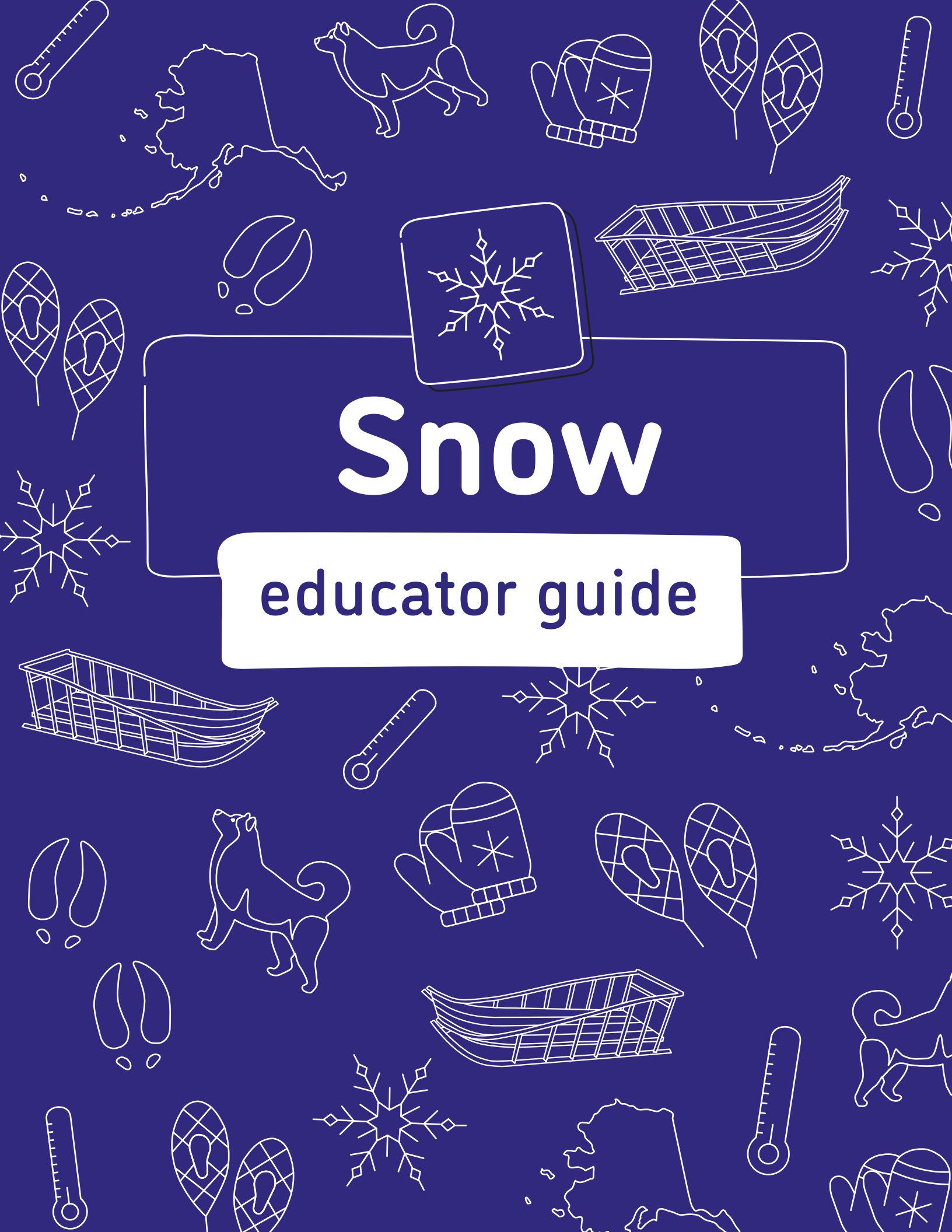




Snow

educator guide

SNOW Educator Guide!

In this Educator Guide, you'll find Grade Banded Learning Standards aligning to each of the activities. You will also find a QR Code linking you to COSI Connects, an online universe of science through videos, activities and so much more! COSI Connects also includes a section called Community Connects, a digital hub for online and in-person resources from museums, cultural institutions, and other nonprofits.

For additional resources, including book recommendations, and video instructions for completing each of the activities inside your box be sure to check out cosi.org/connects/kits/.

For questions regarding the content inside this educator guide, please email ScienceQuestions@cosi.org.

COSI Connects



Enjoy your
educator
guide!



