Tape Dispenser Challenge

Build a tape dispenser that makes it possible to remove tape from the roll and apply it using only one hand.

DISCOVERe GIRL DAY
FEBRUARY 22, 2018

Instructions

Engineers redesign and improve existing tools all the time, looking to make our everyday lives easier. The desktop tape dispenser is found everywhere, but it's not the only solution for making it easy to dispense tape.

1 Show students a standard desktop tape dispenser. Ask them to point out the features it has that enable someone to dispense a piece of tape using only one hand. Let students know their challenge is to design a new tape dispenser that provides a different solution to the constraint of removing and applying a piece of tape.

2 Show students the collection of materials you have available for their designs. Have them brainstorm ideas as they look over the materials.

3 Divide students into teams of 2–3. Have them talk through various design ideas and sketch out their best solution. Encourage them to be creative and think outside the box.

4 Have each team use their sketch to build a prototype and test it out. Have them improve their design and retest as needed, until they believe they have the best possible solution.

5 Have each team demonstrate their design and discuss the features they incorporated.

Materials

☐ Rolls of office desktop tape (clear or "invisible" tape)

A wide range of reclaimed materials, such as:

☐ Cardboard/boxes

☐ Plastic bottles

☐ Pieces of wood or dowels

☐ Wire hangers

☐ Toilet paper or paper towel tubes

☐ Serrated edge strips from plastic wrap boxes, cut to 2-inch pieces

☐ Rubber bands, paper clips, binder clips

☐ Scissors, wire cutters

☐ Duct tape and glue

☐ An example standard desktop tape dispenser

Engineering & Science Connections

🔗 Before the tape dispenser was invented, 3M's standard clear scotch tape was sold only as a roll, which had to be carefully peeled from the end and cut with a pair of scissors. To make the product more efficient and appealing to customers, the scotch tape sales manager at 3M, John Borden, designed the first tape dispenser in 1932, which had a built-in cutting mechanism and would hold the cut end of the tape until its next use.

🔗 All pressure-sensitive tapes share two simple traits: They all have some sort of adhesive attached to a backing. Yet, it requires as many as 30 raw materials and complex chemistry to make this combination work. In the case of "invisible" tape, a backing film of plasticized cellulose acetate is coated with a primer and then a special polymer derived from petroleum.
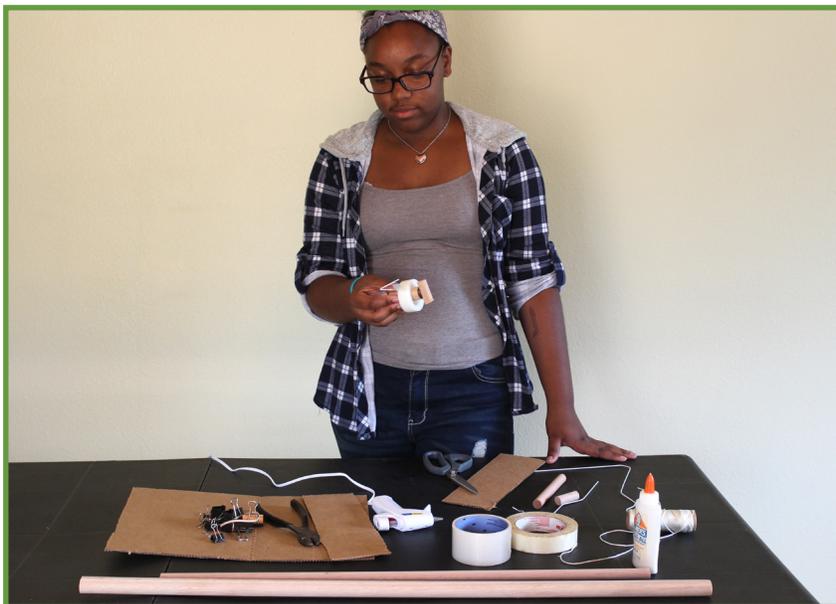
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