



SCIENCE IN THE SEASONS SERIES



UW-MADISON EXTENSION

SCIENCE IN THE SEASONS:

CURRICULUM GUIDE

HOW TO USE THIS CURRICULUM PIECE

This set is intended for youth in grades K-2 in the following scenarios:

1. At home mailing program, mail a copy of one page each month to enrolled youth. Feel free to provide items in the envelope to conduct experiments if able.
2. Grab and go lessons for any group setting.

LEARNING OBJECTIVES

- Youth will be able to connect nature and science
- Youth will formulate parallels between nature and themselves
- Youth will practice basic science experiments using at-home materials

Life Lesson: Each lesson is accompanied by a life lesson section. Make sure to review the life lesson area to determine if you need to be prepared with additional materials, time, or planning in order to help youth embrace the life skills and intentional application.

Works Cited:

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Gold-Dworkin, Heidi Dr. *Little Scientists®: Learning About the Changing Seasons*. McGraw-Hill, 2000.

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SCIENCE IN THE SEASONS:

NOW YOU SEE ME

WHAT IS CAMOUFLAGE?

Camouflage is a way that some animals protect themselves from predators. They can mask how they look so that they blend in. For example, some insects live in green, leafy trees. Over time, they have changed by having a green body shaped like a leaf. Chameleons have the ability to change their colors instantly so that they blend into most things.

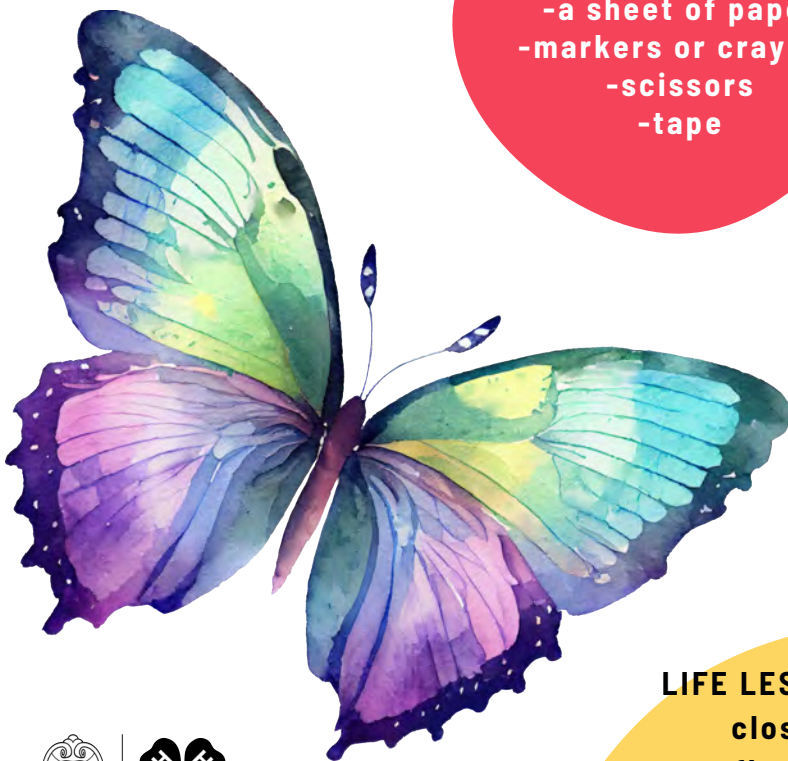


YOU WILL NEED:
-a sheet of paper
-markers or crayons
-scissors
-tape

LET'S EXPERIMENT

Draw an insect or small shape about half the size of your hand. Find a spot around your home and color this shape to match the color of wall, the woodwork, or a spot you have found. Then cut out your shape and put some tape on the back and place it on that spot. It should blend in well enough that you can look quick and not see it. Then ask your family or a friend to try and find your hidden shape.

Did they find it? Why do you think it is important for animals to hide sometimes?