Table of Contents

Facilitating STEAM Learning with Kits	4
Kit Accessibility Tips	7
Standards Alignment and Extension Questions	8
Activity 1: Make a Snowflake	9
Activity 2: Water & Ice	11
Activity 3: Insulation Exploration	13
Activity 4: Animal Tracking	15
Activity 5: Walking on Snow	17
Glossary.....	19

Facilitating STEAM Learning with Kits

Kits Overview

COSI Connects Kits contain carefully designed hands-on STEAM activities that support fun, engaging learning about a topic or theme. Each box comes with:

- **Supplies:** Materials for activities are in the box
- **Activity book:** This guide provides directions for setting up and completing activities, explains relevant STEAM content knowledge and skills, and offers discussion prompts to deepen the learning experience
- **Instructional videos:** Each kit has a QR code linking you to short videos demonstrating how to complete different steps of the activities. If you cannot scan the QR code, you can find the videos online at cosi.org/connects/kits. Click on your kit, then click the "Parent/Educator Resources" tab.

Goals for Using Kits

At COSI, we know science is everywhere and for everyone. To reinforce this message, we've designed our kits to do so much more than just teach STEAM content knowledge. Every kit, regardless of the content or topic, also provides important non-content learning opportunities such as:

- Engaging with STEAM in fun, inspiring, and creative ways
- Making sense of scientific observations
- Seeing oneself as a capable, welcome, and valued STEAM community member
- Practicing a growth mindset by valuing effort and learning over ease and knowing
- Bonding with peers, family, and educators over shared experiences and excitement

Techniques for Facilitating COSI Connects Kits

Decades of research show that learning is rarely as straightforward as receiving information. This is especially true when the goal is to *understand* and *apply* information, not simply recognize and repeat it. Learning and understanding requires the student to make sense of the information for themselves: Have they heard anything like that before? Does it make sense? Does it support or contradict something they already know? Is it useful or interesting enough to warrant the effort to learn and remember it?

When helping your learners accomplish the goals of using a COSI Connects kit, you'll want to ask more questions than you answer (unless they're practical or logistical questions about the directions).

Why? For a few reasons:

- 1) If learners have a question in mind before doing an activity, or before doing a step of the activity, they'll be primed to notice information that is useful for sense-making or question-asking.
- 2) This technique helps you model the process of science for your learners. Instead of assuming what they do or don't know and thus what you need to tell them, you are being curious, collecting data (their knowledge and ideas) and interpreting those data to decide how to most effectively help them.
- 3) This invites critical thinking: you can follow most questions with things like, "Why do you think that?" or "What did you observe during your activity that makes you think that?"
- 4) It shows your learners that you are interested in their experiences, and that you find them valuable and interesting to know.
- 5) If something isn't working, it can help you troubleshoot the issue: Did they skip a step? Use a different material? Was the reaction really fast or really subtle and they missed it?

Make sure you ask your questions with curiosity and openness: you are asking the question because you want to learn your learners' answers, not because you will try to change their minds (even if you do want to!). This will help them feel more comfortable sharing, which will deepen and sustain their conversations and learning.

Technique	Examples of Effective Questions
Model the scientific method before, during & after Model the scientific method before, during & after Scientists work together to collect information (evidence) they can use to answer questions about how things work, why things happen, or even if/when things <i>will</i> happen! They collect this evidence by learning from their peers, making observations, and conducting experiments. Additionally, scientists are never "done" learning: experiments often leave scientists with more questions than answers, which is exciting!	• What questions could we answer by doing this activity? • What information could we collect to answer that question? What changes or results could we look for? • What do you think will happen? Why? • What information or knowledge did you use to come up with your answer? • What new questions do you have? What about those questions is interesting to you? How would you collect evidence to answer your questions?
Focus on ideas rather than terminology If a learner is having a hard time with a particular word or phrase (pronouncing, understanding – anything!), help them find other words to use instead. It's more important for learners to learn by making sense of ideas and practicing skills than it is for them to use terminology correctly.	• What are other words that mean the same thing? • How would you explain it to a younger sibling? • Can you act out the word, or draw the word? • Is there a similar word that means something different, and that's making this feel confusing? • How can you remember the information/skill even if you forget the specific word(s)?

