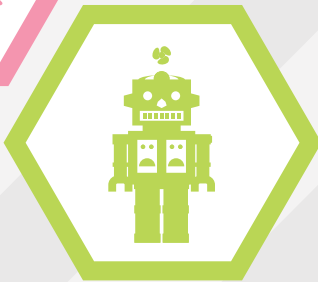


MAKEIT

WORKSHOP PLAN



VIBROBOT BUG RACERS

Over 45 minutes, participants will construct, test and race vibrating bug bots.



AGE GROUP

14+



METHOD

Small Groups

(7:1 participant to facilitator ratio recommended)



LEVEL

Introductory



DURATION

45 minutes



KEY LEARNINGS

Basic Electrical Circuits
Intro to Entomology

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VIBROBOT BUG RACERS

INCLUDED IN THIS WORKSHOP PLAN

- > Materials and equipment list
- > Preparation suggestions
- > Recommendations: General advice, electrical circuit troubleshooting, post workshop suggestions and opportunities for further learning
- > Full 45 minute workshop outline

APPENDIX

- > Circuit Diagram
- > Construction Guide

MATERIALS AND EQUIPMENT

- Coin cell batteries (1 per participant)
- Vibration motor (1 per participant)
- Pre-cut tie wire (100mm long – 2 per participant)
- Lasercut bug robot body (1 per participant) (4 parts)
- Hot glue guns, glue sticks and extension cables (share between 2 or 3 participants)
- Scotch tape (share a roll between a few participants)
- Aluminium Foil (1 x 5x5cm square per participant)
- Scissors
- A selection of coloured, textured and patterned paper stock and other small craft materials
- Pencils and scrap paper for planning
- Coloured art pens
- Basic infographic of bug anatomy
- A range of bug racer examples
- Googly eyes (optional - 2 per participant)
- Flashing and/or standard LEDs in a range of colours (optional - 2 per participant)
- Pre-cut and stripped hookup wire (50mm long with 10mm tails stripped at each end – minimum of 1 per LED) (Optional)
- CIRCUIT DIAGRAM** (appendix)
- CONSTRUCTION GUIDE** (appendix)

PREPARATION

In preparation for this workshop the facilitator should:

- > Experiment with the simple circuits used in this project
- > Experiment with how different bug designs (leg length, centre of balance, weight) impact on their movement
- > Familiarise themselves with a range of interesting looking insects and bugs
- > Pre-cut tie wire
- > Pre-cut and strip hookup wire
- > Prepare a bug racing ring for the final race



Included in MAKEIT Kit:

- Battery
- Motor
- Pre-Cut Wire
- Laser Cut Body
- Aluminium Foil
- Googly Eyes

RECOMMENDATIONS

GENERAL ADVICE

- > Keep the pace up... but don't rush too much. Think of the workshop as a balance between a race to make the most visually interesting bug and an opportunity to experiment with physical designs that increase the speed and efficiency of participants bugs. Communicate this in both word and action (body language) and mixing the pace of different components of the workshop between moments of mindful discussion and intense brackets of explosive creativity. The point of the workshop is not to create a masterpiece, it is to create something fun and creative in 45 minutes and to explore the creative horizons of a simple activity like this.

ELECTRICAL CIRCUIT ISSUES

The most common reasons this circuit doesn't work are:

- > You have a weak or broken connection somewhere in your circuit. Trace the circuit and check all the connections thoroughly.
- > The polarity (electrical direction) of one the motor wires is wrong. Check you have it wired in the right way.
- > There's a short circuit (the electricity is taking a shortcut through a conductor that is making a connection somewhere in your circuit. Check everything is secured and that nothing in the circuit is touching anything (conductive) that it shouldn't.

POST WORKSHOP

- > Don't underestimate the joy participants can draw from making something that moves or lights up.
- > If you have correct permissions don't forget to get photos of the participants with their finished bugs and share these through your organisation's social media.
- > Be sure to credit all involved when sharing or showcasing the work.

FURTHER LEARNING

This workshop can be expanded to any length required by adding to the level of sophistication in the electronics.



WORKSHOP OUTLINE

00:00 INTRODUCTION

Welcome participants to the workshop.

Introduce yourself, and share any housekeeping.

Ask participants to share their names and previous electronics experience (ask them to keep it short).

Explain to participants that they will be making a Vibrobot Bug Racer.