LIFE LESSON: If you take your time and look very closely, you might find an animal that is camouflaged. Sometimes we can get so busy that we forget to look closely for things. Try taking a few minutes each day to sit quietly and look at things around you. Make a nature journal and draw what you see!



UW-MADISON EXTENSION

Written by: Dan Brandt
Iowa County 4-H Educator

SCIENCE IN THE SEASONS:

THE LIFE OF A PUMPKIN

WHY DO PUMPKINS ROT?

You've carved a beautiful pumpkin, set it outside, and now it's starting to fall apart, smell, and get gross! So what is happening? It's called decomposition, or breaking down and falling apart. All fruits and vegetables do this. First, your pumpkin will get soft and change color. It will smell different and maybe grow mold. There also might be some insects that move in, and finally it will return to the soil.



YOU WILL NEED:

- a carved pumpkin or fruit
- notebook
- pen
- camera (optional)

LET'S EXPERIMENT

Grab your carved pumpkin or an apple, for example, and place it outside. With a helper, write down some notes. What do you see? Visit your fruit or vegetable each day with your notebook to capture changes as it decomposes. How does it smell? What does the mold look like? Can you look closer with a magnifying glass? What sorts of insects are on your fruit or vegetable?

Feel free to take daily pictures and compare.



LIFE LESSON: Did you notice that your pumpkin helped a lot of other things while it broke down? It provided food and shelter. Can you think of ways to provide food to others? Could you organize a food drive, and donate it to a local pantry? How about working a shift at a pantry, too?



UW-MADISON EXTENSION

Written by: Emery Bork
Vernon County Senior 4-H Educator



SCIENCE IN THE SEASONS:

THE COLORS OF FALL

DO LEAVES CHANGE COLORS?

Did you know that leaves wear masks? Well, not really, but they actually hide secret colors inside them! All summer long, leaves are green. The green is called chlorophyll, and as the weather gets colder, it goes away revealing the color hidden inside! Usually, this color is yellow, orange, or red. The brightest colors are seen when late summer is dry and fall has bright, sunny days and cool nights.



YOU WILL NEED:

- glasses or jars
- rubbing alcohol
- white coffee filters
- spoon
- colorful leaves



LET'S EXPERIMENT

Grab several green leaves and tear them into small pieces. You can use the back of a spoon to help mash them a bit. Put them into a glass jar. Pour in enough rubbing alcohol to cover the pieces then place the jar in a bowl of warm water. Wait 30 minutes. Then use a coffee filter strip and place one end into the alcohol with the other end hanging over the side of the jar. Watch what happens over a period of time. Were the leaves hiding a color under their green masks?

LIFE LESSON: Leaves change colors in the fall, and it's a sign they're getting ready for something new. People change, too—we grow, learn new things, and try new activities. Change might feel a little scary sometimes, but it can also be exciting and fun—just like seeing all the colors in fall leaves! What is something new you've tried or learned lately? How did it feel? What is something you're excited to try or learn this year?



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Written by: Dan Brandt
Iowa County 4-H Educator

SCIENCE IN THE SEASONS:

GETTING READY FOR WINTER

HOW DO ANIMALS STAY WARM IN THE WINTER?

Animals spend all summer planning for winter! They work hard to eat as much as they can to build up a layer of fat! For animals, fat is like a coat you put on to keep out the cold and wind. Let's try to feel what it's like to protect ourselves like an animal does!

YOU WILL NEED:

- Two bowls of ice water
- Two plastic bags large enough to put your hand in
- Petroleum jelly
- Two rubber bands



LET'S EXPERIMENT

Slather one hand really well in the petroleum jelly.

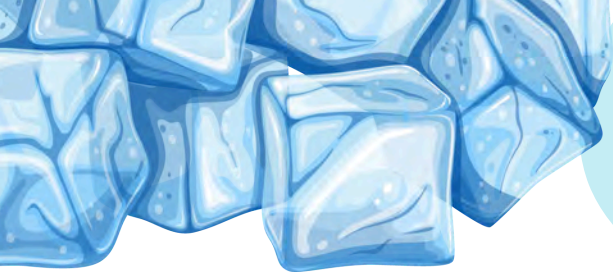
This is our "fat." Place a plastic bag over the hand, and then do the same on the opposite hand, but leaving off the jelly. Secure around the wrist with a rubber band. Place each hand in the bowl of ice water for a few seconds. What differences did you notice between each hand?