Help learners see themselves as scientists by challenging negative misconceptions Importantly, “science” is a <i>process</i>, not a product - science is not simply a collection of information or facts. Science is a process of asking questions, making observations to collect information, and thinking carefully to make sense of the information. The goal of science is not to “prove” that a certain idea is “right,” or to get “the correct result” from doing an experiment. If an experiment produces an outcome that suggests a scientist’s idea was wrong, that’s great because there is something new to be learned! A “good” scientist is not somebody who is already very smart, works all by themselves without any help, and never makes mistakes. A “good” scientist is curious, collaborative, and learns from their mistakes.	• What does the word “science” mean to you? • Do you think science is interesting? Fun? Exciting? Scary? Boring? Why? • How do we use science to learn about things? • How does science help us understand things? • How do you use science to understand things? • What does the word “scientist” mean to you? • What does a scientist do? • What makes somebody a “good scientist” or “good at science”? • Do you think you can be a scientist? • How are you like a scientist every day? • What attributes make you a good scientist? • Why do you think it’s more important for a scientist to learn from mistakes than to never make mistakes? • Have you ever made a mistake that helped you learn something really useful?
Invite sense-making and peer discussion It’s great for learners to have questions because that means they’re curious, and they have the opportunity to learn something new! Ask your learners to share what kit activity information and experiences they’re curious or confused about and want to understand better. Ask other learners in your group to share how they figured something out. This is especially helpful when you have learners who want to work more quickly than others: capitalize on their energy and help them engage more deeply!	• Was any part of the kit activity surprising, strange, or even counterintuitive to what you expected? • Why do you think that was surprising/strange/counterintuitive – what made you think that something else would happen? • Did any part of the kit activity not make sense? • Did you see or try anything in the kit activity that helped something make sense? • Do you have any other information or experiences from before the kit activity that helped something make sense?
Explore real-world connections Learners are more likely to value the effort required to learn or complete a task if they believe the results will provide something useful and relevant. Personal connections can also help learners see themselves as capable STEAM community members and practitioners.	• Is this something you’ve ever wondered about? • Would a friend or family member find this interesting? • How could you use something you learned from this activity in your own life? • How could you use something you learned from this activity to help someone else?
Reflect on progress and experiences At the end of each activity, or even after a step within an activity, ask your learners questions that help them see things like: • They learned a new fact or skill • They had a fun/cool/interesting experience • They overcame an obstacle and achieved success • They are scientists and they’re doing science • They changed their mind with new information • They turned a “mistake” into a learning opportunity • They wondered new and interesting questions	• What is the most interesting thing you learned? • Was anything confusing at first, but now you understand it better? • Was anything frustrating at first, but it helped you learn something? • Why was it confusing at first? How did you get to understand it better? • What is something you learned that you want to tell a friend or family member? • What is something you learned that you want to use in your everyday life?

Kit Accessibility Tips

This is an additional resource to support the success of learners. Below are tips and tools from COSI's accessibility experts that can be used when adapting for learners.

Fine Motor Adaptations

- Get creative! When completing a movement required activity, think of different ways to accomplish it, like moving an object by attaching it to a wheelchair.
- If an object is too small to handle, swap for similar but larger objects, like switching a bouncy ball for a basketball. You can also attach the smaller object to a larger one to make it easier to hold.
- Use hand over hand to support students when completing fine motor tasks.
- For the writing portions, provide notepaper to give extra space for writing.

Blind and Low Vision Adaptations

- Use puffy paint on the activity book images to create additional tactile images.
- Use manipulatives (objects) for students to touch when explaining how something works to help students process what is happening.
- Use the camera on a phone or tablet to magnify the words and images in the activity book.

Deaf Adaptations

- Utilize COSI's demonstration videos with closed captioning when completing an activity.
- Visually demonstrate the activity steps.

Cognitive Adaptations

- Break the activity into smaller steps to make processing easier.
- For harder to understand concepts use manipulatives (objects) to explain or relate to a practical process.
- Model the steps for the child to follow and complete at the same time.
- Ask leading questions to help students problem solve. For example: "How could you change the shape of the wings to make it fly better?"

Speech Adaptations

- Have students present in alternate ways, like with drawings or by demonstrating what they did.

Standards Alignment and Extension Questions

The following pages will include Ohio Learning Standards and Next Generation Science Standards that are aligned with each activity in the kit. In addition to these standards, you will find extension questions to scale up or scale down the content of each activity according to your students' abilities or grade level. These extension questions are arranged in grade level bands of Kindergarten – Second Grade, Third – Fifth Grade, and Sixth – Eighth Grade. Each set of these questions are also aligned with both Ohio Learning Standards and Next Generation Science Standards.

Throughout the kit activities, your students will find opportunities to write down their scientific findings and connect to digital learning resources through COSI Connects. This will allow them to fulfill the Ohio English Language Arts, Technology, and Digital Literacy Learning standards listed below.

Kindergarten – 2nd Grade

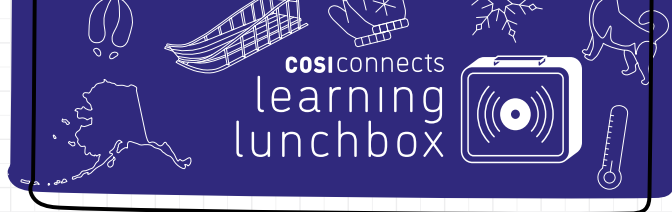
- K-2.ICT.3.b.: Use visuals found in digital learning tools and resources to clarify and add to knowledge.
- W.K.2: Use a combination of drawing, dictating, and writing to compose informative/explanatory texts that name what is being written about and supply some information about the topic.
- W.1.8: With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
- W.2.8: Recall information from experiences or gather information from provided sources to answer a question.
- K-2.ST.2.a.: Communicate and collaborate using several digital methods.

