Explore Friction Away from the Classroom!

P19: Friction (Recommended for Grades 3-8)

Please use the following resources to learn about Friction.

Watch this Video: MIT video: A World Without Friction

Answer these questions:

- What does friction do?
- What are some things you couldn't do without friction?
- When friction "wastes" energy, that usually means kinetic energy is changed into another kind of energy. What kind? When is this actually useful?
- Bonus question: What are the two kinds of friction, and how are they different?

Activities:
Follow these directions for a surprising demonstration of the power of friction:

You will need:

- Two phone books, catalogs, notebooks, paperback books, or stacks of sticky notes

1. Place the books on a flat surface with their spines facing away from each other.
2. Lift up the pages. Slide the books together until the bottom covers overlap.
3. "Shuffle" the pages of the books together so that the pages overlap. You can do every single page, or a few pages at a time.
4. Once the pages are all shuffled, let go of the top covers, and lift up one of the books by its spine. What happens?
5. You can attach something to the lower book, or have a friend take the spine of it and have a tug-of-war with you. Can you pull them apart?
6. **Experiment a little:** What difference does it make if you layer different numbers of pages? What if you use rougher or smoother paper? Does tugging hard or pulling gently make a difference?
7. Just how big can the force of friction be? Check out an extreme case on Mythbusters here and here.

Make observations & use Claims, Evidence, and Reasoning!

1. **Claim**: Friction is a force that opposes motion.
   - **Evidence**:
   - **Reasoning**:
2. **Claim**: Different surfaces have different amounts of friction.
   - **Evidence:**
   - **Reasoning:**