Center for Energy and Environment

Dear Educator,

Thank you for scheduling a visit from TOLBY! We are excited to visit your school. Included with this letter is information that will help make your TOLBY experience a success. Please look through the packet carefully and let us know if you have any questions.

The packet contains the following documents:

1. Preparing for your TOLBY Visit
2. TOLBY Meets Standards
3. TOLBY Pre/Post Assessment
4. TOLBY Pre-Activities
5. TOLBY Post-Activities
6. Curriculum Resources and Extensions

Please contact us know if you have any questions:

Emma Appleman, communications@mncee.org
612-335-5852

We look forward to the visit!

Emma Shriver
Communications Specialist

TOLBY
School Energy Mascot

Center for Energy and Environment

Preparing for Your TOLBY Visit

These five steps will help make every visit a success:

1. Talk to the office: Please tell someone in the office that we will be arriving. It helps when the office knows that we will be arriving and looking for your room.

2. Find a changing room: "TOLBY" will need a room to change in and to wait in for about 15 minutes while Emma gives the presentation. Appropriate changing and waiting rooms for TOLBY are: unused classrooms, storage rooms, or meeting rooms. A public restroom is not a suitable place for TOLBY to change and wait.

3. Talk to your students: Please prepare your students for the visit by telling them there will be a TOLBY mascot visiting their classroom and they must be respectful to TOLBY. We appreciate that students refrain from touching TOLBY unless they are given permission to do so.

4. Get your classroom ready: If possible, create a walkway and open space in the front of the classroom for TOLBY to walk and stand. Please have a small table set up in the front of the classroom for the game wheel. A projector and projector screen are needed for the presentation. Please coordinate with Emma if you are able to provide these materials or if Emma should bring her own projector and projector screen.

5. Do the pre-activities and pre-assessment: Prepare your students with helpful information and experiences pertaining to the TOLBY presentation so that they may get the most out of the experience. This is also a helpful time to build a bridge between your curriculum and the content the TOLBY presentation will address.

Now, you are ready to go!

We will arrive 15 minutes prior to the presentation to set up and help TOLBY change into the mascot outfit.

Please let Emma Appleman know if you have any questions:

Thank you!

Emma Appleman
Communications Specialist
Center for Energy and Environment

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TOLBY Meets Standards

The TOLBY presentation and materials are designed to fit into individual class periods and to address the needs of educators who work with grades k-5. Many educators use the TOLBY materials and presentation to emphasize environmentally responsible behavior related to classroom or home energy use (i.e. “turn off the lights behind you” – which is what the acronym TOLBY stands for – and recycling). This can often be easily connected to lessons on potential and kinetic energy (one of which you will find in our “TOLBY Pre-Activities” section).

Minnesota Science Standards

The following standards will be covered through the pre and post activities and a TOLBY presentation.

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Grade	Strand	Substrand	Standard "Understand that ..."	Code	Benchmark
GRADE 2					
2	1. The Nature of Science and Engineering	1. The Practice of Science	2. Scientific inquiry is a set of interrelated processes incorporating multiple approaches that are used to pose questions about the natural world and investigate phenomena.	2.1.1.2.1	Raise questions about the natural world and seek answers by making careful observations, noting what happens when you interact with an object, and sharing the answers with others.
2	2. Physical Science	1. Matter	1. Objects can be described in terms of the materials they are made of and their physical properties.	2.2.1.1.1	Describe objects in terms of color, size, shape, weight, texture, flexibility, strength and the types of materials in the object.
GRADE 3					
3	1. The Nature of Science and Engineering	1. The Practice of Science	1. Scientists work as individuals and in groups; emphasizing evidence, open communication and skepticism.	3.1.1.1.1	Provide evidence to support claims, other than saying "Everyone knows that," or "I just know," and question such reasons when given by others.
3	1. The Nature of Science and Engineering	1. The Practice of Science	2. Scientific inquiry is a set of interrelated processes incorporating multiple approaches that are used to pose questions about the natural world and investigate phenomena.	3.1.1.2.1	Generate questions that can be answered when scientific knowledge is combined with knowledge gained from one's own observations or investigations. *For example:* Investigate the sounds produced by striking various objects.