Third Grade – Fifth Grade

- 3-5.ICT.1.a.: With guidance, identify and use digital learning tools or resources to support planning, implementing and reflecting upon a defined task.
- W.3-5.10: Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.
- 3-5.ICT.4.d.: Produce and publish information appropriate for a target audience using digital learning tools and resources.

Sixth Grade – Eighth Grade

- 6-8.ICT.4.b.: Select and use a variety of media formats to communicate information to a target audience.



Snow

ACTIVITY 1: Make a Snowflake

Have you ever looked really closely at a snowflake? If you did, you probably noticed that all snowflakes have a hexagonal (6-sided) structure! Make your own paper snowflakes.

Ohio Learning Standards

1st Grade Fine Arts: Visual Art 1.2CO: Identify examples of art and artists in students' everyday lives.

2nd Grade Mathematics 2.G.1: Recognize and identify triangles, quadrilaterals, pentagons, and hexagons based on the number of sides or vertices.

5th Grade Fine Arts: Visual Art 5.3RE: Evaluate the relationship between works of art and human experiences.

GRADES
K-2

Extended Learning Questions:

- 1) What shapes do you see in your snowflake?
- 2) Get a piece of dark blue construction paper and a white crayon. Draw a snowflake. Then, compare your picture to what other people drew. What is the same? What is different?
- 3) Build a snowflake using popsicle sticks or pipe cleaners. Count how many points your snowflake has.
- 4) Imagine you are outside and it is snowing. Tell a story about what happens.
- 5) Use a magnifying glass to examine frost on a cold day or ice from a freezer. What do you notice? Do the same thing a few days in a row. What changes do you notice?

Ohio Learning Standards:

Kindergarten Math K.G.1

Identify and describe shapes.

First and Second Grade Math

1-2.G.1 Reason with shapes and their attributes.

Kindergarten Art K.2CR Engage in self-directed play with various materials.

First Grade Art 1.2CR Explore materials to devise imagery and symbols.

Second Grade Art 2.3CO

Respect and support peer ideas and creativity.

Kindergarten Science K.ESS.1:

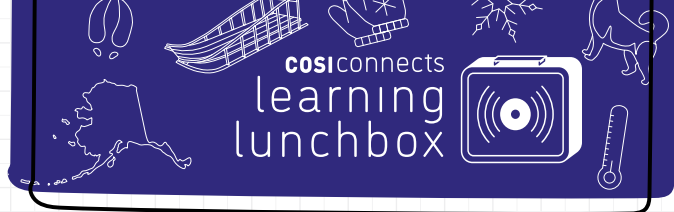
Weather changes are long-term and short term.

First Grade Science 1.ESS.2:

Water on Earth is present in many forms.

Next Generation Science Standards:

K-ESS2-1 Earth's Systems: Use and share observations of local weather conditions to describe patterns over time.



Snow

ACTIVITY 1: Make a Snowflake

Have you ever looked really closely at a snowflake? If you did, you probably noticed that all snowflakes have a hexagonal (6-sided) structure! Make your own paper snowflakes.

GRADES
3–5

Extended Learning Questions:

- 1) Find ten photos of different snowflakes. Sort them into groups. What patterns do you notice? Now research the different types of snowflakes. What snowflake types do you see in your pictures?
- 2) Get a zoomed-in, printed picture of a snowflake. Measure and label three different angles on the snowflake.
- 3) How might snowflake shapes affect how snow behaves on the ground?

Ohio Learning Standards:

Fourth Grade Math 4.MD.5

Geometric measurement: understand concepts of angle and measure angles.

Fourth Grade Science 4.PS.1:

When objects break into smaller pieces, dissolve, or change state, the total amount of matter is conserved.

Next Generation Science Standards:

5-PS1-3 Matter and Its Interactions:

Make observations and measurements to identify materials based on their properties.

GRADES
6–8

Extended Learning Questions:

- 1) Look outside when it is snowing or watch a video online of snow coming down. What forces are acting on each snowflake as it falls? How could you describe its motion?
- 2) Make a model of a water molecule. How does it build crystals? How might this compare to crystal growth of salt or sugar crystals? Optional: Grow salt or sugar crystals!
- 3) Find a video online of slow-motion footage of snowflake formation. Observe and describe what you see.

Ohio Learning Standards:

Sixth Grade Science 6.PS.4

An object's motion can be described by its speed and the direction in which it is moving.

Next Generation Science Standards:

MS-PS1-1 Matter and its

Interactions: Develop models to describe the atomic composition of simple molecules and extended structures.

