (Make sure you date each entry.)
Radish	
Cantaloupe	
Basil	
Cucumber	

SEED RACE

Name: _____ Date: _____

1. Which seed had the fastest growth in the conditions we provided? Which seed had the slowest growth?

2. Based on what you read in the text, what conclusions can you draw about the fastest and slowest growing seeds and the environment we provided for them?

SEED RACE

Name: _____ Date: _____

If we wanted to take one of the seeds and determine the optimal environment for growth, what would we need to do differently? Briefly describe and plan a science experiment that would allow you to determine optimal environment for one of the seeds.

SEED GROWTH

Name: Answer Key _____ **Date:** _____

What personally helps you thrive? Think about activities or foods that give you energy, the people you like being around, and the places that excite you. Odds are that your list of responses is different than what any one of your friends would say. That's because we each react to our environments in different ways. The same is true for other organisms, including plants.

You've planted four different kinds of seeds in the same conditions. They have the same light, the same soil, and the same water. Why are some growing more quickly then? Like us, each kind of plant has different needs. Each has an *optimal environment* for thriving, meaning that each has a best possible set of conditions. The conditions have to be right for the particular seed to activate, or *germinate*, in the first place. Then the conditions have to be right for it to grow in a healthy way.

For plants, there are several different factors that affect germination and growth rate. One important factor is temperature. If it's too hot or too cold, a seed might grow slowly or not at all. Seeds also need the right amount of water. Different plants have different kinds of roots and store water in different ways. Therefore, each needs a different amount of moisture in the soil. Again, too much or too little will cause the plant to not perform at its best. Plants also need different amounts of air to germinate and grow properly. Even with two identical seeds, if the soil is packed more tightly around one than the other, their growth rate might be affected. Lastly, plants need different amounts of light. Just like with people, too much or too little natural light can have a big effect.

These are some of the key factors that can influence a plant's growth rate.

1. Based on what you read, what are the factors that affect the growth of seeds?

   Temperature, the type of roots the plant has, amounts of air, and light.

2. If a seed grows well under the conditions we plant, what can we conclude?

   We can conclude that we created an optimal environment for the plant to thrive in.