LIFE LESSON: Animals work to prepare, and it pays off by keeping them warm and comfortable in winter! What is one way that you could prepare for winter? How would it help keep you safe?



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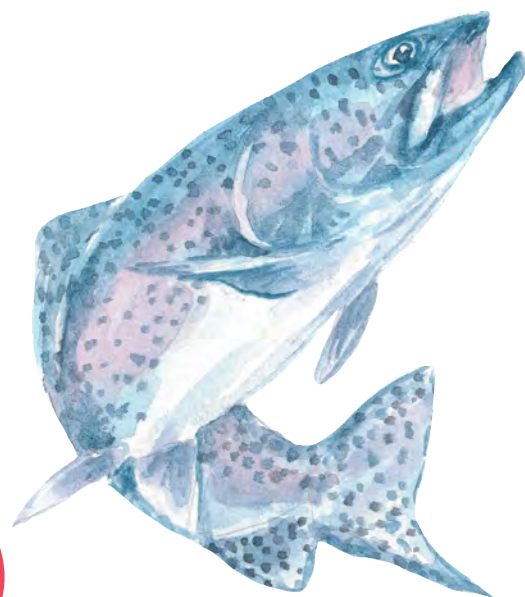
SCIENCE IN THE SEASONS:

Winter

LAKES, RIVERS, AND PONDS ICE, OH MY!

HOW DO FISH SURVIVE IN THE WINTER?

Fish have the ability to change their body temperature to match the temperature outside. When water gets cold, so do they! But what about when water freezes? Well, there is so much water, that not all of it freezes. The frozen water protects the water underneath, too! Let's learn how this works.



YOU WILL NEED:
-A clear plastic cup
-Water
-Metal spoon



LET'S EXPERIMENT

Fill the cup 3/4 of the way full with water. Place in the freezer and check it every fifteen minutes or so. Soon you will observe the water freezing at the top, creating the protective layer. After a while (don't wait too long), have an adult take the end of the metal spoon and punch a hole through the top layer of ice. Do you see how there is water still in the middle that is not frozen yet? If this were a giant lake, it would not continue to freeze solid.



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LIFE LESSON: Fish change with the temperature of the water in order to be safe. Can you think of a time when you had to make a change to be more safe? (For example, changing from wearing summer clothes to warmer winter clothes.) Why is it important to be able to do this?



SCIENCE IN THE SEASONS:

LEARNING HOW TO WALK IN THE SNOW

WHY IS IT SO HARD TO WALK IN THE SNOW?

Have you ever tried to walk in deep snow? It can make you tired quickly because your feet sink right to the bottom! Snow is light and fluffy. When you put the weight of your foot on the snow, you squish it down. So how do animals and people walk on the snow without getting tired? They spread out their weight so they don't squish the snow down as much by either having large paws, or humans would put on snowshoes.



YOU WILL NEED:

- A plastic toy animal that can stand on all four legs
- Tape
- Scissors
- Cardboard
- A shallow dish
- Flour



LET'S EXPERIMENT

Fill the shallow dish with flour. Place your toy animal on top of the flour. Does it sink in? What if you push it down a bit? Take it out to see how deep its footprints are. Let's cut 4 circles of cardboard and attach some snowshoes. Make sure to make them larger than the animal's paws. Before you put the animal back in the 'snow,' take a fork and fluff it back up to how it was in the beginning. What happens this time when you try to push it down?

LIFE LESSON: Lynx and foxes, for example, are born with wide paws so that they can easily walk on snow. What are some talents or special abilities that you naturally have? How can you share them with other people?



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SCIENCE IN THE SEASONS: FOREVER GREEN

HOW DO SOME TREES KEEP THEIR NEEDLES YEAR ROUND?