3	1. The Nature of Science and Engineering	3. Interactions Among Science, Engineering, Technology and Society	4. Tools and mathematics help scientists and engineers see more, measure more accurately, and do things that they could not otherwise accomplish.	3.1.3.4.1	Use tools, including rulers, thermometers, magnifiers and simple balance, to improve observations and keep a record of the observations made.
3	2. Physical Science	3. Energy	1. Energy appears in different forms, including sound and light.	3.2.3.1.1	Explain the relationship between the pitch of a sound, the rate of vibration of the source, and factors that affect pitch. *For example:* Changing the length of a string that is plucked changes the pitch.
GRADE 4					
4	1. The Nature of Science and Engineering	2. The Practice of Engineering	1. Engineers design, create, and develop structures, processes, and systems that are intended to improve society and may make humans more productive.	4.1.2.1.1	Describe the positive and negative impacts that the designed world has on the natural world as more and more engineered products and services are created and used.
4	1. The Nature of Science and Engineering	3. Interactions Among Science, Engineering, Technology and Society	3. The needs of any society influence the technologies that are developed and how they are used.	4.1.3.3.1	Describe a situation in which one invention led to other inventions.
4	2. Physical Science	1. Matter	1. Objects have observable properties that can be measured.	4.2.1.1.1	Measure temperature, volume, weight and length using appropriate tools

					and units.
4	2. Physical Science	3. Energy	1. Energy appears in different forms, including heat and electromagnetism.	4.2.3.1.1	Describe the transfer of heat energy when a warm and a cool object are touching or placed near each other.
4	2. Physical Science	3. Energy	2. Energy can be transformed within a system or transferred to other systems or the environment.	4.2.3.2.1	Identify several ways to generate heat energy. *For example:* Burning a substance, rubbing hands together, or electricity flowing through wires.
4	3. Earth Science	1. Earth Structure and Processes	3. Rocks are an Earth material that may vary in composition.	4.3.1.3.2	Describe and classify minerals based on their physical properties. *For example:* Streak, luster, hardness, reaction to vinegar.
GRADE 5					
5	1. The Nature of Science and Engineering	1. The Practice of Science	2. Scientific inquiry requires identification of assumptions, use of critical and logical thinking, and consideration of alternative explanations.	5.1.1.2.1	Generate a scientific question and plan an appropriate scientific investigation, such as systematic observations, field studies, open-ended exploration or controlled experiments to answer the question.
5	1. The Nature of Science and Engineering	3. Interactions Among Science, Engineering, Technology	4. Tools and mathematics help scientists and engineers see more, measure more accurately,	5.1.3.4.1	Use appropriate tools and techniques in gathering, analyzing and interpreting data. *For example:*

		and Society	and do things that they could not otherwise accomplish.		Spring scale, metric measurements, tables, mean/median/range, spreadsheets, and appropriate graphs,
5	3. Earth Science	4. Human Interactions with Earth Systems	1. In order to maintain and improve their existence humans interact with and influence Earth systems.	5.3.4.1.1	Identify renewable and non-renewable energy and material resources that are found in Minnesota and describe how they are used. *For example:* Water, iron ore, granite, sand and gravel, wind, and forests.
5	3. Earth Science	4. Human Interactions with Earth Systems	1. In order to maintain and improve their existence humans interact with and influence Earth systems.	5.3.4.1.3	Compare the impact of individual decisions on natural systems. *For example:* Choosing paper or plastic bags impacts landfills as well as ocean life cycles.
5	4. Life Science	4. Human Interactions with Living Systems	1. Humans change environments in ways that can be either beneficial or harmful to themselves and other organisms.	5.4.4.1.1	Give examples of beneficial and harmful human interaction with natural systems. *For example:* Recreation, pollution, wildlife management.

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TOLBY Visit FAQs

Where does a TOLBY presentation take place?
TOLBY presentations take place at your school or event location.

