



## Start Your Engines

Zoom into engineering challenges.

### Tinkering, Toying & Taking Apart

There's no magic in engineering. There's a design. Electrical appliances, gadgets and gizmos were designed in a special way, to do a special job. They're made of individual components working together.

Let's find out how they work *together* by taking them *apart*.

#### Safety First

- Don't take apart anything electrical if the cord hasn't been cut off by an adult.
- Don't take apart anything electrical if it still has batteries.
- Don't take apart TVs or computer monitors! Even unplugged, they can have high voltages.
- Don't take apart smoke detectors—many use a radioactive element inside.
- Don't take apart anything spring-loaded.
- Wear goggles where necessary.

#### Before you get started . . .

- Divide into groups. Each group chooses an appliance, gadget or gizmo.
- Read aloud the **Safety First** section above.
- If your team is working on an electrical appliance, make sure you get a copy of "So What's This?"

#### Dig In

1. First, predict what you will find when you open it up. Record your prediction on your data sheet.
2. When you open up your gadget, gizmo or appliance, make a sketch of what it looks like. You might want to make more sketches as you go along. When you get deep inside, you might be able to understand better how it works if you can look back at a sketch of what the whole thing looked like before you started taking it apart
3. As you're taking it part, what are you wondering about? Record some of your questions.
4. Now that you're digging inside, look at your predictions. Are you finding what you thought you'd find?
5. Are there any more interesting parts you'd like to sketch?
6. Did taking it apart help you understand how it works?
7. Can you explain how you think it works?

**Note:** Don't throw anything away. You might want to use these parts in you own creations.

#### What You Need

- "So What's This?" hand-out
- appliances, gadgets and gizmos
- variety of tools (e.g., screwdrivers, pliers, wire snips)
- goggles where necessary
- newspaper—old appliances can be messy
- data sheet