

West Side Science Club – Event #28 – “Bristlebots”

Original Presentation

Date: 12 April 2014
Time: 10 am to 12 pm
Site: West Side Science Club

Big Questions

- These questions are meant to frame the day’s event and might be written on the chalkboard
 - (1) How do you build a robot from scratch?
 - (2) What basic parts are in are in most robotic toys?

Concepts

- Concepts to cover from the “Work of CCI Solar” Mind Map: Devices: design, cost-effectiveness; Electricity- current, voltage, series/parallel; Energy- batteries

Lesson Plan

Student Objectives

- Learn techniques and vocabulary for building robots and working with electronics
- Become familiar with engineering and the design → device process

Schedule/Agenda

- Take apart cheap toys (30 min.)
- Build Bristlebots (1 hr 20 min.)
- Clean-up (10 min.)

Materials

Activity: Toy Take apart

- Cheap target toys
- Screwdriver

Activity: Bristlebots

- Toothbrush
- Coin cell battery
- Page motor
- Hot glue
- Tape
- Wire cutters (to cut toothbrushes)
- Wire
- Solder
- Soldering iron
- Wire stripper

Safety

- Be careful with the glue gun and with soldering. Have a mentor help you

Activity: Toy Take Apart

Procedure

1. Use the screwdrivers (or brute force) to take apart some cheap electronic toys
2. Notice how the toys were put together and the function of each piece

Facilitation/Concept Questions

- Are the toys made the way you thought they were? More or less simple?
- Do you think you could replicate the functions of these toys given similar parts?

Activity: Bristlebots

Procedure



1. Cut off the handle of a toothbrush

2. Solder short lengths of wire to the terminals of the pager battery so that the wire can be attached to a coin cell battery
3. Tape the motor and battery to the top of the toothbrush
4. Connect the lengths of wire on the motor to the coin cell battery (one on each flat side)

Facilitation Questions and Concepts

- Is it easier or harder to build a robot than you first thought?
- Is there a way you can think of to turn the robot on and off?
- Is there another way to power the robot?
- How could you control the motion and/or direction of the robot?

Check for Understanding

- Does the bristlebot move as expected?
- Was it easier or harder to make a robot than you thought?
- Does the bristlebot design make sense given what you saw in the toys?

Wrap Up: Event #29 Preparation

- How could this design be improved upon to make another roving robot?

References

- (1) Evil Mad Scientist: "Bristlebot: A tiny directional vibrobot "
<http://www.evilmadscientist.com/2007/bristlebot-a-tiny-directional-vibrobot/>