Is there a fee to host a presentation?
There is no cost to host a presentation. This program is provided and administered by the Center for Energy and Environment (CEE), an energy non-profit in Minneapolis. Part of CEE's mission is to educate the community on energy and energy efficiency.

How long is the presentation?
A TOLBY presentation lasts 30 minutes. If you would like multiple presentations in a row (ex: multiple classrooms or grades), we need 10 minutes between each presentation to ensure a smooth transition.

What are the space requirements?
Presentations are usually in classrooms, multi-purpose rooms or a similar type of space. Space requirement depends on the size of the audience. There needs to be enough room for TOLBY to walk to the front of the classroom, as well as room for TOLBY and Emma to stand in the front. For three or more classrooms, we often like to hold the presentations in a gym, lunchroom or media center.

An additional changing room, close to the presentation room, is requested for TOLBY to change and wait in. This is usually a utility room, storage room, or empty classroom, and cannot be a public restroom.

How much set up time is needed before and after the program?
Expect the presenters to arrive 15 minutes before the scheduled presentation time, and leave 10 minutes after they are done.

Do I need to provide our own technology or equipment?
It is easiest if the presenter can use the classrooms screen and projector but we can also come with our own projector and computer. All that the school/ location needs to provide is a table to set the projector on and a screen.

Do teachers/ adults need to be present during the program?
Yes! We are great with kids, but we require a teacher or other school staff to supervise the students.

What age and size of groups do you present to?
The TOLBY program is best suited for 1st through 5th grade. We can present to a minimum of 10 with no maximum (providing there is a large enough space to accommodate everyone). Most presentations are to individual classrooms, or whole grade levels with 3 to 5 classrooms together.

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How far do you travel?

We will always travel to schools and locations within the Twin Cities Metro area. We are willing to travel farther, but it is dependent on scheduling availability.

How does TOLBY support my curriculum or MN state teaching standards?

The TOLBY presentation and materials are designed to fit into individual class periods and to address the needs of educators who work with grades k-5 The attached TOLBY Meets Standards document gives an overview of curriculum connections covered.

How do I schedule a visit?

E-mail or call Emma Appleman, the program coordinator, to schedule a visit at Communications@mncee.org or 612-335-5852.

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TOLBY Pre/Post-Assessment

Recommended for Grades 3-5

Your Name _____
Class Period _____

1) “Fossil Fuels” are actually the remains of ancient _____ (circle one)
(a) Rocks and sand (b) Volcanoes (c) Plants and animals (d) Rivers

2) Which of the following is an example of renewable energy? (circle one)
(a) Gasoline (b) The wind (c) Coal (d) Greenhouse gases

3) Energy comes in different forms, in the table below, list 4 forms of energy:

4) Electricity, one form of energy, comes from many sources. In the table below list 4 sources of energy:

5) Energy is wasted in our homes and school in many ways. In the table below, list 5 ways we can use less energy:

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TOLBY Pre/Post-Assessment
Answer-Key

Answers highlighted and in Bold

1) "Fossil Fuels" are actually the remains of ancient _____ (circle one)
(a) Rocks and sand (b) Volcanoes **(c) Plants and animals** (d) Rivers

2) Which of the following is an example of renewable energy? (circle one)
(a) Gasoline **(b) The wind** (c) Coal (d) Greenhouse gases

3) Energy comes in different forms. In the table below, list 4 forms of energy:

Acceptable answers include: movement/motion/mechanical(the sum of potential and kinetic), heat, light ,sound, chemical, magnetic, kinetic, potential, electric

4) Energy comes from many sources. In the table below list 4 sources of energy:

Acceptable answers include: wind, sun/solar, coal oil, gas, natural gas, nuclear, hydroelectric/dam/river

5) Energy is used in our homes and school in many ways. In the table below, list 4 ways we use energy:

Acceptable answers include: Use entertainment devices less often (TV, video games, computer, etc), change light bulbs, ride a bicycle, use less energy for heating or cooling, keep the house door closed when it is winter in Minnesota.

TOLBY Pre-Activities

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Pre-Activities prepare your students with vocabulary, understanding and ideas that will help them get the most out of their time with TOLBY. This is also the best time to link the presentation to your curriculum objectives. Make your experience learning about energy rich with connections by trying at least one pre-activity!