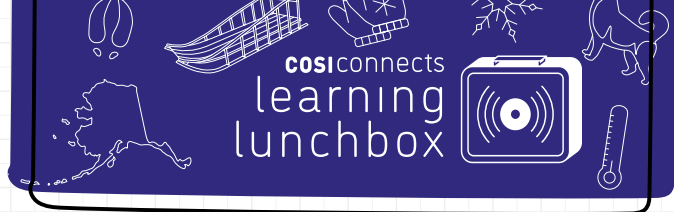


Join us at our Community Learning Table: "Community Connects"

The Community Connects section of this digital hub brings together educational resources from museums, cultural institutions, and other nonprofits in your community to extend your learning

cosi.org/connects





Snow

ACTIVITY 2: Water & Ice

Change the freezing point of water and pick up an ice cube with a string!

Ohio Learning Standards

1st Grade Science 1.ESS.2: Water on Earth is present in many forms.

1st Grade Science 1.PS.1: Properties of objects and materials can change.

2nd Grade Science 2.ESS.2: Water is present in the atmosphere.

3rd Grade Science 3.PS.2: Matter exists in different states, each of which has different properties.

3rd Grade Mathematics 3.NF.1: Develop understanding of fractions as numbers.

GRADES K-2

Extended Learning Questions:

- 1) Freeze water in different containers (like a cup, an ice cube tray, and a balloon). Which shapes melt the fastest? Why? Optional: do this activity outside. How does the weather impact this experiment?
- 2) What does ice feel like? What happens when you hold it on your flattened hand? What happens when you hold it in a closed fist? Why?

Ohio Learning Standards:

Kindergarten Science K.PS.1:

Objects and materials can change when heating or cooling occurs.

Next Generation Science Standards:

K-PS3-1 Make observations to determine the effect of sunlight on Earth's surface.

GRADES 3-5

Extended Learning Questions:

- 1) Get two ice cubes that are the same size. Add salt to one but not the other. Observe and record (write down) what happens. Why do you think cities sometimes put salt on their roads in the winter? Design a container that will keep ice from melting. Build your container and try it out – does ice melt more slowly in the container than it does outside of the container? Why or why not?
- 2) Graph how ice melts over time at room temperature. Before getting started, decide how to best graph this.
- 3) When you allow an ice cube to melt, where does it go? Design a test to determine whether the weight of the water changes as it turns from solid to liquid.

Ohio Learning Standards:

Third Grade Science 3.PS.2:

Matter exists in different states, each of which has different properties.

Fifth Grade Math 5.MD.2:

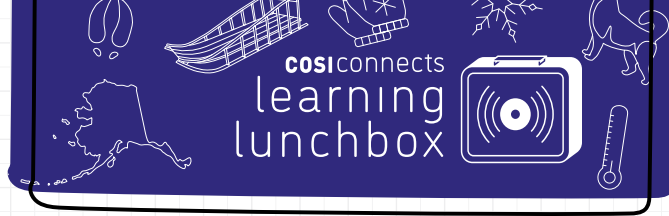
Display and interpret data in graphs

Next Generation Science Standards:

5-PS1-4: Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

5-PS1-2 Matter and Its Interactions:

Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.



Snow

ACTIVITY 2: Water & Ice

Change the freezing point of water and pick up an ice cube with a string!

GRADES
6–8

Extended Learning Questions:

- 1) Why do some cities put salt on the road in the wintertime? Research this and explain to a partner what you learned. What other materials might affect ice? Design an experiment to compare the effects of salt, sugar, and sand on ice.
- 2) How does melting ice near the poles change Earth's oceans? How might it affect weather and animal habitats?

Ohio Learning Standards:

Sixth Grade Science 6.PS.2

Changes of state are explained by a model of matter composed of particles that are in motion.

Next Generation Science Standards:

MS-PS1-4 Matter and its

Interactions: Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.

MS-ESS-2 Earth and Human

Activity: Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

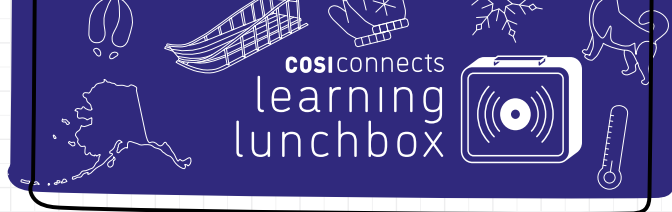


Join us at our Community Learning Table: "Community Connects"

The Community Connects section of this digital hub brings together educational resources from museums, cultural institutions, and other nonprofits in your community to extend your learning

cosi.org/connects





Snow

ACTIVITY 3: Insulation Exploration

Animals, plants, and even humans use snow for insulation sometimes! What makes a good insulator? Become a scientist as you carefully measure temperatures to learn how well different materials insulate.

