Halloween-Themed Energy Activities

Explore energy through these spooky, fun activities!

October is National Energy Awareness Month

Each year, the U.S. Department of Energy designates October as Energy Awareness Month. Throughout this time, schools often engage in activities focused on energy efficiency and conservation. Practicing smart energy use benefits both the environment and household budgets. Learn more about Energy Awareness Month:

- https://www.need.org/energyawarenessmonth/
- https://www.need.org/143-2/

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Pumpkin Battery

Focus: *Chemical Energy*
Level: *Elementary-Middle School (Ages 3-8)*

Turn a pumpkin into a battery! Teach kids about chemical energy by using a pumpkin to power a small light or an LED. This activity from NEED is a fun way to show how energy can come from unexpected places, just like in our daily lives.

https://www.need.org/wp-content/uploads/2020/10/Pumpkin-Power.pdf

Materials Needed

- **Pumpkin** (small- to medium-sized)
- **Copper wire** (about 6 inches)
- **Galvanized nails** (zinc-coated nails)
- **Alligator clip wires** (to connect the nails and copper wire)
- **Small LED light** (or a low-voltage digital clock or light bulb)
- **Knife** (to make small slits for the wires)
- **Multimeter** (optional, to measure voltage)
- **Gloves** (optional for safety)

NGSS (Next Generation Science Standards) Alignment:

1. ***PS3.A: Definitions of Energy***
    - **Grade 4**: Energy can be transferred in various ways and between objects.
2. ***PS3.B: Conservation of Energy and Energy Transfer***
    - **Grade 4**: Energy is present whenever there are moving objects, sound, light, or heat.
    - **Middle School**: Energy can be transferred from place to place by electric currents, which can then be used to power devices like lights.
3. ***PS3.D: Energy in Chemical Processes and Everyday Life***
    - **Elementary and Middle School**: The chemical energy stored in substances can be transformed into electricity, demonstrating energy conversion processes.
4. ***ETS1.A: Defining and Delimiting Engineering Problems***
    - **Grades 3-5**: Possible solutions to a simple problem like generating energy from a pumpkin can be tested and improved.

Harry Spotter Play

Focus: *Energy transformation/wind*
Grade Level: *Elementary-Middle School (Ages 8-14)*

Incorporate a wizard-themed play to explain the mysteries of energy transformation. You can use this storyline to introduce different forms of energy, making learning magical and memorable.

https://www.need.org/wp-content/uploads/2020/02/Energy-On-Stage.pdf

Materials Needed for the Play:

- **Costumes** (wizard robes, hats, etc., to make the play more engaging)
- **Props** (magic wands, LED lights, small fans to represent wind energy, handheld mirrors for light reflection)
- **Script** (based on the "Energy On Stage" document, which provides guidance on characters, lines, and scenes)
- **Posters or Visuals** (to explain the types of energy: sound, light, heat, and mechanical energy)
- **Sound Effects** (optional: pre-recorded sound effects or simple instruments like a tambourine or drum to create the feeling of magic and energy transformation)

NGSS (Next Generation Science Standards) Alignment:

1. ***PS3.A: Definitions of Energy***
    - **Grade 4**: Energy can be transferred in various ways and between objects.
2. ***PS3.B: Conservation of Energy and Energy Transfer***
    - **Grade 4**: Energy is present whenever there is light, sound, motion, or heat.
    - **Middle School**: Energy can be transferred by sound, light, heat, and electric currents.
3. ***PS3.C: Relationship Between Energy and Forces***
    - **Grade 3-5**: When objects collide, energy can be transferred from one to the other.
4. ***ETS1.A: Defining and Delimiting Engineering Problems***
    - **Grades 3-5**: Energy-related problems can be solved by creative and scientific approaches.
5. ***PS3.D: Energy in Chemical Processes and Everyday Life***
    - **Elementary and Middle School**: Understanding energy in everyday life, including how wizards might "cast spells" that mimic energy transformations like lightning (light energy), levitation (mechanical energy), etc.

Pumpkin Explosion

Focus: *Potential Energy*
Level: *Elementary-Middle School (Ages 6-12)*

Demonstrate how energy is stored and released by using the famous pumpkin explosion experiment! Show how potential energy in everyday objects, like pumpkins, can transform rapidly into kinetic energy.