The following activities were designed for grades 3-8, and are ideal for the week preceding the visit of TOLBY to your classroom. These are adapted from the Will Steger Foundations *Experience Energy* curriculum, available free online here: http://willstegerfoundation.org/curricula-resources.

Energy defined in a day (20 min.), Grades 3-8

Raise awareness of energy used each day and create a visual, working definition of energy.

Materials:

- Notebook paper
- Writing utensil
- Interactive whiteboard or large piece of paper (for mind map)

Instructions:

1. Have students make a list of everything that they have done today beginning when they woke up (take 5 minutes or so). Yes, everything. Encourage them to be specific and to include as many steps as possible.
2. When finished, ask them to "circle everything on the list that used energy". (Some will likely ask, "doesn't all of this use energy?" You might choose to challenge these students by trying to reply only with the original request to "circle everything on the list that used energy to complete".)
3. Next, have students share their lists with one another and then share a few with the large group:
    - What is something they circled?
    - In what ways does this activity use energy?
    - Do all thing use energy? What's something you did today that didn't use energy?
    - Ask the class "what is energy?"
4. Together - on your interactive whiteboard or a large piece of paper - make a mind map (See Figure 1 & 2) that defines energy in their own words. Use words, colors and images. This mind map will be referenced again and it is most useful if it can be stored on paper or digitally on an interactive whiteboard. If students run out of ideas, you can ask:
    - "how can we tell if something is using energy?"
    - "what sources of energy can you think of?"

5. Prompt students to ponder one of the fundamental laws of energy:
    - Say, and add to the board, **"Energy is never created or destroyed"**

- And ask, “So, if that’s true, what happens to it? Where does it go? **Answer**: energy is just a quantity that passes from system to system. When we think it is “gone” or when, for example our gas tank is empty, it’s not because that energy has completely disappeared. Rather, it transferred into heat and motion to move your vehicle. The energy still exists: it has just transferred to a different system. (Physicists know this as the Law of Conservation of Energy, the First Law of Thermodynamics.)

In the absence of a working definition, you can share this definition, from the National Energy Education Development Project (NEED): “Energy produces light … heat … motion … sound … growth and powers technology”.

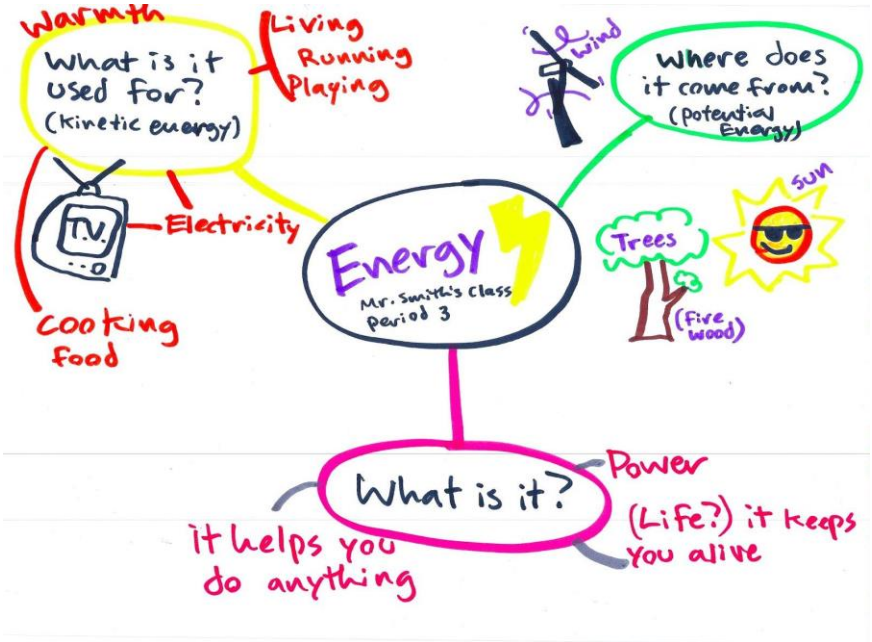

Figure 1: Example of a simple mind map with energy at the center.

