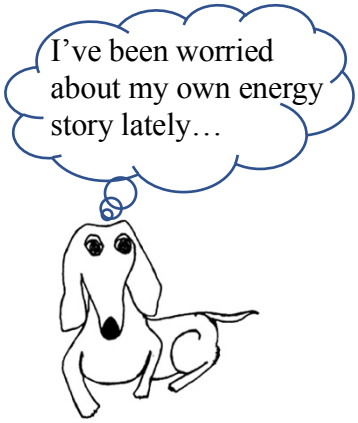
What is an Energy Story?



Throughout the *Focus on Energy* curriculum students are asked to "tell the energy story." Just what is an energy story? Asking students to tell the energy story is another way of saying, "Tell me/show me everything you think you know about the energy, or the flow of energy, in a system, and explain your reasoning." The basis for an energy story is a combination of direct observation and inference. The expectation for what students include in an energy story evolves with their experience with new energy concepts, reasoning, and representations.

An energy story can be told verbally or in writing, and can be supported by various representations, including annotated drawings.

The first time students are asked to tell the energy story is in Motion Investigation 1, where the scenario involves a single ball, in three different situations: not moving, moving slowly, and moving quickly. A typical energy story at this early point in the curriculum can be the simple verbal or written expression:

> "The ball has no motion energy. I know that because it is not moving. Only things that move have motion energy."
>
> Or
>
> "The ball has a lot of motion energy. I know that because it's moving quickly, and the faster the ball moves, the more motion energy it has."

In Motion Investigation 3B, students are formally introduced to the Energy Tracking Lens, the framework that will guide them going forward each time they tell an energy story. Their energy stories then become much more complete, may include representations, and should describe energy forms as well as instances of energy gains, losses, transfers and transformations as appropriate, and the reasoning that supports their claims.

By the end of the *Focus on Energy* curriculum, students are able to tell an energy story for a complex scenario involving a wind-up toy called *Sparklz*. In the energy story below, a student describes the relevant system components, what forms the energy takes, energy transfers and transformations, and where in the system transfers and transformations take place as *Sparklz* unwinds. While this story is told with words, we have found that most students choose to use representations that become familiar during their investigations.

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Sparklz

Part 1. Describe changes you *observe* when you set Sparklz in motion. Use drawings, words, and/or arrows.

- First the coil is loose and unwinded and with no elastic energy and then you wind the key and it coils up the coil and gives it elastic energy.

Part 2. Tell the Energy Story.
Use drawings, words, and/or arrows.
Use observations to support your energy story.

- ☐ System Components?
- ☐ Form(s) of energy?
- ☐ Energy gains and losses?
- ☐ Energy transfers
- ☐ Energy transformations?
- ☐ Where does the energy come from and where does the energy go?

(1) First you transfer motion energy to the key through winding it with your hand.
(2) The key transfers motion energy to the gears
(3) The gears tranfers motion energy and transforms elastic energy to the coil.
(4) When the coil unwinds and you letgo, the coil transfers motion energy to the other gears
(5) The gears transfer motion energy to the scraper.
(6) The scrapers moves against the sandpaper and transformes into thermal energy with the sparks.
(7) While the gears are moving the scraper they are also transfering motion energy to the wheel witch makes them wheel.
(8) The coil runs out of energy and all the energy transfers stop.