

Duration: 30 minutes- 2 hours

Institution: TELUS SPARK

Skill level/Age Level: 5th Grade - Adult

Group size: 10 to 30 participants, more if there is enough space and resources

INTRODUCTION

Participants will challenge their creativity and dexterity to build tiny robot-esque creations using small, recycled materials.

KEY CONCEPTS AND/OR SUBJECT AREA

Repurpose recycled electronic pieces like keyboard pieces, motors, and capacitors into tiny robots. Test your creativity and dexterity. For an added challenge, create micro-bots with moving parts using battery powered lights and motors.

MATERIALS AND TOOLS

Essential Materials:

- Glue Guns
- Glue Sticks
- Capacitors
- Screws
- Small pieces of electrical wire
- Small gears
- Salvaged LED lights
- Metal pieces
- Scraps of circuit board
- Bottle caps, especially metal
- Pre-cut pieces of wire

Optional Materials:

- Googly eyes
- Sequins
- Gems
- Colored paper/Gels
- Shiny conductive tape
- Depending on your materials you may want scissors or wire cutters



SET UP

- Harvest material from donated electronics. To be safe, ensure that all batteries, glass, and large capacitors are removed from the electronics before allowing participants to use.
- Sort materials by kind into smaller, stable bins and label them accordingly. For example: round thing, capacitors, motors, screws, wire, etc.
- Set out workspaces on tables with glue guns.

HOW TO OR STEP-BY-STEP

1. Start by collecting pieces that you will use to build your micro-bot
2. Glue the pieces together with a glue gun. The micro-bots can have characteristics like faces, moving arms and legs. For an added challenge, you can incorporate working parts from electronics like motors or lights.
3. Modifications
 - a. As an extra challenge, try limiting to only one material! E.g. what can you build out of ONLY SCREWS?
 - b. Ask participants to imagine the environment where robots would live, and then help them imagine the environment, or even create it out of simple materials in one of the display shelves if you have time.
 - c. Inexperienced participants can proactively use hot glue guns with adult (or facilitator) supervision.

FACILITATION TIPS

- Provide some examples of size, as some people have a hard time conceptualizing building on a small scale. Also provide materials and guidance if participants have trouble using them.
- This program is great for all ages! Encourage parents who are hovering to build their own, put pieces in the hands and get them started. Sometimes parents are hesitant to jump in and build their own, but if you act like you expect them to do it, or make jokes about how their child's creation will be lonely, it can break the ice and get them involved.
- Help participants troubleshoot and brainstorm materials uses. Comments like, "I wish I could build _____ but all I have are screws," are your cue to jump in with suggestions of what alternatives to try, or what materials could be used.
- Every "I wish it could have laser beams with sharks attached to them and a spinning ninja sidekick..." thought is valuable. Listen for those "I wish I could do _____" thought and try to help them brainstorm how to bring their ideas to life. "I bet we can find a way!" Is almost always the best response.
- Ask questions! Try to encourage participants to think creatively about their creations. E.g. Come up with a backstory, decide on some special skills etc.
- Monitor glue gun and other tool usage and safety.
- Participants with reduced dexterity may need help putting small pieces together. Have them choose the pieces and direct the placement and then help them glue or engage an adult to help.
- Limiting materials to a few repetitive parts forces participants to think laterally about material use ("if all I have are screws and capacitors, how can I transform them into all the different parts that I need?" Rather than, "this part already looks like an arm, so I'll use it as an arm") while restricting the size of the creations encourages participants to invest extra thought and care into detailed objects they can hold in one hand. Up close and personal = detailed and intimate!

Why this experience?

- Using small materials engages dexterity and fine motor skills.
- Repetitive or limited variety of materials encourages lateral thinking and creative material use.
- Hot glue guns are a real world tool that requires skill and practice.

PROMPTS AND QUESTIONS

- Ask participants to come up with a backstory for their creations e.g., "This is farmer-robot Joe, who can play 50,000 potatoes per minute, even though he walks with a cane..." What specialized skills does the creation have? Any history? What does "a day in the life" look like?
- Some participants have trouble with the idea of such small-scale building. A few diverse examples of previous creations can help to clear up the size confusion. If you find that participants are only copying the examples, try to get them thinking

creatively with some leading questions. “Does your creation have any special features or skills?”

SAFETY AND TROUBLESHOOTING

- Using glue guns and other tools can be hazardous for some people. Encourage young children or participants with reduced dexterity to collaborate with an adult. I.e. Child chooses the pieces and placement and adult glues them in place.
 - a. To engage inattentive parents of young kids, try asking if they’re comfortable with their kids using the glue gun; it reminds them that it is their choice and responsibility
- Do not leave scissors or wire cutters unattended. In addition to becoming hazards, if they escape into the gallery they can disrupt the regular function of some exhibits.

MATERIALS SOURCES

Use harvested parts from donated electronics.