Puking Pumpkin by Stacy Harris: https://youtu.be/rNBgroAENZ4

Materials:

- **Pumpkin** (carved with an open mouth)
- **Hydrogen peroxide** (3% or stronger for a more dramatic effect)
- **Dry yeast** (activator for the reaction)
- **Dish soap** (to create foam)
- **Warm water** (to activate the yeast)
- **Tray or large pan** (to catch the foam)
- **Spoon and measuring cups** (for adding ingredients)
- **Food coloring** (optional, to make the foam colorful)

Directions (Summary):

- Carve a pumpkin with a large open mouth for the foam to escape.
- Place the pumpkin on a tray or pan to contain the mess.
- Add a generous squirt of dish soap and some food coloring inside the pumpkin.
- In a separate cup, dissolve a packet of dry yeast in warm water.
- Pour hydrogen peroxide into the pumpkin.
- Quickly add the yeast mixture to the pumpkin and step back. The reaction will cause foam to gush from the pumpkin's mouth, creating a "vomiting" effect.

Vomiting pumpkin Halloween experiment from Fizzics Education:
https://youtu.be/yhEVbNU3VQo?si=X1Cxy4lypo9eJGXS

Materials Needed:

- **Pumpkin** (carved with a large, open mouth for the "vomiting" effect)
- **Baking soda** (the base for the chemical reaction)
- **Vinegar** (the acid that reacts with baking soda)
- **Dish soap** (to help create the frothy, bubbly "vomit")
- **Food coloring** (optional, to make the foam more visually striking)
- **Tray or large pan** (to contain the mess)
- **Measuring cup or spoons** (to add the right amounts of ingredients)

Directions (Summary):

- Carve a pumpkin, creating a large, open mouth.
- Place the pumpkin on a tray to catch the foam.
- Add a few tablespoons of baking soda inside the pumpkin.
- Add a squirt of dish soap and food coloring for extra effect.
- Pour vinegar into the pumpkin, and watch the chemical reaction create frothy foam that spills out of the pumpkin's mouth, simulating vomiting.

While the **Vomiting Pumpkin Halloween Experiment** primarily focuses on chemical reactions, it can also connect to **energy-related NGSS standards** through the transformation of energy during the reaction.

NGSS (Next Generation Science Standards) Related to Energy:

1. ***PS3.A: Definitions of Energy***
    - **Grades 3-5**: Energy is present whenever there is motion, sound, light, or heat. In the experiment, the reaction between baking soda and vinegar releases energy in the form of **motion** (the bubbling foam) and **sound** (the fizzing sound).
2. ***PS3.B: Conservation of Energy and Energy Transfer***
    - **Grades 4-5**: Energy can be transferred from place to place by sound, light, heat, and electric currents. In this experiment, **chemical potential energy** stored in the baking soda and vinegar is converted into **mechanical energy** (bubbling foam) and **sound energy** during the reaction.
3. ***PS3.D: Energy in Chemical Processes and Everyday Life***
    - **Elementary and Middle School**: The energy released during chemical reactions (like in the pumpkin experiment) is an example of **energy transformation**. The reaction converts chemical energy into **kinetic energy** (movement of bubbles) and **thermal energy** (slight warming from the exothermic reaction).

Static Electricity Ghosts

Focus: *Static Energy*
Level: *Preschool-Elementary School (Ages 4-10)*

Create floating ghosts using static electricity! Rubbing a balloon can generate enough static energy to make lightweight objects float. This is a great interactive way to teach kids about static energy.

Static electricity/static energy Halloween activity from Play & Learn With Kids:
https://youtu.be/pQ8tAaQeoxM?si=prpRxT3vSW3wcdnd

Materials Needed:

1. **Balloon** (preferably orange or black for a Halloween theme)
2. **Tissue paper** (cut into ghost shapes or other Halloween figures)
3. **Wool fabric or sweater** (to create static charge)
4. **Marker** (to draw ghost faces on tissue paper)
5. **Flat surface** (like a table to do the experiment)

Directions (Summary):

1. Cut tissue paper into ghost shapes and draw faces on them.
2. Inflate the balloon and tie it off.
3. Rub the balloon with a wool fabric or sweater to build up static electricity.
4. Hold the balloon close to the tissue paper ghosts without touching them. The static electricity will cause the ghosts to "dance" or stick to the balloon.

