Winter Activities

Below, you'll find a collection of winter activities centered around energy education. The activities are organized into four sections:

- All Grades-(3rd-12th) Link
- PreK-K Link
- Primary-(-1st –5th) Link
- Middle School-(6th-8th) Link
- High School-(9th-12th) Link

We hope you enjoy exploring these ideas! If you have any questions or need equipment, please don't hesitate to reach out—we're here to help.

Christmas STEM Games: 12 Days of Fun Puzzles

- **Found at:** Kansas Energy Program's Games and Puzzles page - Link
- **Ages:** 3rd-12th
- **Duration:** 5-10 minutes
- **NGSS:**
  - Varies depending on the activity (e.g., MS-PS3-1, MS-ETS1-2)
- **Description:** Jumpstart your students' holiday spirit with quick, fun puzzles about energy, circuits, and sustainability. Great as classroom warmups or a festive wrap-up to your lessons!

Newton's Law of Motion and Potential/Kinetic Energy (Christmas Catapult)

- **Found at:** Little Bins for Little Hands - Link
- **Ages:** K-8th
- **Duration:** 30-60 minutes
- **NGSS:**
  - MS-PS3-1, MS-PS3-5, MS-ETS1-2
- **Materials:** Popsicle sticks, spoons, rubber bands, Christmas-colored pom-poms, present-shaped box.
- **Description:** Build a catapult, launch festive pom-poms, and explore motion, potential, and kinetic energy! A great way to bring Christmas cheer into your science lessons while reinforcing physics concepts.

Pre-K to Kindergarten

Holiday Static Electricity Experiment: Dancing Holiday Shapes

- **Found at**: Lessons for Little Ones by Tina Oblock - Link
- **NGSS**:
  - K-PS2-1: Pushes and pulls can have different strengths and directions.
- **Materials**:
  - Tissue paper (cut into holiday shapes)
  - Balloons
  - Recording pages for observations
- **Time**: 10-15 minutes
- **Description**: Make tissue paper holiday shapes "dance" with static electricity! Students explore how rubbing a balloon on their hair creates static electricity to lift and move shapes. This simple, magical experiment sparks curiosity and helps young learners understand the basics of forces and interactions.

Jingle Bell STEM: Quiet the Bell Challenge

- **Found at**: Lessons for Little Ones by Tina Oblock - Link
- **NGSS**: K-PS3-1: Make observations to determine the effect of sunlight on Earth's surface.
- **Materials**:
  - Jingle bells
  - Small plastic containers
  - Various sound-dampening materials (cotton balls, fabric, paper, etc.)
- **Time**: 10 minutes
- **Description**: Can students find a way to quiet the jingle bell? Using various materials, students experiment with sound dampening, fostering creativity and problem-solving while exploring energy and sound.

Magnets & Jingle Bells Exploration

- **Found at**: Lessons for Little Ones by Tina Oblock - Link
- **NGSS**:
  - K-PS2-1: Investigate pushes and pulls.

- **Materials**:
  - Magnetic wands
  - Jingle bells
  - Ruler or Unifix cubes
  - Recording pages
- **Time**: 10-15 minutes
- **Description**: Explore the power of magnets! Students predict how many jingle bells a wand can hold, measure magnetic force, and test attraction through various materials. A hands-on way to learn about magnetism during the holidays.

Christmas Tinsel Science Experiment

- **Found at:** Little Bins for Little Hands - Link
- **Ages:** PreK-3rd
- **NGSS:**
  - 3-PS2-4 (Electric interactions)
- **Materials:** Balloons, tinsel, various surfaces for testing static charge
- **Description:** Watch the magic of static electricity come alive as students use balloons to pick up tinsel! Experiment with different surfaces and balloon colors to find out what generates the strongest charge.

Grades 1st-5th

Christmas Tinsel Science Experiment

- **Found at:** Little Bins for Little Hands - Link
- **Ages:** PreK-3rd
- **NGSS:**
  - 3-PS2-4 (Electric interactions)
- **Materials:** Balloons, tinsel, various surfaces for testing static charge
- **Description:** Watch the magic of static electricity come alive as students use balloons to pick up tinsel! Experiment with different surfaces and balloon colors to find out what generates the strongest charge.

DIY Yarn Ball Ornaments: A Static Electricity Craft

- **Found at**: Lemon Lime Adventures - Link

- **NGSS**:
  - 3-PS2-3: Forces and interactions.
- **Materials**:
  - Yarn
  - Glue
  - Balloons
  - Water
- **Time**: 20-30 minutes
- **Description**: Students explore static electricity before creating festive yarn ball ornaments. Perfect for combining creativity with science, this activity introduces basic physics concepts in a fun, crafty way.

