

### Material Needed

- Unneeded or broken audio/video tapes, keyboards, radios, VCRs/DVD players, or other items safe for kids to dismantle
- Common hand tools such as screwdrivers (various sizes and head types), pliers, hammer/mallet, wire cutters, etc.
- Small containers
- Any flat surface
- Pen/pencil
- Paper
- Recommended: Eye protection

### Grade Range

- K-2
- 3-5
- 6-8

### Topics/Skills

Science: Observations, Material Properties, Systems;  
Engineering: Defining Problems, Developing Potential Solutions

### Learning Standards

NGSS: [Structure and Properties of Matter](#), [Engineering Design](#)

### Duration

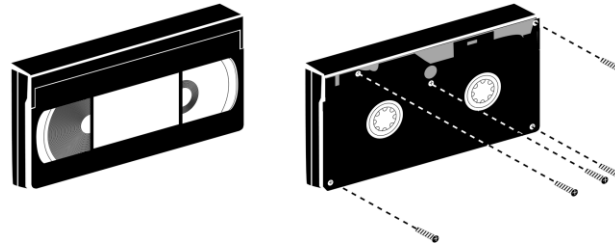
20-45 minutes

### Prep Time

5-10 minutes

## Abiotic Dissections

Open a world of new possibilities by dismantling non-living objects!



Students hone their observation skills by disassembling unneeded or broken items to observe internal structures and mechanisms and to consider new uses.

### Activity Challenge

Take apart unneeded or broken items piece by piece and list the functions and potential uses for the underlying pieces and structures.

### Preparation

1. Review and gather the Materials Needed.
2. Identify the item (specimen) to be dismantled (dissected).
3. Set out the materials and tools on a flat working surface.

### To Do (Adult supervision required!)

1. Examine the specimen and identify any moving parts, obvious openings, fasteners, clips, or other mechanisms that hold the specimen together.
2. Identify appropriate tools required to open the specimen.
3. Choose an easily accessible starting point and begin dissecting the specimen. Put all removed screws, clips, or other fasteners in separate containers.
4. Lay each removed part onto the flat surface and continue to spread them out as needed. For more complex subassemblies further dissection may be needed.

### Observations

- Observe each removed part. Write down the function the part served in the specimen, if known. What do you think the part is supposed to do?
- Look at the attributes (characteristics) of each part. Write down a potential use for the parts. Use your imagination!

### Extensions

- Try to reassemble the specimen using all the removed parts.
- Build a different device that incorporates some or all the parts.

### The Science behind the Activity

Scientists **dissect** (take apart) objects that act as systems to better understand how the internal components interact with the each other. Biologists, scientists who study living things and the environment, conduct dissections on **biotic** specimens composed of organic tissues. Students often get this experience in science classes by dissecting preserved specimens such as frogs, fish, or freshly picked plants. Unlike in a science class, where the removed parts of a specimen are studied and either preserved or discarded, surgeons (specialized doctors) work on living people to remove tissues and muscle and often must put them back into their patients (a very good thing!).

This activity focuses on **abiotic** dissections, those that are performed on non-living (inorganic) objects or factors. Engineers do this all the time to fix or redesign broken systems. An example that lends itself well to this activity is a VHS cassette (see image on first page). Video cassettes were very popular from the late 1970s to around 1995 until the release of DVDs. They are relatively simple in design but contain many parts that together form a complex system. VHS tapes contain ½" wide magnetic tape that is wound on two plastic spools. A ratcheting mechanism prevents the tape from coming loose. A clear tape leader keeps the tape from breaking where the tape connects to the plastic spools while a hinged tape cover protects the tape from dust and possible sources of damage. Finally, metal sleeves on plastic posts guide the tape through its path in the cassette.