Conservation of Energy

6-5 The student will demonstrate an understanding of the law of conservation of energy and the properties of energy and work. (Physical Science)

6.5.6 Recognize that energy is the ability to do work (force exerted over a distance).
Taxonomy level: 1.1-B Remember Conceptual Knowledge

Previous/Future knowledge: In 3rd grade (3-5.3), students explained how the motion of an object is affected by the strength of a push or pull and the mass of the object. In 5th grade, students illustrated the affects of force on motion (5-5.1) and explained how a change of force or a change in mass affects the motion of an object (5-5.6). Students have not been introduced to the concept of work in previous grades. They will further develop the concept of work in 9th grade Physical Science (PS-6.3).

It is essential for students to know that *energy* is a property that enables something to do work.

- *Work* means to (1) apply a force to an object over a distance, and (2) the object moves in response to the force.
- If something has the ability to cause a change in motion, it is has energy.
- Energy can cause work to be done, so when we see work done, we see evidence of energy.

An evidence of energy is when work is being done. For example:

- When a toy car at rest is pushed, work is done on the car if it moves. This work (or movement) is evidence of energy.
- When a fan is connected to an electric circuit, it moves, so work was done on the fan. This work (or movement) is evidence of energy.
- When an object is lifted, it moves, so work is done on the object. This work (or movement) is evidence of energy.

A *spring scale* is used to measure force. Force (including weight) is measured in SI units called *newtons* (N).

It is not essential for students to know how to calculate work using the formula of amount of force multiplied by the distance moved, or that work is measured in units of joules.

Assessment Guidelines:
The objective of this indicator is to *recognize* that energy is the ability to do work (force exerted over a distance); therefore, the primary focus of assessment should be to remember that work is force exerted over a distance. However, appropriate assessments should require students to *recall* that force is measured in newtons (N); *recognize* that energy can cause things to move; *identify* situations that show work; or *recall* that work is an evidence for energy.