Kinetic vs. Potential Energy (20 min.), Grades 3-5

Draw items from a bag and decide whether they show either kinetic energy, potential energy or both.

Materials:

- Paper grocery bag (“the mystery bag”)
- Kinetic & Potential energy props:
  - Tennis ball
  - Matches (optional)
  - Apple

- Charcoal briquette (i.e. for grilling)
- Battery-powered flashlight
- Winter hat

Preparations:

1. Place all of the kinetic & potential energy props in the mystery bag. During the exercise they will selected form the bag at random by students.

Instructions:

1. In front of the class, define kinetic and potential energy. These can be simply defined this way:
    a. **Kinetic energy**: energy in use
    b. **Potential energy**: energy at rest
2. Explain to your students that we will be exploring kinetic and potential energy through a few activities. First, we will get active, then we will ask big questions and discuss things that we find in the mystery bag
3. Have all students clap their hands, as loud and as fast as they can, for 10 seconds. Then have them suddenly freeze in place – as still as they can be, using as little energy as possible. Ask:
    a. Did any stop using energy completely? (They may think so.)
    b. Did anyone keep using energy even when they stopped clapping? How did they do it? (heartbeat, breathing, thinking, observing … all of these things take and use energy!)
    c. When we were clapping, were we examples of kinetic energy or potential energy (ans: kinetic in that we were moving, but we also did have some potential energy still in us, right? Here you could decide to do the clapping exercise again to prove that we also have potential energy stored in our fat and muscles. We get it from food, nutrients and water.)
4. Next, have all students sit down or form a circle while one student draws an item from the mystery bag. Have that student hold it up so everyone can see it. Ask:
    a. Is this item an example of kinetic or potential energy? How can you tell?
    b. When might this item be an example of kinetic energy? When might it be an example of potential energy?
5. To help you and your students interpret these items, here are some examples that people may come up with for each item:
    a. Tennis Ball: Kinetic when it is moving and bouncing. Potential when it is stopped. More potential energy when it is higher in the air.
    b. Matches: Potential energy is stored in each stick of wood. They are examples of kinetic energy when they are lit.
    c. Apple: Food contains potential energy that our bodies use to keep working – we turn them into kinetic energy. Also, apples take kinetic

energy from the sun and store it in their matter – that's how they grow bigger!

d. **Charcoal briquette:** This is an example of potential energy. These briquettes are made from charred wood, which condenses the potential energy from wood into a more compact morsel. When they burn, they give off incredible heat and that's when they are showing kinetic energy.
e. **Battery-powered flashlight:** When the light is on, using battery power, it is showing kinetic. When it is off, it is full of potential energy. What do I need to do when I'm all out of potential energy and my light goes out? Replace the batteries with new ones to get more potential energy!

f. **Winter hat:** When a hat keeps us warm, it is catching our kinetic energy. When our bodies burn potential energy, we give off heat. Hats and clothes and blankets capture that heat and hold it in. When it is cold outside, our bodies work extra-hard to keep us at a warm, cozy 98.6 degree Fahrenheit. Hats and mittens keep the warmth close to our skin so our bodies don't have to work so hard! When you shiver, it's because your body is trying to make extra heat and warm you up.

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TOLBY Post-Activities

For the same reason that pre-activities are valuable, post-activities allow students to apply their new knowledge, which helps solidify it in their minds better than the presentation alone. Try one of the following activities – or one of your own creation – to achieve this end and transition to your next unit or learning objectives.

Energy Scavenger Hunt (30 min.), Grades 3-5

Investigate the presence of energy outdoors, build sensory awareness of biomass, wind, solar and other local energy sources and carriers.