Grow the Grinch's Heart: A Chemical Reaction Experiment

- **Found at**: Creative Family Fun - Link
- **NGSS**:
  - 5-PS1-4: Conduct an investigation to determine whether the mixing of two or more substances results in new substances.
- **Materials**:
  - Green balloons
  - Vinegar
  - Baking soda
  - Water bottles
  - Funnel
- **Time**: 15-20 minutes
- **Description**: Bring the Grinch's story to life with science! Students mix baking soda and vinegar to inflate a balloon, simulating the Grinch's heart growing. A wonderful blend of holiday cheer and chemistry.

Build Your Own Christmas Lights

- **Found at**: D&T Science - Link
- **Ages:** 4^{th}-6^{th}
- **NGSS**:
  - 4-PS3-4: Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
- **Materials**:
  - Battery packs and AA batteries
  - LEDs
  - Crocodile leads
  - Solar panels
- **Time**: 30-60 minutes

- **Description**: Design eco-friendly Christmas lights to explore energy sources and circuits. Students investigate the environmental impact of traditional lights and create sustainable solutions to help Santa save the North Pole.

Grades 6th-8th

Circuit-Tree: A STEAM-Powered Holiday Activity

- **Found at:** STEAM Powered Family - Link
- **Ages:** Upper Elementary - High School
- **NGSS:**
  - 4-PS3-2, MS-PS3-4, HS-ETS1-3
- **Materials:** LED lights, insulated copper magnet wire, batteries, electrical tape, clothespins, pipe cleaners, scissors, Lego pieces
- **Description:** Light up the holidays by building your own circuit-powered Christmas tree! Combine creativity with engineering and learn how circuits power festive decorations.

StarCups Challenge: Keep It Hot Like a Barista!

- **Found at**: Kansas Energy Program (Original) – Link
- **NGSS**:
  - MS-PS3-3: Apply scientific principles to test a device minimizing thermal energy transfer.
  - MS-ETS1-1: Define criteria and constraints for design problems.
- **Materials**:
  - Various insulation materials (felt, foam, aluminum foil, cotton, bubble wrap, etc.)
  - Hot water or prepared hot chocolate/coffee
  - Cups
  - Thermometer
- **Time**: 90 minutes
- **Description**: Design insulated cups to keep hot drinks warm! Students test materials, analyze heat transfer, and discuss real-world applications of insulation.

Santa's Pressure Problem: Down the Chimney

- **Found at**: Ward's Science - Link
- **NGSS**: MS-PS1-4: Develop a model that predicts and describes changes in particle motion.
- **Materials**:
  - Hard-boiled eggs
  - Glass bottles
  - Matches
- **Time**: 15-20 minutes

- **Description**: Explore atmospheric pressure and vacuums with this engaging experiment. Students learn how temperature changes affect gas molecules, creating enough pressure to pull a hard-boiled egg into a bottle—just like Santa squeezing down a chimney!

Wind Challenge: Santa's Windy Dilemma

- **Found at:** Kansas Energy Program Original – Link
- **Ages:** 6th-12th
- **Duration:** 90 minutes
- **NGSS:**
    - **Middle School**
        - **MS-PS3-1:** Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and its speed.
        - **MS-PS3-5:** Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.
        - **MS-ETS1-2:** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

    - **High School**
        - **HS-PS3-3:** Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.
        - **HS-ETS1-3:** Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics.
    - **Description:** Can you design a wind-powered system to help Santa overcome strong winds? Test your propeller designs using an energy sensor to measure joules generated. Combine creativity, engineering, and renewable energy for this high-stakes sleigh-saving mission! The winner gets Santa's cookies!

Grades 9th-12th

Circuit-Tree: A STEAM-Powered Holiday Activity

- **Found at:** STEAM Powered Family - LinkLink
- **Ages:** Upper Elementary - High School
- **NGSS:**
  - 4-PS3-2, MS-PS3-4, HS-ETS1-3
- **Materials:** LED lights, insulated copper magnet wire, batteries, electrical tape, clothespins, pipe cleaners, scissors, Lego pieces
- **Description:** Light up the holidays by building your own circuit-powered Christmas tree! Combine creativity with engineering and learn how circuits power festive decorations.

Christmas Energy Exploration

- **Found at**: Edgalaxy - Link
- **NGSS**:
  - HS-PS3-4: Evaluate the claims, evidence, and reasoning behind energy transfer processes.
- **Materials**:
  - Energy measurement devices
  - Experiment setup to demonstrate energy transformation
- **Time**: 30-60 minutes
- **Description**: Dive deep into energy transformations and renewable energy concepts. This activity connects holiday cheer with serious science to inspire curiosity about the future of energy.

Eco-Friendly Gingerbread House Competition

- **Found at**: Suburban Science - Link
- **NGSS**:
  - HS-ESS3-1: Construct an explanation of how human activities impact Earth systems.
- **Materials**:
  - Gingerbread house kits
  - Mini solar panels, wind turbines, and other renewable energy items
- **Time**: 60-90 minutes

- **Description**: Challenge students to design eco-friendly gingerbread houses with renewable energy solutions like solar panels and rooftop gardens. A sweet way to integrate environmental science with engineering!