

# Cardboard Robotic Hand

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## Guiding Questions

How do we empower students to value diversity, defend human rights, advocate for issues, and interact ethically with others.

How do Applied Design Skills and Technology (ADST) projects that embrace Design Thinking foster growth mindset, creativity, innovation and problem-solving?

([curriculum.bc.ca](http://curriculum.bc.ca))

<p><b>Know: (content)</b></p> <p><b>Applied Design</b></p> <ul style="list-style-type: none"> <li>• <i>Empathize with potential users to find issues and uncover needs and potential design opportunities</i></li> </ul> <p><b>Applied Skills</b></p> <ul style="list-style-type: none"> <li>• <i>Identify and evaluate the skills and skill levels needed, individually or as a group, in relation to a specific task, and develop them as needed</i></li> </ul> <p><b>Applied Technologies</b></p> <ul style="list-style-type: none"> <li>• <i>Identify the personal, social and ethical impacts, including unintended negative consequences, of the choices they make about technology use</i></li> </ul>	<p><b>Understand: (Big Ideas)</b></p> <p>Design can be responsive to identified needs. <b>(ADST 6)</b></p> <p>Our attitudes toward careers are influenced by our view of ourselves as well as by our friends, family, and community. <b>(Careers 6)</b></p>	<p><b>Do: (Social Awareness &amp; Responsibility Core and Curricular Competencies)</b></p> <p><b>Resolving Problems:</b> Students identify and develop an appreciation for different perspectives on issues. They show empathy, disagree respectfully, and create space for others to use their voices. They generate, use, and evaluate strategies to resolve problems.</p> <p><b>Valuing diversity</b> Students value diversity, defend human rights, advocate for issues, and interact ethically with others. They are inclusive in their language and behaviour and recognize that everyone has something to contribute. Their approach to inclusive relationships exemplifies commitment to developing positive communities.</p>
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## INSTRUCTIONAL MODEL (5E)

**Engage:** (*interest piqued, prior knowledge assessed*)

1. **Read or Show** "[A Sick Day for Amos McGee](#)" (Philip C. Stead).
  - a. **Discussion**
    - i. What are some things you SEE, THINK and WONDER about after listening to this book. (For more on the Google Infused Classroom's (2017) STW Thinking Routine, [click this link](#)).
      1. Identify ways Amos's friends were kind and showed awareness of his needs.
      2. Identify ways you are kind, helpful and help people feel better.
2. **Show this YouTube about amputees who help reimagine and design their own prosthetics** "[Beyond bionics: how the future of prosthetics is redefining humanity](#)"
  - a. **Discussion**
    - i. What are some things you SEE, THINK and WONDER about after watching this YouTube. (For more on Thinking Routines, [click this link](#)).
      1. Brainstorm enhancements for prosthetics that are kind, helpful and empower people with amputations.
      2. Brainstorm ethical considerations ("enhancements" that wouldn't be considered kind, helpful or "best for the world").

►► **Watch Moneca's "Cardboard Robotic Hand" lesson here!** [Video Link](#) (<https://youtu.be/ZSMsQ-GUCjl>).

### Task Summary:

Students experience Design Thinking as they design and construct a cardboard hand "prostheses" in response to a hypothetical friend's hand amputation scenario. Using the supplies referenced in Moneca's video, students act as engineers tasked with bionically enhancing their friend's quality of life, post amputation. Building on what they learned and discussed in the aforementioned discussion prompts, they design and fabricate a replacement prosthetic limb using video-specific starting material and limited additional supplies. A more-advanced scenario challenges students to design a prosthesis that is able to provide a more-specific movement function.

*"People who are socially aware and responsible contribute to the well-being of their social and physical environments. They support the development of welcoming and inclusive communities, where people feel safe and have a sense of belonging."*

*(Social Awareness & Responsibility Core Competency ~ BC Curriculum)*

Instructional Models = Constructivism & Connectivism

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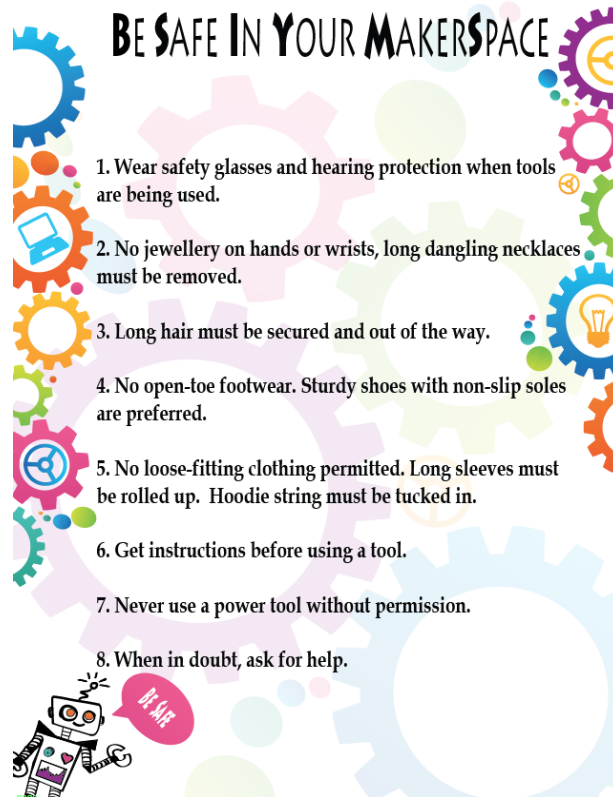
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## Explore: (inquiry-based activity)

### SAFETY

- **Introduce** expected behaviours poster for hand tools



### TOOLS & MATERIALS

- Tape
- Scissors
- Cardboard paper or cardstock paper
- Standard drinking straws (Dollar Store variety is fine)
- Pearl drink straws or bigger diameter straws
- Yarn or twine
- Utility Scissors



### PROCEDURE

- IN PAIRS, determine who will be the “amputee” and identify activities that are really important to that person.
- Complete “[Design Your Own Prosthesis Worksheet](#)”
- Work together to build the Cardboard Robotic Hand (as shown in [Moneca’s Video](#)).
- Add “bionic enhancements” to your the Robotic Hand prosthesis prototype.
- SHOW what enhancements you’ve added to the prosthesis and TELL us how they are kind, helpful and help people feel better.