Materials:

- Clip board (optional)
- Writing utensils
- Energy Scavenger Hunt worksheet (1 sheet for every 2-3 students)

Instructions:

1. Take students outside to an open area and ask them to create a safe space around themselves by spreading their arms outward. Ask students to use as much energy as they can – or to make as much of their energy "kinetic" as possible - for the next 30 seconds.
    a. NOTE: Of course this activity should be done without students hurting themselves or each other and while remaining within appropriate area boundaries. You may suggest that they spread out first and choose to run in place, do "jumping jacks", talk, sing, even yell.
2. When 30 seconds have passed, ask them to STOP using any energy for the next 15 seconds. Ask them:
    a. "Did you do it? Can you stop using energy? Why or why not?" (answer: the human body continues to use energy even when we stand still. No, we never stop using energy until we die.)
    b. "Where do we get our energy?" (answer: we get it from food)
    c. "Where is that energy stored - after we eat – as potential energy?" (answer: fat and muscle mainly compromise our bodily potential energy).
    d. "So, does that make us an example of potential energy, kinetic energy or both?" (answer: both as we have potential energy stored at all times and are using energy at all times, until we die).
3. To prepare for the scavenger hunt, hike around the school or to your outdoor classroom to note any local energy sources - trees/timber, plants, animals (which we use for energy in the source of food), the sun, wind, even the moon (the

moon controls high and low tide and capturing tidal energy is being explored in some coastal regions). Ask students to explain:
    a. "if this is an energy source, then what is its purpose?"
    b. "Who does it give energy to? Where does it get its energy from?"
4. Have students form groups of 2-3 for the Energy Scavenger Hunt. This is a fairly straightforward scavenger hunt. The groups will go out looking for the items, find the items and return as fast as they can. This scavenger hunt is made to work for many school yards but can freely be customized to fit your unique situation. Most of the items to be hunted for do not need to be picked-up or otherwise collected, students simply need to record what they find by writing it on the Scavenger Hunt Worksheet.
5. As they return, reflect on what everyone found:
    a. What did they notice?
    b. What was easiest to find?
    c. What was hardest to find?
6. Back in the classroom, record your outdoor energy observations on the board, and in their notebooks. You might choose to add what they found to the mind map you started earlier.
7. Ask students to reflect on:
    a. How would we use these types of energy?
    b. How do other living things use them?
    c. How do we capture the energy inside of these things we observed?

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Energy Scavenger Hunt Worksheet

Instructor Note: Assign clear physical boundaries and behavior expectations. Be sure to clearly explain that all students must return to you when you give a signal that the activity is finished (a whistle, a yell, a howl, whatever). Some of the scavenger hunt items may not apply to your location - you may add or subtract items from the list at your discretion.

Also note: "collecting" these items may not be possible. We recommend that students only "see" or "experience" the item hunted in order for it to count as "collected".

Find answers to the following tasks and hurry back as quick as you can!

1. Find something that is using energy to produce light. Record it here:

2. Spot a living animal or insect and determine what food source it gets its energy from. Record what the creature is, and where it gets its food, here:

3. Find 3 things with potential energy. Record them here:

4. Find something that uses the wind's energy. Record it here:

5. Find 3 things showing kinetic energy. Record them here:

BONUS: Find someone or something using energy in-efficiently. Record it here:

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Energy Scavenger Hunt: *Answer-Key*

Instructor Note: Many of these items are open to interpretation. Be prepared to get varying answers for every item. At the same time, they have to actually answer the task at hand.

1. Find something that is using energy to produce light. Record what it is here:

Answers may include: the Sun, headlights on a car, street lamps, backlight on a phone, etc.

2. Spot a living animal or insect and determine what food source it gets its energy from. Record what the creature is, and where it gets its food, here:

Answers may include: grasshopper (grass), bird (insects or seeds), squirrel (nuts), human (any human food item), dog (dog food), etc.

3. Find 3 things with potential energy. Record them here:

Answers may include: a tree, grass, humans, the school, a parked vehicle, garbage on the ground, woodchips, leaves, the sun, etc.

4. Find something that uses the wind's energy. Record it here:

Answers may include: birds flying, seeds falling from trees, leaves shaking, clouds moving, your hair blowing, etc.

5. Find 3 things showing kinetic energy. Record what they are here:

Answers may include: anything that is moving! Humans, the wind, insects, plants growing, trees, the sun, etc.