NGSS (Next Generation Science Standards) Related to Energy:

1. ***PS2.B: Types of Interactions***
   - **Grades K-2**: Objects can move due to contact or non-contact forces, such as static electricity. In this activity, static charge causes the tissue paper ghosts to move without direct contact.
2. ***PS3.C: Relationship Between Energy and Forces***
   - **Grades K-2**: The rubbing of the balloon creates static electricity, demonstrating how energy is transferred through forces and interaction between objects.
3. ***PS2.A: Forces and Motion***
   - **Grades K-5**: The motion of the tissue paper is caused by the electrostatic force from the charged balloon.

Rolling Objects

Focus: *Potential and Kinetic Energy*
Level: *Elementary School (Ages 6-12)*

Explore potential and kinetic energy by rolling spooky objects, like ghost-shaped cars or pumpkins, down a slope. This hands-on experiment visually demonstrates energy transformations.

Potential Energy and Kinetic Energy In Halloween Way from @Bee a maker:
https://youtube.com/shorts/XuhH_oicJao?si=gFIajemzEhzKJsRC

Materials Needed:

- **Spooky objects** (like ghost-shaped cars, small pumpkins, or other Halloween-themed items)
- **Ramp or incline** (can be made from a piece of cardboard, wood, or a sturdy poster board)
- **Tape** (to secure the ramp)
- **Marker** (to mark starting points and measure heights)
- **Measuring tape** (optional, to measure distance traveled)

Directions (Summary):

- Set up the ramp at an incline using cardboard or a sturdy board.
- Place spooky objects (ghost cars or small pumpkins) at the top of the ramp.
- Discuss potential energy (stored energy based on height) as you place the object at the top.
- Release the objects and observe their movement down the ramp to illustrate kinetic energy (energy of motion).
- Optional: Measure how far the objects roll after leaving the ramp to discuss energy transformation.

NGSS (Next Generation Science Standards) Related to Energy:

1. ***PS3.A: Definitions of Energy***
    - **Grades 3-5**: Energy can be stored (potential energy) and can cause motion (kinetic energy). This activity demonstrates the transformation from potential energy at the top of the ramp to kinetic energy as the objects roll down.
2. ***PS2.A: Forces and Motion***
    - **Grades K-5**: The interaction of forces (gravity pulling objects down the ramp) results in motion, illustrating the principles of potential and kinetic energy.
3. ***PS3.B: Conservation of Energy and Energy Transfer***
    - **Grades 4-5**: The total energy in the system (potential energy at the top and kinetic energy at the bottom) is conserved, reinforcing the concept of energy transformation.

ENERGY EDUCATION EVENT from the Kansas Corporation Commission and K-State Engineering Extension. Made possible by a grant from the U.S. Department of Energy.

Energyween – Energy-Saving Tips

Focus: *Energy Efficiency*
Level: *Elementary to Middle School (Ages 6-14)*

Celebrate 'Energyween' with tips from the U.S. Department of Energy. Encourage families to save energy by using energy-efficient LED lights in their decorations, and share simple tips on reducing energy consumption.

https://www.energy.gov/energyween

Materials Needed:

- **Printed handouts or posters** with energy-saving tips (can be created using information from Energy.gov)
- **Examples of LED lights** (for display or demonstration)
- **Markers and paper** (for students to write down their own energy-saving tips)
- **Display board** (optional, to showcase the tips)

NGSS (Next Generation Science Standards) Related to Energy:

1. ***PS3.A: Definitions of Energy***
    - **Grades 3-5**: Understanding how energy can be used efficiently, such as through LED lights, relates to recognizing different forms and uses of energy.
2. ***ETS1.A: Defining and Delimiting Engineering Problems***
    - **Grades 3-5**: Discussing energy consumption and efficiency encourages problem-solving regarding how families can reduce energy use during Halloween celebrations.
3. ***PS3.B: Conservation of Energy and Energy Transfer***
    - **Grades 4-5**: Promoting energy-saving practices, such as using LED lights, illustrates how energy conservation can be implemented in daily life.
4. ***ESS3.C: Human Impacts on Earth Systems***
    - **Middle School**: Understanding how energy use impacts the environment encourages students to think critically about their consumption habits.

