Your son's or daughter's science class will soon begin exploring a unit entitled "Energy". In this unit, students will learn about the nature of energy and how it can be transformed from one type to another . By the end of the unit, students should demonstrate a clear understanding of the unit's main ideas and should be able to discuss the following topics:

1. the relationship between energy and work
    - *When a force is applied to an object and does work it on it, the kinetic energy of the object will change by an amount equal to the work done.*
2. kinetic and potential energy
    - *kinetic energy is the energy of motion while potential energy is energy stored in an object*
3. a summary of the different forms of energy
    - *forms of energy can include kinetic, potential, gravitational potential, mechanical, chemical, electrical, magnetic, thermal, etc.*
4. what happens during an energy conversion
    - *Energy conversion (or transformation) is the change of energy from one form to another. Energy is neither created nor destroyed, it just changes form.*
5. examples of energy conversions among the different forms of energy
    - *i.e: Chemical energy in food converts to potential energy in your body to do work*
      i.e. Potential energy at the top of a rollercoaster hill converts to heat and kinetic energy down the hill
6. the role of machines in energy conversions
    - *Machines can transfer energy from one object to another as they make work easier. For example, when you use a crowbar to remove a hubcap, you transfer energy to the crowbar, and the crowbar transfers energy to the hubcap*
7. how energy conversions make energy useful
    - *When we generate energy we are actually converting energy from various sources.*
8. how energy is conserved within a closed system
    - *In a closed system, no energy is exchanged with the environment, so no energy is lost.*
9. the law of conservation of energy
    - *Energy cannot be created or destroyed, only change forms. In a closed system, no energy is lost. However, in open systems some energy is "lost" due to heat, friction etc. Ultimately, the universe is a closed system.*
10. examples of how thermal energy is always a result of energy conversion
    - *Any time an energy conversion takes place, some of the energy is transformed into thermal energy.*
    - *i.e. A car on a road experiences friction between its tires and the road, which creates thermal energy*
11. why perpetual motion is impossible
    - *Because some energy is "lost" (transferred) to thermal energy when an object is in motion, eventually the object will stop moving if a constant net force is not applied.*
12. different kinds of energy resources

- *These include alternative sources such as solar, wind, tidal, wave, nuclear, geothermal, etc in addition to non-renewable sources like fossil fuels.*

13. the sun as the ultimate source of energy on Earth
14. the advantages and disadvantages of different types of energy resources

Questions to Ask Along the Way

You should encourage students to generate and investigate their own questions about energy as you work through the unit. As needed, you can facilitate this process by asking them questions like the ones below.

- If a compact car and a bus are travelling at the same speed, which has more kinetic energy? Why?
- Machines can convert energy into a more useful form. What is one way in which your body does the same thing?
- What are some of Earth's renewable resources?