Show them examples of the bugs and discuss some ideas to make them more visually stunning and faster.

00:05 DISCUSSION ON THE ANATOMY OF A BUG

Discuss the basic anatomy of an insect.

Discuss the various forms of terrestrial locomotion.

00:15 ELECTRICAL CIRCUITS

Introduce participants to the concept of an electrical circuit as a closed system.

Identify and hand out the components of the circuit and have participants arrange these to work with their visual design:

- > Battery
- > Wires
- > Motor
- > LED (optional)

Participants construct their circuit and decorate their bug bodies using the craft materials.

Continued...

Once the circuit is complete allow participants to experiment with a range of leg configurations by bending and if needed cutting the wires.

Call tools down.

**00:35****FINISHING TOUCHES**

Get participants to put the final decorative touches on their bugs and prepare them for the race.

**00:40****SHARE**

Participants race their bugs from the centre to the outside of a circle. The circle is usually approximately 2m in diameter and can be marked out in chalk, tape or a piece of rope.

If you have permission photograph the participants with their bugs at the end of the race. Before finishing up have a discussion with the participants about what they thought made different bugs fast and slow... or just spin around in circles. Settle any disputes with a rematch.

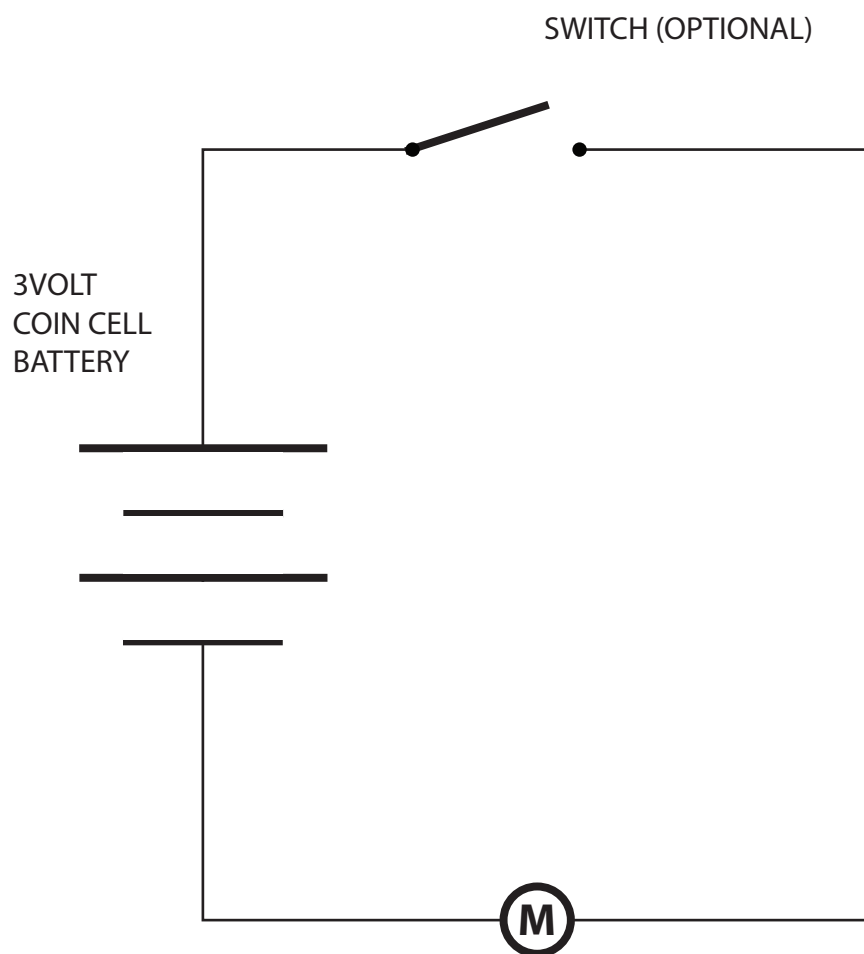
**00:45****THE END**

APPENDIX

CIRCUIT DIAGRAM

CONSTRUCTION GUIDE

CIRCUIT DIAGRAM



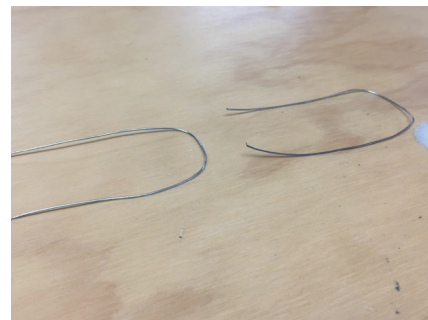
CONSTRUCTION GUIDE



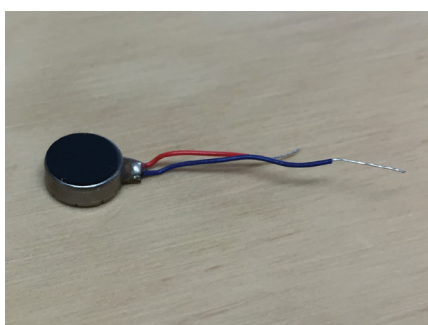
1. Peel off protective paper.



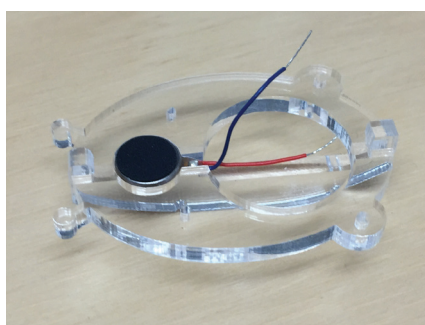
2. Snap bridge in place. Make sure dents are aligned with the holes on the body.



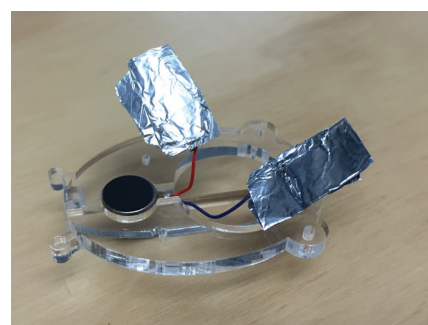
3. Bend both legs/wires as shown.



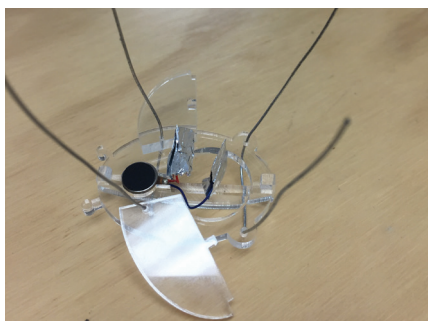
4. Remove white backing paper.



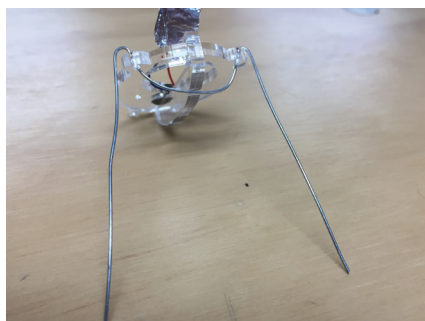
5. Stick battery to body. Adhesive side down.



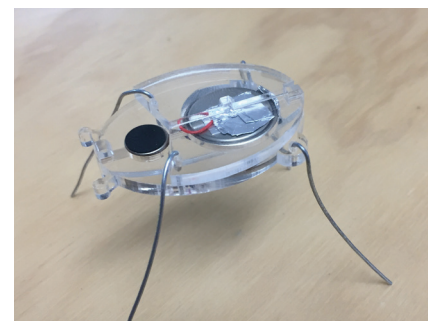
6. Fold aluminium foil around motor wires (for improved conductivity).



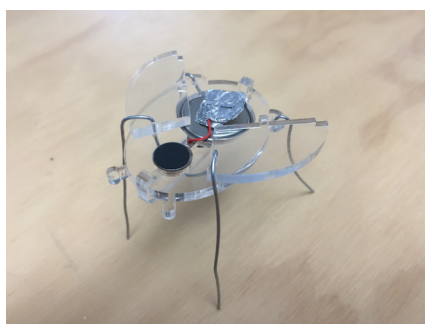
7. Insert leg wires through the bottom. Don't forget the wings.



8. Bend legs down.



9. Insert battery and make sure the motor wires are on the correct sides of the battery.

10. Wings open.
Tip: This makes it easier to adjust wires (and it looks cool!

11. Play around with the legs to make sure the bug moves forward! Cut off excess wire if needed!

The Edge

Author/Developer

Mick Byrne and Daniel Flood
The Edge, State Library of Queensland

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