Ohio Learning Standards

3rd Grade Mathematics 3.MD.1b: Solve problems involving money, measurement, and estimation of intervals of time, liquid volumes, and masses of objects.

4th Grade Science 4.PS.2: Energy can be transferred from one location to another or can be transformed from one form to another.

4th Grade Mathematics 4.MD.1: Know relative sizes of the metric measurement units within one system of units.

5th Grade Mathematics 5.MD.1: Know relative sizes of these U.S. customary measurement units: pounds, ounces, miles, yards, feet, inches, gallons, quarts, pints, cups, fluid ounces, hours, minutes, and seconds.

Next Generation Science Standards

4-PS3-2 Energy: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

MS-PS3-3 Energy: Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

GRADES
K-2

Extended Learning Questions:

- 1) When it is cold outside, we try to keep ourselves warm. Name 3 different pieces of clothing you wear to stay warm when it's cold outside.
- 2) Do you think mittens would make ice melt faster or more slowly? Why? Try it out!
- 3) How do you think animals like penguins and polar bears stay warm?

Ohio Learning Standards:

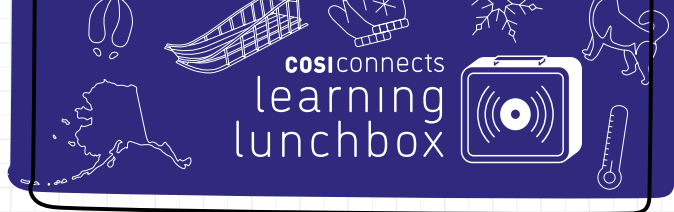
Kindergarten K.LS.2: Living things have physical traits and behaviors, which influence their survival.

First Grade 1.LS.2: Living things survive only in environments that meet their needs.

Next Generation Science Standards:

K-LS1-1 From Molecules to Organisms: Structures and Processes Use observations to describe patterns of what plants and animals (including humans) need to survive.

K-ESS3-1 Earth and Human Activity Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.



Snow

ACTIVITY 3: Insulation Exploration

Animals, plants, and even humans use snow for insulation sometimes! What makes a good insulator? Become a scientist as you carefully measure temperatures to learn how well different materials insulate.

GRADES
3-5

Extended Learning Questions:

- 1) How do you think homes in cold climates are built to keep heat inside? Do some research online to learn more.
- 2) How does layering clothing help keep heat in? Create a poster showing examples.
- 3) Get two different kinds of coolers. Which one works the best? Why? Add equal amounts of ice to both and use thermometers to track and graph how the temperature inside changes over time.

Ohio Learning Standards:

3rd Grade Science 3.PS.1: All objects and substances in the natural world are composed of matter.

3rd Grade Science 3.PS.3: Heat, electrical energy, light, sound and magnetic energy are forms of energy.

Next Generation Science Standards:

4-PS3-2 Energy: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

GRADES
6-8

Extended Learning Questions:

- 1) Investigate--through research or experimentation--some of the materials used to make clothes (cotton, wool, etc.) Which is the most insulating? When might you want to wear that type of clothing? Why?
- 2) The Earth would be cold and uninhabitable by humans without its own insulation – the greenhouse effect. Research the greenhouse effect and describe how it works. The Earth is currently warming. Why is the greenhouse effect getting stronger?

Ohio Learning Standards:

7th Grade Science 7.ESS.2
Thermal-energy transfers in the ocean and the atmosphere contribute to the formation of currents, which influence global climate patterns.

Next Generation Science Standards:

MS-PS3-3 Energy: Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

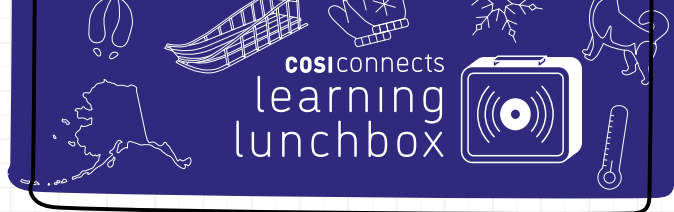


Join us at our Community Learning Table: "Community Connects"

The Community Connects section of this digital hub brings together educational resources from museums, cultural institutions, and other nonprofits in your community to extend your learning

cosi.org/connects





Snow

ACTIVITY 4 : Animal Tracking

Animals interact with the snow too – one simple way is that they leave their tracks in the snow. Match animal tracks to their pictures in a memory game. Then, create some artwork and tell a snow story!

Ohio Learning Standards

1st Grade Science 1.LS.1: Living things have basic needs, which are met by obtaining materials from the physical environment.

1st Grade Science 1.LS.2: Living things survive only in environments that meet their needs.

3rd Grade ELA SL.2.4: Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences.

4th Grade Science 4.LS.1: Changes in an organism's environment are sometimes beneficial to its survival and sometimes harmful.