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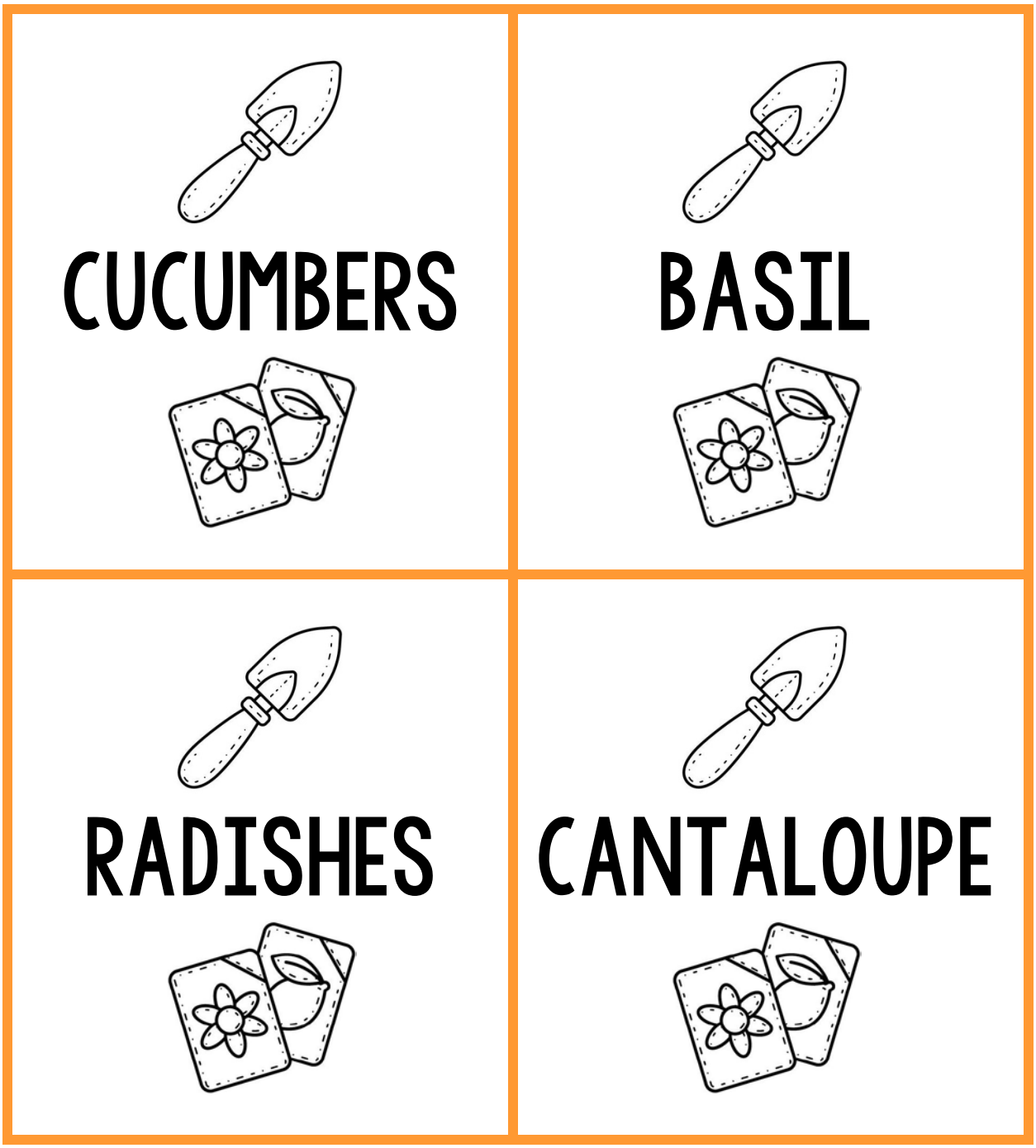

ROLE OF WATER

THE ROLE OF WATER

Name: _____ **Date:** _____

Water is central to the growth and survival of living things. This is especially true with plants. Some plants are actually made up of 90% water. Water is important to the growth of plants for a couple of reasons. First, water transports nutrients throughout the plant. Second, water is an important part of photosynthesis. That's when a plant uses sunlight to make food and energy.

For a plant to thrive, it has to move nutrients throughout its body. It moves them from the soil, into the roots, and then through its stem and branches into its leaves. This often means moving upward *against* gravity. Therefore, there needs to be enough water to create enough pressure to push the water and nutrients throughout the plant. When there is not enough water pressure, the stem and leaves will droop. The leaves simply don't have the proper nutrients to stand tall, and the plant's skeleton doesn't have enough water in its cells to remain firm.

There's another reason why water and nutrients need to make it to a plant's leaves. That's where photosynthesis happens. Within its leaves, a plant uses the light from the sun to start a chemical reaction. The plant uses water, carbon dioxide from the air, and nutrients that have been transported from the soil. It uses these ingredients to make food and energy and to give off the oxygen we breathe.

As you can see, water plays a big part in transporting nutrients. It is also a key ingredient a plant uses to make food and energy.

1. According to the text, why is water important to a plant's growth?

2. What is the connection between water and nutrients?

3. What is the connection between water and photosynthesis?

ROLE OF WATER

Name: _____ **Date:** _____

Objective – To determine if different types of water affect plant growth

Materials:

- Clear plastic cups
- Potting soil
- Seeds – we used radish seeds because they sprout quickly
- Drill or Dremel
- Wooden craft sticks
- Tape
- Printable cards
- Aluminum foil pan or tray
- Bottled water
- Spring water
- Tap water
- Distilled water

Directions:

1. Prepare your markers by taping each card to a wooden craft stick.
2. Poke one small hole in the bottom of each cup to provide drainage. I used a Dremel tool for this.
3. Place the cups into a tray. An aluminum foil pan works great for this.
4. Fill each cup with potting soil to within 1/2 inch of the rim.
5. Add a few seeds into each cup and top with 1/4 inch of soil
6. Place a wooden craft stick marker into each cup and then lightly water the soil with the correct type water.
7. Set the tray in a sunny location and check back in a few days. Radish seeds usually sprout within five days.
8. When the soil begins to feel dry, lightly water it again.

