

Introduction to the Maker Lessons



The LEGO® Education WeDo 2.0 Maker lessons have been developed to engage and motivate elementary school students, piquing their interest in learning design, engineering, and coding using motorized models and simple programming.

Each lesson provides an initial brief as a starting point. The open-ended prompts allow for unlimited answers and enable students to express a wide range of creative solutions as they sketch, build, and test prototypes of the designs they create.

The teacher's role in these lessons is to provide students with the tools and necessary freedom to connect with and define a problem, make a solution, and share what they have made.

Use your creativity to adapt these lessons to suit the needs of your students.

“The role of the teacher is to create the conditions for invention rather than provide ready-made knowledge.”

– Seymour Papert

Classroom Management Tips

Required Materials

- LEGO® Education WeDo 2.0 Core Set
- Lesson plan
- Student Worksheet for each lesson
- Modeling materials already available in your classroom

How much time do you need?

Each lesson is designed to take 90 minutes. If you work in shorter class periods, you can break this down into two 45 minute sessions.

Preparation

It is important to establish student groups. Groups of two work well. Ensure that each student has a copy of the Student Worksheet for recording their design process, or alternatively, they can use their own preferred method for recording their design journey. They will also need the LEGO Education WeDo 2.0 Core Set (one set for every two students is recommended).

Prior Learning

Before beginning these Maker lessons, it is recommended that students complete at least one of the Getting Started lessons with Milo the Science Rover, and spend some time tinkering and playing with the WeDo 2.0 LEGO® bricks and programming app. These lessons, which can be found within the WeDo 2.0 software, will build students' competence and confidence in building and coding.

However, if you prefer a more open-ended, explorative approach, you can start out with this lesson and allow students to find help on their own by exploring the WeDo 2.0 Model and Program Libraries.

The LEGO® Education Maker (Design) Process



Find a Problem

It is important that students define a real problem to solve or find a new design opportunity from the start. The Connect images are provided as inspiration to help students as they begin thinking about their own design solutions.



Brainstorm

Brainstorming is an active part of making. Some students will find it easier to explore their thoughts through tinkering (hands-on experimentation) with the LEGO bricks, and others through recording sketches and notes. Group work is essential, but it is important to allow time for students to work alone before sharing their ideas with their group.



Choose the Best Idea

Discussing and finding an agreement about the best solution to build can involve a lot of negotiation, and may require different techniques depending on the student's skills. For example:

- Some students draw well.
- Others may build part of a model, and then describe what they mean.
- Other students may be good at describing a strategy.



Encourage a culture in which students can share anything, no matter how abstract it might sound. Be active during this phase and ensure that the ideas the students choose are achievable.

It is important that students set clear design criteria. Once the solution to the problem has been made, the students will return to these criteria, which will then form the basis for testing how well the solution works.



Go Make

Students must make one of the ideas using the LEGO® set, and can use other materials if needed. If they are finding it hard to build their idea, encourage them to break problems down into smaller parts. Explain that they do not have to come up with the whole solution from the start. Remind students that this process is iterative and they must test, analyze and revise their idea as they go.

Using this Maker process does not mean you are following an inflexible set of steps. Instead, think of it as a set of practices.

For example, brainstorming may be prominent at the beginning of the process. However, students may also need to brainstorm ideas when they are trying to figure out ways to improve their idea, or when they have a bad test result and they must change some feature of their design.



Evaluate What You Have Made

To help students develop their critical thinking and communication skills, you may wish to have students from one group observe and critique the solution from another group's solution. Peer review and formative feedback helps both the students giving and the students receiving the feedback to improve their work.



Present Your Model

The Student Worksheet is helpful for basic documentation of the lesson. Students can also refer to it when presenting their work in front of the class. You may also wish to use the Student Worksheet as a portfolio for performance evaluations or for student self-evaluation.

Assessment

Where can I find the assessment materials?

Assessment materials are provided at the end of the Student Worksheet for the first three projects.

What learning goals are assessed?

Students use the Maker self-assessment rubric to evaluate their design work. Each rubric includes four levels or achievement. The intention is to help students reflect on what they have done well and what they could have done better. Each rubric can be linked to engineering-related learning goals.

Using these rubrics, students assess themselves according to the 'Four Bricks Scale' in which the biggest brick represents the highest rating. In certain situations, you might consider asking your students to assess themselves using only two of the four bricks.



Design criteria example:
The design must..
The design should..
The design could..



Emerging

The student is at the beginning stages of development in terms of content knowledge, ability to understand and apply content, and/or demonstration of coherent thoughts about a given topic.

Developing

The student is able to present basic knowledge only (e.g., vocabulary), and cannot yet apply content knowledge or demonstrate comprehension of the concepts being presented.

Proficient

The student has concrete levels of comprehension of the content and concepts, and can demonstrate adequately the topics, content, or concepts being taught. The ability to discuss and apply concepts outside of the required assignment is lacking.

Accomplished

The student can take concepts and ideas to the next level, apply concepts to other situations, and synthesize, apply, and extend knowledge to discussions that include extensions of ideas.

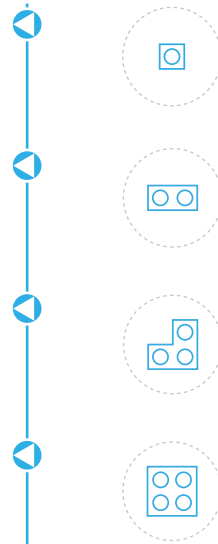
Share It

We encourage you to share your students' brilliant projects on the appropriate social media platforms using the hashtag #LEGOMaker.

The Maker Lessons

Start your Maker journey with the following three lessons:

- Make a sound machine
- Make a dancing robot
- Make a Life Hack



#LEGOMAKER