Next Generation Science Standards

K-LS1-1 From Molecules to Organisms: Structures and Processes. Use observations to describe patterns of what plants and animals (including humans) need to survive.

2-LS4-1 Biological Evolution: Unity and Diversity
Make observations of plants and animals to compare the diversity of life in different habitats.

GRADES
K-2

Extended Learning Questions:

- 1) Pretend you are an animal walking in the snow. Act it out. Talk about what is happening.
- 2) What other things do animals leave behind besides paw prints? Go on a nature walk to see if you can find any clues that animals were there!
- 3) What animals (or evidence of animals) might you see in the woods? How about in a swampy area? What about in a desert?
- 4) How big is your hand print? Trace your hand. Measure it with a ruler or small blocks. How many blocks (or cm) long is it? How many blocks (or cm) wide?

Ohio Learning Standards:

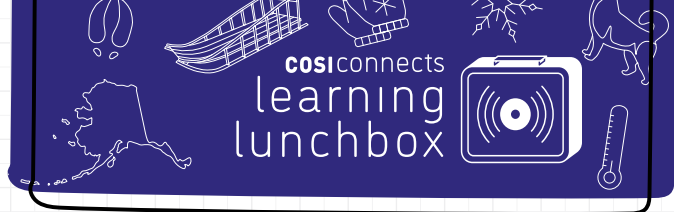
First Grade Math 1.MD.2:
Measure lengths indirectly and by iterating length units.

Second Grade Math 2.MD.1:
Measure and estimate lengths in standard units.

Next Generation Science Standards:

2-LS4-1 Biological Evolution: Unity and Diversity. Make observations of plants and animals to compare the diversity of life in different habitats.

K-LS1-1 From Molecules to Organisms: Structures and Processes. Use observations to describe patterns of what plants and animals (including humans) need to survive.



Snow

ACTIVITY 4 : Animal Tracking

Animals interact with the snow too – one simple way is that they leave their tracks in the snow. Match animal tracks to their pictures in a memory game. Then, create some artwork and tell a snow story!

GRADES
3–5

Extended Learning Questions:

- 1) Invent a new animal. First, imagine what type of habitat it lives in. Then, decide what adaptations it needs to be able to live in that environment. Draw a picture of the animal and a picture of its tracks.
- 2) Think about animals that live in a coral reef. Many of these animals swim. Do any of them leave tracks in the sand? What do those tracks look like? What else might they leave behind to show they were there?
- 3) Are paw sizes a good estimate of the size of the animal itself? Why or why not? Do some research of animal size and paw size. Create a graph to support your argument.

Ohio Learning Standards:

3rd Grade Science 3.LS.3: Plants and animals have life cycles that are part of their adaptations for survival in their natural environments.

5th Grade Math 5.MD.2: Display and interpret data in graphs.

Next Generation Science Standards:

3-LS4-2 Biological Evolution: Unity and Diversity. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

3-LS4-3 Biological Evolution: Unity and Diversity. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

GRADES
6–8

Extended Learning Questions:

- 1) Compare technological tracking techniques (like GPS tags) to traditional Indigenous knowledge. How can both be used to understand animal behavior?
- 2) How might climate change affect tracking animals in Arctic regions?
- 3) How is climate change affecting animals in Alaska? What are people doing to help? Provide two examples.
- 4) You've learned how paws might help animals living in snow. How do tails help?

Ohio Learning Standards:

Sixth Grade Science 6.LS.4
Living systems at all levels of organization demonstrate the complementary nature of structure and function.

Seventh Grade Science 7.ESS.2
Thermal-energy transfers in the ocean and the atmosphere contribute to the formation of currents, which influence global climate patterns.

Next Generation Science Standards:

MS-LS2-5 Ecosystems: Interactions, Energy, and Dynamics. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

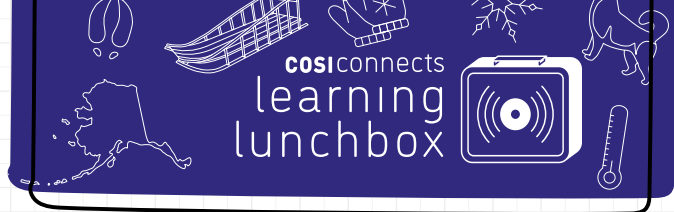


Join us at our Community Learning Table:
"Community Connects"

The Community Connects section of this digital hub brings together educational resources from museums, cultural institutions, and other nonprofits in your community to extend your learning

cosi.org/connects





Snow

ACTIVITY 5: Walking on Snow

Animal feet have many adaptations that help them to adapt to the snow. One adaptation that some animals have is foot size. Humans have also created technologies to walk across the surface of snow. Make some fake snow to test this out!