Take a look outside in winter. Do you see any trees that are still green? How can they still be green in the middle of winter!? There are a few different names for these trees. We call them evergreens because they stay green all year. Most are pine, fir, or cedar trees. Their needles are special. They have a waxy coating that keeps water in. This helps the needles stay on the tree instead of drying up and falling off like other trees' leaves. Let's find out how well wax works to keep water in.



YOU WILL NEED:

- A sheet of wax paper
- 1 sheet of plain printer paper
- A rubber band
- Bowl of water



LET'S EXPERIMENT

Grab the plain piece of paper and smooch it up into a ball. Take the wax paper and wrap it around the paper ball, tightly. Secure it with a rubber band on one end.

Holding near the rubber band, dip the ball into the water a bit. Next, dry the outside, and open it up. Did any water get on your paper ball? This shows us how good wax is at keeping water in or out!



LIFE LESSON: Trees need water to survive, and so do we! It is recommended that 4-8 year-olds drink 5 cups of water each day. Take some time to discover how much that is and track how much water you drink every day. Look at your results. Do you need to drink more water each day to stay healthy?



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SCIENCE IN THE SEASONS:

LOOKING FOR

SIGNS OF SPRING

IS IT TIME FOR NATURE TO WAKE UP YET?

Yesterday, I enjoyed listening to a bird singing outside my window. Have you heard any birds singing or have you seen any around yet? The days are now starting to get longer, and this is a sign that spring is coming, however, it isn't quite time for all the trees, grass, and flowers to wake up quite yet. Let's learn why.

YOU WILL NEED:

- Two pieces of wet paper towels
- Four seeds
- Two plastic sandwich bags



LET'S EXPERIMENT

Get your paper towels wet and lay them flat. Place two seeds on each towel and then roll them up nice and tight so they don't fall out. Place them inside the sandwich bag. Put one bag in the freezer, and the other bag in a dark place. Check them in two days--what's happening to your seeds? Seeds, or plants, need heat to grow. Check the temperature outside. Is it as warm as it is in your house? Not quite, but soon spring will be here!

LIFE LESSON: Are you excited for spring and summer? What are you looking forward to the most? Make a list: one thing you want to do for fun, one thing you want to do to help someone, and one place you want to visit where you could learn something new.



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SCIENCE IN THE SEASONS:

BREATHING LEAVES

HOW DO PLANTS BREATHE?

All living things need energy to live on Earth. We get energy by eating food. Unlike us, green plants make their own food through a process called photosynthesis. Plants help us breathe by taking in carbon dioxide and letting out oxygen through their leaves. When humans breathe, we take in oxygen and let out carbon dioxide. Plants and humans have a friendship and help each other out with breathing.

YOU WILL NEED:

- Leaf off of a plant
- Clear bowl of water



LET'S EXPERIMENT

Go outside and find a leaf from a plant. Make sure the leaf is a fresh leaf, not one that has fallen off. Next find a clear glass or plastic dish and fill halfway with water. Place your leaf in the water and put a small rock or weight on the leaf to keep it under the water. Place the dish in a bright, sunny spot and come back in a few hours. What do you see? Do you see any tiny bubbles on the leaf? That's oxygen!

LIFE LESSON: As we learned, humans need plants and plants need humans. We help each other. Can you think about someone that helps you all the time but maybe you don't notice them? Take some time to thank people who help you!



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SCIENCE IN THE SEASONS:

EGG-CITING SPRING!

WHAT IS INSIDE AN EGG?

Most of the birds are back for summer! One of the first things they do is either build a nest or return to an old one. Why? Because it is time to lay their eggs! Eggs are the start of a new baby chick. Typically, birds lay 2-6 eggs.

There are several important parts of an egg:

- The white/clear part of the egg is called the albumen. It provides extra food for the chick as it grows.
- The yellow part of the egg is the yolk; it is also food for the chick.
- If the egg develops into a chick, there will be a small circle about the size of a pencil eraser on the outside of the yolk. That is the chick.