ROLE OF WATER

Name: _____ Date: _____

Type of Water	**Notes (Make sure you date each entry.)**
Bottled Water	
Spring Water	
Tap Water	
Distilled Water	

ROLE OF WATER

Name: _____ Date: _____

1. Which type of water had the greatest impact on the growth of the plant? Provide evidence from your notes to support your answer.

2. Would the experiment be valid if each plant was a different type of seed? Defend your answer.

3. Would the experiment be valid if the experimenter failed to measure the amount of water? Defend your answer.

THE ROLE OF WATER

Name: Answer Key _____ **Date:** _____

Water is central to the growth and survival of living things. This is especially true with plants. Some plants are actually made up of 90% water. Water is important to the growth of plants for a couple of reasons. First, water transports nutrients throughout the plant. Second, water is an important part of photosynthesis. That's when a plant uses sunlight to make food and energy.

For a plant to thrive, it has to move nutrients throughout its body. It moves them from the soil, into the roots, and then through its stem and branches into its leaves. This often means moving upward *against* gravity. Therefore, there needs to be enough water to create enough pressure to push the water and nutrients throughout the plant. When there is not enough water pressure, the stem and leaves will droop. The leaves simply don't have the proper nutrients to stand tall, and the plant's skeleton doesn't have enough water in its cells to remain firm.

There's another reason why water and nutrients need to make it to a plant's leaves. That's where photosynthesis happens. Within its leaves, a plant uses the light from the sun to start a chemical reaction. The plant uses water, carbon dioxide from the air, and nutrients that have been transported from the soil. It uses these ingredients to make food and energy and to give off the oxygen we breathe.

As you can see, water plays a big part in transporting nutrients. It is also a key ingredient a plant uses to make food and energy.

1. According to the text, why is water important to a plant's growth?

Water is necessary to transport nutrients and to complete the process of photosynthesis.

2. What is the connection between water and nutrients?

Nutrients are transported throughout the plant through the water and the water pressure.

3. What is the connection between water and photosynthesis?

Water is used during photosynthesis to create the energy the plant needs.

ROLE OF WATER

Name: Answer Key _____ Date: _____

1. Which type of water had the greatest impact on the growth of the plant? Provide evidence from your notes to support your answer.

2. Would the experiment be valid if each plant was a different type of seed? Defend your answer.

   No, because we are not testing the seeds. We are testing the effects of the different types of water.

3. Would the experiment be valid if the experimenter failed to measure the amount of water? Defend your answer.

   No. It is important to ensure that the only dependent variable is type of water and not the amount of water used.

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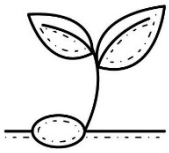
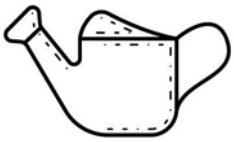
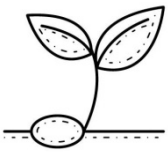
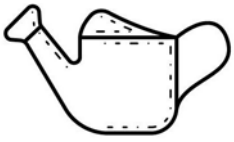
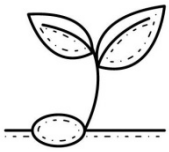
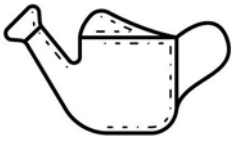
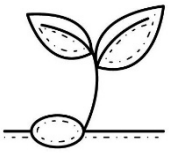
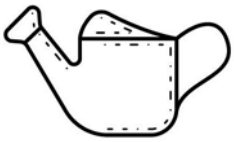
 BOTTLED WATER 	 SPRING WATER 
 TAP WATER 	 DISTILLED WATER 

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