BONUS: Find someone or something using energy in-efficiently. Record it here:

Answers may include: someone improperly dressed, a car running but not moving, an incandescent light blub, etc.

Classroom Energy Audit

Consider putting student observation skills, math and energy knowledge to work by doing a classroom – or school-wide – energy audit! See the Classroom Energy Audit Worksheet below.

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To successfully complete the energy audit, your students will benefit from the use of energy-use meters. The Will Steger Foundation rents classroom energy monitoring kits that are kid and teacher friendly and free. Contact the Will Steger Foundation for more information on kit rentals:

education@willstegerfoundation.org
612-278-7147

Materials:

- "Kill-a-watt" meter(s)
- School Energy Audit worksheet
- Classroom board or large sheet of paper

Instructions:

1. Introduction: TOLBY visit refresher Ask students some reflection questions related to the TOLBY visit:
    a. What's the number one source of electricity in Minnesota? (coal.)
    b. What did TOLBY tell us coal burning can lead to?
    c. What is one way we can lessen the amount of coal burned? (use our electricity more efficiently)
    d. In order to use our electricity more efficiently we need to find out ho we are using it. Lets do an investigation of our classroom.
2. Next, students are to be split into groups of 2-4 individuals. Each group will receive (1) "School Energy Audit" worksheet and will need a writing utensil.
3. Have each group make predictions or guesses about where we use energy around school and write them in their notebooks. What things will use the most? What things will use the least?
4. Now, to do the audit groups need to choose a room to review. Perhaps your classroom is best, or maybe students are allowed to look into neighboring rooms as well. It is best if groups are encouraged to spread out from one another. This helps prevent copying answers.
5. When each group finishes, compile all findings in a table on the board. Perhaps it will look like this:

Room #	**Number of windows**	**Item Name**	Electricity used when **ON**	Electricity used when **OFF = "Vampire Energy"**
Ex. 101	Ex. 4	Ex. Radio	Ex. 15 watts	Ex. 0 watts

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Note: It is true that some electrical appliances use energy even when turned “off”. This is especially true of electronics that automatically go into a “stand-by” mode when turned off so they can be easily turned on again. An example of this is a TV that is remote-controlled. In order for the remote to turn “on” the TV it has to be sensing for the signal of the remote, which takes electricity. It’s off, but it’s essentially on too!

6. Processing the audit data and experience can be fun. Consider asking:
    a. What item, of everything tested, uses the most energy?
    b. How do our findings compare to our predictions?
    c. What was one thing that surprised you?
    d. What new thing did you learn about the room you audited that you didn’t know before?

Classroom Energy Audit Worksheet

What are the energy needs of your classroom or school? Choose one room (or more) and explore the usage of energy in that place.

Names: _____ Class Period: _____

_____

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_____ Room Audited: _____

LIGHTING

How many light bulbs or light tubes do you find?	**A**
How many hours are the lights ON each day? (you may need to estimate)	**B**
Find the type of light pictured below and enter the amount of energy it uses (watts) here	**C**
Find the total energy used by the lights using this equation: **A x B x C =**	**Total energy used for lighting (Watts/hour)** **A x B x C =**