YOU WILL NEED:

- One hard boiled egg
- One raw egg
- Two bowls



LET'S EXPERIMENT

Crack the raw egg into a bowl and see if you can identify all of the parts. Next, crack the hard-boiled egg and try to also find the rubbery shell membrane. This protects the chick from diseases. Feel the parts of the egg and make a list of the differences between the yolk and albumen.

Don't forget to wash your hands before and after!

LIFE LESSON: Eggs are a great food for humans because they have a lot of protein and vitamins. Make a list of foods that are good for you that you would like to taste, and add them to what you eat often.



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SCIENCE IN THE SEASONS:

THE INVISIBLE SHIELD

HOW DOES SUNSCREEN WORK?

Have you ever been in the sun too long and received a sunburn? Ouch! Those can really hurt. A sunburn is caused by too much time in ultraviolet light or UV light. UV light comes from the sun. UV light damages skin cells, which makes the immune system in your body react by increasing blood flow to that area.

That causes the sunburn.

When you put sunscreen on your skin, it creates an invisible shield that protects your skin from being burned by the UV light.



YOU WILL NEED:
-Roll-on sunscreen
-Colored paper



LET'S EXPERIMENT

Go outside and take 2 or 3 different colors of paper and roll-on sunscreen with you. On the colored paper, draw an image, shape, or anything you want with the roll-on sunscreen. Then place a rock or something heavy to hold down the paper. Come back in a few hours to check on your paper. Where on the paper has the color changed? Why do you think it has changed?

LIFE LESSON: Sunburns can damage your skin and hurt really bad. It is important to plan for when you go outside. Make a list of items you will need if you decide to spend the day outside. Work with a trusted adult to create a kit you can easily grab to take with you that has all of your items in it.



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SCIENCE IN THE SEASONS:

RAIN, RAIN, COME TODAY!

WHAT MAKES RAIN?

Rain is really important for everyone, but how does it work? Well, it happens inside of a cloud! There is a lot of water inside clouds, but they are in tiny drops. As the clouds move, grow, and collect more water, the droplets come together and get very heavy. When the water gets too heavy, it falls out of the cloud causing rain!



YOU WILL NEED:

- A clear jar or glass
- White, foamy shaving cream
- Food dye in a dropper



LET'S EXPERIMENT

Fill the glass jar 3/4 of the way with water. Fill the remaining area with shaving cream. This represents your cloud! How is it similar to a cloud? Next, using the food dye filled dropper, fill the cloud with "water" by letting the dye drip onto the cloud. What do you think will happen if you drip enough "water" into the cloud? Keep going until something magical happens!

LIFE LESSON: Sometimes we get sad when we can't go outside to play when it rains. Can you work to put together a rainy day kit full of fun activities and give it to a friend or sibling? Perhaps you can do this lesson together and trade with each other!



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SCIENCE IN THE SEASONS:

HAIL STORM

WHAT IS HAIL?

Sometimes, during a thunderstorm, balls of ice will fall from the sky. It's called hail. Hail, depending on its size, can cause a lot of damage. It can be very small or very large, like the size of a baseball. The size of the hail depends on how long it spends moving around in the very cold clouds. The more it moves around, the more it collects and freezes water.



YOU WILL NEED:

- An ice cube tray
- A string
- A ruler with centimeter marks
- Food dye (optional)

LET'S EXPERIMENT

Fill a cube slot on the tray with water and place the string in it so it will freeze together. After freezing, take the cube out and measure how big it is. Then dunk the cube in very cold water a few times, and place it quickly back in the freezer. Wait 15 minutes or so. Take it out and measure to see if it has gotten bigger. Dip, freeze, and repeat! Use different colors in your layers for a bit of extra fun. Afterwards, feel free to smash open your cube with the help of an adult to see all the layers!

LIFE LESSON: Weather is both amazing and powerful. We need to respect the weather and sometimes that means being extra safe. Does your family have a plan for bad weather or an emergency? Ask your parent or caregiver about the plan and what to do in case of bad weather or an emergency.



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