Reverse Engineering of Hair Dryers

In this activity, students will take apart a hair dryer in order to see the components inside and understand how they work.

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>Grades 5 - 12</th>
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<tbody>
<tr>
<td>Activity Time</td>
<td>1 hour 30 minutes</td>
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<tr>
<td>Preparation Time</td>
<td>This varies depending on the availability of hair dryers at thrift shops and the ease of loosening the screws on the hair dryers.</td>
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<tr>
<td>Grouping</td>
<td>Pairs</td>
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Objective

As a result of this activity the students will be able to:

- Understand the parts of a hair dryer and how it works

Materials

Per Pair:

- Hair dryer (can be found at thrift shops)
- Tools (screwdrivers, scissors, and pliers)
- Plastic bins
- Safety glasses

Preparation:

1. Check the different screws in each hair dryer to figure out which ones are holding the hair dryers together and to make sure you have the right size and types of screwdrivers needed for disassembly.
2. Cut off the electrical plug of each hair dryer.

Directions

1. Break the group into pairs.
2. Hand out the hair dryers and tools. Explain to the students the 3 goals of this activity:
   - Take apart the hair dryer while trying not to break too many pieces. They will need to put them back together again (if time permits).
   - Investigate: As they tear open the hair dryer they should examine and discuss each component they see. What material is the component made out of? How is that component connected to other components? What purpose does it serve?
Reverse Engineering of Hair Dryers

- **Draw:** Have each student draw the inside of their hairdryer and label the parts. It’s okay if they don’t know the actual names, they can write down what they think the part’s function is.

3. Let the students start disassembling their hairdryers. Walk around the classroom and ask students questions to get them thinking about how and why their hairdryer was engineered in such a way. Here are some questions to help you get them started:

   - Do you like the design of your hairdryer? Would you buy this hairdryer for yourself if you saw it at the store?
   - Count how many parts make up the hairdryer. What materials are they made out of? Why did the engineer choose those materials?
   - Follow the electrical path of your hairdryer. Electricity comes from an electrical outlet through the hairdryer’s electrical cord and onto the on/off switch on the hairdryer and then where?
   - If you could re-design this hairdryer what would you do differently and why?

4. If time permits, ask each pair to bring their hairdryer to the front of the class. Have them describe:

   - How their hairdryer works
   - Any challenges they faced while taking it apart
   - If they could re-engineer the hairdryer, what would they do differently and why?

5. Review with the entire group how a hairdryer works. An excellent description can be found at http://home.howstuffworks.com/hair-dryer.htm.

6. As a class, have the students redesign a hairdryer for Techbridge enterprises.

   - Draw their suggestions on the board
   - Let the students be creative
   - No idea is a bad idea
   - Have fun

Discussion Questions

- What types of engineers do you think have to work together to design and manufacture hairdryers?
- If you could design your own hairdryer, what features would it have and why?