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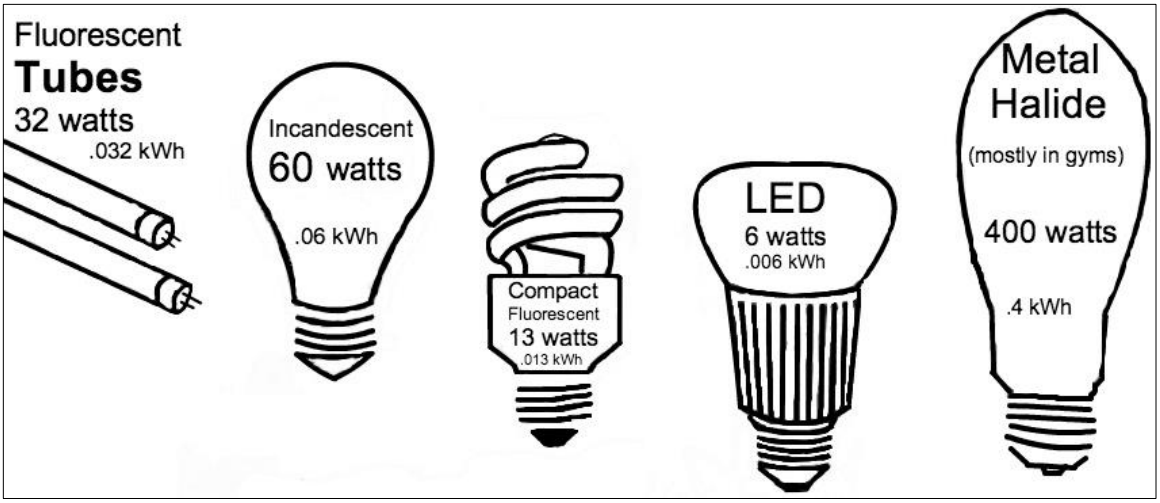
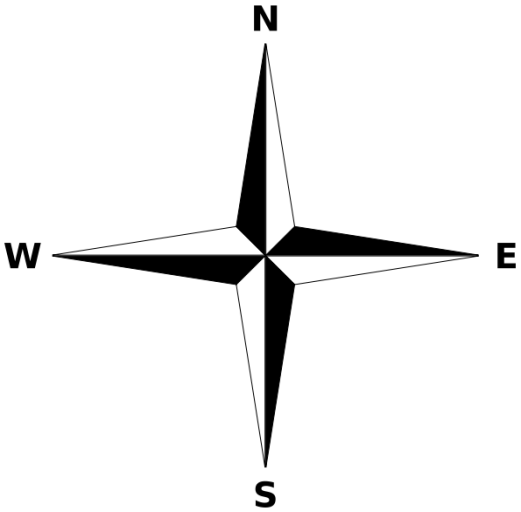
Which light is it?



WINDOWS

Number of windows	
How many layers of glass do they have? (1 or 2)	
Feel closely: Do you notice a draft near the edges of the window? (yes or no)	



What direction are the windows facing? (circle one in the picture at left)

Did you know?

The sun rises in the **east** and sets in the **west**. We get the most sunlight from the **south** and have the most shade on the **north** side of homes, buildings and trees.

APPLIANCES

Test 3 things that use electricity with the “kill-a-watt” meter

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Name of item	kWh used when turned **ON**	kWh used when turned **OFF (vampire energy)**

Did you know?

Vampire Energy happens when something uses energy *when it is turned OFF.*

Outdoor energy Audit

As an extension to the Energy Audit and Energy Scavenger Hunt activities, consider how the exterior and grounds of a building impact energy use.

To do this, take students outside to explore what can be learned about the electricity use of the building from the outside. Stop at a few different locations to observe windows, equipment, doors, lights etc. This may not fit within the audit worksheet, but provides an important perspective of building audits. Consider the following:

- Where is the sun hitting the building?
- Do we spend most of our school year in winter or summer weather? (Answer: winter.) With that in mind, do we want the building to let more sunlight in, and heat the building, or do we want it to be shady, and cooling the building? (In general, you want as much of the sun's heat as you can use in a Minnesota school). Also, since Minnesota buildings never get sun on the north side of the building, it can be valuable to grow evergreen trees to protect that side of the building from cold winter wind.
- Where do people enter the building? Are there multiple sets of doors to keep the cold air out? (i.e. an exterior door and then an interior door.)
- What ways do we use electricity outside of the school? Are there lights on in the middle of the day, when they are not necessary?

Public Service Announcement

Often, following a TOLBY visit, students have a heightened sense of awareness when making energy choices. This is the perfect time to have them share their new ideas

with classmates and the world through Public Service Announcements (PSAs). PSAs come in many forms – posters, videos, songs, skits and presentations.

Consider creating a video for **Youth Voices of Change**, the climate change youth video contest that is a partnership of the Will Steger Foundation and the Minnesota Pollution Control Agency. Learn more about how to join the contest here: http://classroom.willstegerfoundation.org/about/youth-voices