Tips for Energyween:

- Use **LED lights** instead of traditional bulbs for decorations.
- Turn off lights when they are not needed.
- Use natural decorations like pumpkins or corn stalks instead of plastic.
- Plan a Halloween event during daylight hours to reduce the need for lighting.
- Encourage families to create energy-saving challenges and share results.

Floating Ghost

Focus: *Static Energy*
Level: *Elementary-Middle School (Ages 8-14)*

Use static energy to make ghosts 'float' in the air. Inspired by viral TikTok and YouTube experiments, this visual trick is a fun and easy way to demonstrate static electricity at work.

Flying Ghosts - Wow the Kids with this Flying Tea Bags Experiment for Halloween from STEAM Powered Family: https://youtu.be/AluDHKW-dLY?si=_C0Ht2iPl9sIOttL

Materials Needed:

- **Empty tea bags** (the kind that are made of paper, not plastic)
- **Scissors** (to cut the tea bags)
- **Candle or lighter** (for igniting the tea bags)
- **Plate or heat-resistant surface** (to catch the ashes)
- **Matches or lighter** (to safely light the tea bags)
- **Tweezers** (optional, for handling hot tea bags)

Directions (Summary):

1. Carefully open the empty tea bags and remove any staples or tags.
2. Trim the tea bags to make them more ghost-like, if desired.
3. Stand the tea bag upright on a heat-resistant surface or plate.
4. Light the top of the tea bag with a candle or lighter and step back as it burns down.
5. Watch as the hot air from the burning tea bag causes it to rise, demonstrating the principle of convection.

NGSS (Next Generation Science Standards) Related to Energy:

1. ***PS2.B: Types of Interactions***
   - **Grades 3-5**: The experiment demonstrates the interaction of thermal energy and buoyancy, illustrating how heated air rises, causing the tea bag to fly.
2. ***PS3.A: Definitions of Energy***
   - **Grades 3-5**: This activity shows the transformation of chemical energy (from the burning tea bag) into thermal energy, leading to motion (the rising ghost).
3. ***PS3.B: Conservation of Energy and Energy Transfer***
   - **Grades 4-5**: The transformation of energy in this experiment can be discussed, highlighting how energy is conserved and transferred in the process.
4. **PS1.A: Structure and Properties of Matter**
   - **Grades 3-5**: The experiment also touches on how heating affects the properties of matter, causing the tea bag to change from solid to gas as it burns.

Heat-Sensitive Color-Changing Slime

Focus: *Static Energy*
Level: *Elementary-Middle School (Ages 6-14)*

Get spooky with heat-sensitive slime! Show how heat energy affects the slime's color, making this a sensory-rich experiment that demonstrates heat transfer. Perfect for a hands-on, Halloween-themed lesson.

Heat Sensitive Color Changing Slime by Left Brain Craft Brain:
https://youtu.be/AmFqON1ZezI?si=AknMMmKTtjXFNTiN

Materials Needed:

- **Clear school glue** (PVA glue)
- **Liquid starch** (or another slime activator)
- **Color changing pigment powder** (thermochromic pigment, which changes color with temperature)
- **Mixing bowl** (for combining ingredients)
- **Spoon or spatula** (for mixing)
- **Container** (for storing the slime)
- **Optional**: Warm water (to heat the slime and activate the color change)

Directions (Summary):

- In a mixing bowl, combine equal parts clear glue and liquid starch.
- Stir the mixture until it begins to thicken and form slime.
- Add the color-changing pigment powder and mix thoroughly until the color is evenly distributed.
- Knead the slime with your hands until it reaches the desired consistency.
- Test the slime by warming it with your hands or placing it in warm water to see the color change.

NGSS (Next Generation Science Standards) Related to Energy:

1. ***PS1.A: Structure and Properties of Matter***
    - **Grades 3-5**: This activity explores how the properties of matter change when temperature changes, showcasing the relationship between thermal energy and molecular structure.
2. ***PS3.A: Definitions of Energy***
    - **Grades 3-5**: The slime demonstrates energy transformation as heat is applied to change the color of the slime, illustrating how energy affects the state and properties of materials.
3. ***PS2.A: Forces and Motion***
    - **Grades K-5**: The slime's movement and stretching can introduce concepts of forces acting on matter, showing how thermal energy affects the behavior of the slime.