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**Explain:** *(students communicate what they have learned).*

**Core Competency reflections:** *Assign one or more to individuals or groups.*

**Reflections could take the form of a checklist, a recorded reflection, a written paragraph, etc.**



## **Creative Thinking Competency Discussion/Writing Prompt:**

*Tell me about some ways you can look for ways to make the world a better place for your friend. What are some small things you can do that could make a difference?*

**I can think “outside the box” to get innovative ideas and persevere to develop them.**

- I can get new ideas that are innovative, may not have been seen before, and have an impact on my peers or in my community.

Profile 5 ([curriculum.gov.bc.ca](http://curriculum.gov.bc.ca))



## **Critical Thinking Competency Discussion/Writing Prompt:**

*Tell me about anything that made you S-T-R-E-T-C-H today. What was new/challenging?*

**I can ask questions and consider options. I can use my observations, experience, and imagination to draw conclusions and make judgments.**

- I can ask open-ended questions, explore, and gather information.
- I experiment purposefully to develop options.
- I can contribute to and use criteria.
- I use observation, experience, and imagination to draw conclusions, make judgments, and ask new questions.
- I can describe my thinking and how it is changing.
- I can establish goals individually and with others.
- I can connect my learning with my experiences, efforts, and goals.
- I give and receive constructive feedback.

Profile 3 ([curriculum.gov.bc.ca](http://curriculum.gov.bc.ca))

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## Collaboration Competency Discussion/Writing Prompt:

*Tell me about the way you and your partner shared resources, ideas & jobs.*

**I contribute during group activities with peers and share roles and responsibilities to achieve goals.**

- I take on different roles & tasks. I work respectfully & safely.
- I express my ideas & help others feel comfortable to share theirs.
- I work with others to achieve a common goal.

Profile 3 ([curriculum.gov.bc.ca](http://curriculum.gov.bc.ca))



## Communication Competency Discussion/Writing Prompt:

*Tell me about the different ways you communicated your ideas.*

**I communicate purposefully, using forms and strategies I have practiced (For example, I used the SEE, THINK & WONDER Strategy).**

- I participate in conversations for a variety of purposes.
- I listen and respond to others.
- I can consider my purpose when I am choosing a form and content.
- I can communicate clearly about topics I know and understand well, using the SEE, THINK, WONDER Strategy.

Profile 3 ([curriculum.gov.bc.ca](http://curriculum.gov.bc.ca))



## Personal Awareness & Responsibility Discussion Prompt:

*Tell me about activities that are really important to you. What brings you joy?*

**I can make choices that help me meet my wants and needs and increase my feelings of well-being. I take responsibility for my actions.**

- I can take action toward meeting my own wants and needs and finding joy and satisfaction, and work toward a goal or solving a problem.
- I can use strategies that increase my feeling of well-being and help me manage my feelings and emotions.
- I can connect my actions with both positive and negative consequences and try to make adjustments; I accept feedback.
- I make decisions about my activities and take some responsibility for my physical and emotional well-being.

Profile3 ([curriculum.gov.bc.ca](http://curriculum.gov.bc.ca))

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## Social Awareness & Responsibility Discussion/Writing Prompt:

*Tell me about a time when you noticed someone needed help.*

I can be aware of others and my surroundings.

- I like to be with my family and friends.
- I can help and be kind.
- I can tell when someone is sad or angry and try to make them feel better.
- I am aware that other people can be different from me.

Profile1 (curriculum.gov.bc.ca)



## Social Awareness & Responsibility Competency Discussion/Writing Prompt:

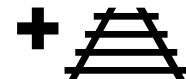
*Tell me about a time that you helped someone or someone helped you.*

I can take purposeful action to support others.

- I can build relationships and be a thoughtful and supportive friend.
- I can identify ways my actions and the actions of others affect my community and the natural environment.
- I look for ways to make my classroom, school, community, or natural world a better place and identify small things I can do that could make a difference.
- I demonstrate respectful and inclusive behaviour in a variety of settings, and I recognize that everyone has something to offer.

Profile 4 (curriculum.gov.bc.ca)

**Extend:** (*transfer knowledge to other concepts*)



### Cross-Curricular &/or **Connectivist Extension Activities:**

- Kids could take their prototypes, measure them and create their own functional prosthetics using tinkercad to design 3D printable prosthetics.
- Kids could use their prosthetic hands ONLY to engage in the [Stacking Cup Challenge!](#)
- Recommended Story Books that deal with helping others:  
<https://bookroo.com/books/topics/helping-others>

**Evaluate:** (*assess student understanding*)

[Share this link](#) with students if you wish to assess their ADST development.

Alternatively/additionally, students can self-assess their current state of being by highlighting any applicable statements on the **Core Competencies**, above.

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Here is a visual that summarizes the lesson:



Question → connect to text → YouTube → make it → reflect on competencies → extend thinking.