

LEGO-Cardboard Creation

Teacher Guide



ABOUT

Cardboard is a ubiquitous classroom building material. Using it in projects is a great way to upcycle resource material before recycling it. Relative to other “raw” materials like plywood sheets, metal, or PVC materials, cardboard cuts very easily. Relative to LEGO’s geometry, cardboard has the advantage of being able to put holes anywhere for attachments.

As you’ll see in this video, cardboard adds new projects possibilities to your LEGO project while keeping the overall project easy for beginnings and broad enough for experts.

MATERIALS

- Clean cardboard (20 min)
- LEGO beams (10 min)
- Sharp pencil (10 min)
- Brass fasteners (20 min)
- Heavy duty scissors
- Paper cutter
- Battery powered cardboard cutter

VIDEO



Link:

<https://www.youtube.com/watch?v=G2N8i0envI8&t=1s>

EXTENSIONS

- Use cardboard to personalize LEGO projects
- Cardboard is a resource for new types of STEM/LEGO projects - e.g., make a LEGO turbine with large cardboard fan blades. Make an electronic musical instrument with a cardboard body.
- Make big projects quickly!

PREPARATION FOR TEACHER

- Read through the Teacher Guide
- Print placemat

TIPS FOR MAKERS

- Not all cardboard alike - check out the density of corrugations and the # of layers. Some types are very rigid and durable
- Try out the purpose built cardboard cutters. They come in two types - serrated edge, passive cutter and motorized “mini circular size” cutters.
- Pre-cut sheets before students see them

Teacher Guide: LEGO Plus Cardboard

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WHAT YOU WILL NEED

- Clean cardboard (20 min)
- LEGO beams (10 min)
- Sharp pencil (10 min)
- Brass fasteners (20 min)
- Heavy duty scissors
- Paper cutter
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WHAT ELSE?

- Use cardboard to personalize LEGO projects
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- Make big projects quickly!

PREPARATION FOR TEACHERS

- ☐ Read through the Teacher Guide
- ☐ Print placemats

TIPS FOR MAKER

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USEFUL LINKS

- Youtube: <https://www.youtube.com/watch?>



Lesson 4: Programming

Powerful Idea From Computer Science:

Algorithms, Design Process

Powerful Idea From Literacy:

Descriptive Language in Writing

OVERVIEW

Students will learn about sequencing in programming and think about how it relates to sequencing in literacy. Students will program KIBO to dance the Hokey-Pokey, or if you wish, a different children's song where students can program a robot to dance to the words. At the end of the lesson, students will demonstrate their current level of understanding by completing the first Solve-It assessment.

PURPOSE

In the previous lesson, students had the opportunity to engage with KIBO's hardware and software separately. Now they will engage in goal-oriented programming, in which students purposefully choose their KIBO blocks and place them in a specific order to achieve a particular outcome.

ACTIVITIES

- Dance the Hokey-Pokey (5 min)
- Program the Hokey-Pokey (20 min)
- Hokey-Pokey Reflection (10 min)
- Share Creations (10 min)
- Solve-It Assessment A (15 min)

STUDENTS WILL BE ABLE TO...

- Tell and retell a story clearly and effectively
- Identify common errors with scanning KIBO programs and troubleshoot them
- Practice scanning programs with KIBO
- Learn strategies for debugging and editing

PREPARATION FOR TEACHERS

- ☐ Read through the Activity Guide
- ☐ Ensure all KIBO bodies have 4 working AA batteries
- ☐ Sort KIBO blocks and pieces (listed in Materials section) by part and place in a central location
- ☐ Print Solve-It Assessment A (one for each student)

MATERIALS

FOR THE TEACHER:

- Anchor chart of discussion sentence starters*
- 1 flathead screwdriver
- Extra AA batteries

FOR STUDENTS:

- Design Journal (see Appendix C for example)
- KIBO bodies, wheels, motors, Begin and End blocks, blue Motion blocks, yellow Light blocks, Beep and Sing blocks
- KIBO stickers

*See Appendix A for examples



VOCABULARY

- Instruction — a direction that a robot will follow
- Program — a complete set of instructions for a robot
- Scanner — electronic device for reading printed barcodes