Ohio Learning Standards

Kindergarten Science K.LS.2: Living things have physical traits and behaviors, which influence their survival.

3rd Grade Mathematics 3.MD.2: Measure and estimate liquid volumes and masses of objects using standard units of grams, kilograms, and liters.

4th Grade Mathematics 4.MD.1: Know relative sizes of the metric measurement units within one system of units. Metric units include kilometer, meter, centimeter, and millimeter; kilogram and gram; and liter and milliliter.

Next Generation Science Standards

K-PS2-1 Motion and Stability: Forces and Interactions Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

GRADES
K-2

Extended Learning Questions:

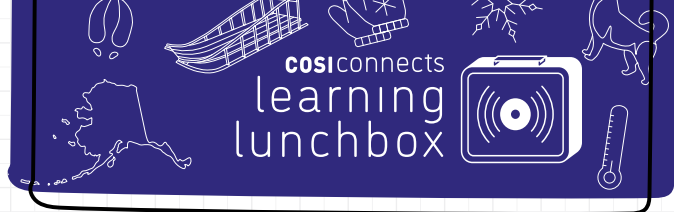
- 1) Have you ever walked in snowshoes? If so, what was it like? If not, what might it feel like?
- 2) Find three different sizes of toys. Which will walk best on the pretend snow? Try it out!
- 3) Imagine you are setting out on a snow adventure. Draw, tell, or write a story about that adventure.

Ohio Learning Standards:

Kindergarten ELA W.K.3 Use a combination of drawing, dictating, and writing to narrate a single event

Next Generation Science Standards:

K-PS2-2 Motion and Stability: Forces and Interactions: Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or pull.



Snow

ACTIVITY 5: Walking on Snow

Animal feet have many adaptations that help them to adapt to the snow. One adaptation that some animals have is foot size. Humans have also created technologies to walk across the surface of snow. Make some fake snow to test this out!

GRADES
3-5

Extended Learning Questions:

- 1) Create a bar graph comparing how different foot sizes affect sinking.
- 2) What materials do you think would make the best snowshoes? What considerations should someone make in choosing a material to make snowshoes? Test some materials out.
- 3) Imagine that instead of walking on snow, you're trying to get your plastic animal to float on water. Is it possible to do so with cardboard cutouts? How? What is the difference between floating on water and walking on snow?
- 4) Sometimes collisions (objects bumping into each other) can cause those objects to change shape. Create a collision between your finger and snow (real or poly snow). What happens when your hand gently collides with the snow? What about when it quickly collides with the snow? Does your hand change shape? Does the snow? Why is this?

Ohio Learning Standards:

Fifth Grade Math 5.MD.2:

Display and interpret data in graphs

Fourth Grade Science 4.PS.1:

The physical properties of materials can be used to describe and compare substances.

3rd – 5th Grade Technology

3-5.ID.4.a Students explore and practice how a design process works to generate ideas, consider solutions, plan to solve a problem, or create innovative products that are shared with others.

Next Generation Science Standards:

2-PS1-2 Matter and Its Interactions:

Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

4-PS3-3 Energy: Ask questions and predict outcomes about the changes in energy that occur when objects collide.

GRADES
6-8

Extended Learning Questions:

- 1) Calculate pressure using a toy's weight and foot area: $\text{Pressure} = \text{Force} \div \text{Area}$
- 2) How do animals inspire human gear for the wintertime? Think about clothing, snowshoes, etc.
- 3) Research how Alaska Natives designed snowshoes and how different shapes help in specific snow types. Share what you've learned.

Ohio Learning Standards:

6th-8th Grade Technology 6-8.

KC.3.a. Students demonstrate and practice the ability to effectively use research strategies to locate appropriate digital resources in support of their learning.

6th-8th Grade Technology 6-8.

GC.7.a. Students use digital tools to interact with others to develop a richer understanding of different perspectives and cultures.

Next Generation Science Standards:

MS-PS2-2 Motion and Stability:

Forces and Interactions: Plan and carry out an investigation to provide evidence of motion and forces.

MS-ETS1-3: Engineering Design:

Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.



Join us at our Community Learning Table: "Community Connects"

The Community Connects section of this digital hub brings together educational resources from museums, cultural institutions, and other nonprofits in your community to extend your learning

cosi.org/connects



Glossary:

Boil – To turn from a liquid to a gas.

Freeze – To turn from a liquid to a solid.

Freezing Point – the temperature at which a material turns from liquid to solid.

Insulator – A material that helps stop other materials from losing or gaining heat.

Polymer – A long chain of repeating units (called monomers), linked together.

Tracking – The science of looking at animal tracks to understand animal patterns.

Scat – Animal poop used as a clue in tracking.

Snowshoe – Footwear that allows people to walk on top of snow without sinking it. A snowshoe spreads a person's weight over a larger area.