

# TOLBY<sup>®</sup> MEETS STATE 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.

Grade	Strand	Substrand	Standard "Understand that ..."	Code	Benchmark
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.
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.

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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. <i>For example:</i> 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. <i>For example:</i> Changing the length of a string that is plucked changes the pitch.
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.

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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. <i>For example:</i> 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. <i>For example:</i> Streak, luster, hardness, reaction to vinegar.
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.

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5	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.	5.1.3.4.1	Use appropriate tools and techniques in gathering, analyzing and interpreting data. <i>For example:</i> 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. <i>For example:</i> 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. <i>For example:</i> 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. <i>For example:</i> Recreation, pollution, wildlife management.

### FOSS Connections

If you use Foss kits in your classroom TOLBY is a nice addition to the 3<sup>rd</sup> grade Matter and Energy, 4<sup>th</sup> grade Magnetism and Electricity and 5<sup>th</sup> Grade Energy and Force units.

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