

# LEGO® Education WeDo 2.0

Use the following information when requesting grants for manipulatives used to teach science, technology, engineering and math for Grades 2-5.

## Need Statement

The issue, in my elementary classroom, is . . . (choose from the list below or create your own)

**Issue 1:** Our science curriculum is not hands-on

**Issue 2:** Our science curriculum does not integrate national engineering standards

**Issue 3:** Students are not engaging with critical thinking processes to solve real world problems

**Issue 4:** Students' interest or engagement are low

**Issue 5:** Students are struggling with problem solving skills

**Issue 6:** Not engaged in learning math or science

**Issue 7:** Extreme diversity of abilities

**Issue 8:** Need to incorporate more creative or project-based learning opportunities

**Issue 9:** Students need better opportunities to communicate in the language of mathematics and science, both orally and in writing

**Issue 10:** Students need to work effectively in teams

## Project Description:

Our solution is to utilize LEGO® Education WeDo 2.0 in the elementary school classroom to engage students in a STEM learning environment that is hands-on. WeDo 2.0 was designed around the Next Generation Science Standards to enrich science curricula through integrating technology, engineering, and programming into the four core areas of science: life science, earth and space science, physical science, and engineering. WeDo 2.0 is rooted in the belief of Constructivism, which says that children learn best when they experience things firsthand and within a meaningful context. The use of LEGO® bricks helps students overcome difficulties and persevere when a first attempt does not work. Students stay motivated to continue to try and learn rather than give up. Students will become more independent learners and develop 21st century skills including problem solving, comprehension, communication, creativity, critical thinking and technology. Additionally, students will be exposed to basic programming and coding skills through use of the WeDo 2.0 software, which allows students to create movement in their robots and program sensors to take in information.

Through this program (XX) number of students will learn how to program, design, and create working models that represent what is happening in real life. Students will be able to build models around themes that integrate



brainstorming, analyzing cause and effect, making observations during testing, displaying and communicating data, and creating working models with effective programming using the WeDo 2.0 Software. These experiences allow students to expand their knowledge of simple machines to demonstrate an understanding of how to make robots move and interact to solve problems. Additionally, these experiences will help students hone their speaking and listening skills as they present their ideas and listen to others' ideas.

The goals of this project are for students to demonstrate an increased ability to comprehend and solve basic problems through an application of science, technology, engineering, and math skills. **(Add in information on current scores in mathematics, science, etc. or other issues as it pertains to this grant to re-emphasize need.)**

This program will encourage a better attitude toward solving problems and increase students' confidence. **(Add information on the increases you hope to achieve using this program.)** Students' skills will be assessed throughout the project through on-going observation, presentations, and written work.

The project goals will be accomplished by working through the curriculum, which includes \_\_\_\_\_ hours of classroom instruction with open-ended, problem-solving activities that engage students. **(Add information on the standards and types of lessons you will utilize in this program to achieve the growth indicated in the paragraph above. See product alignment to NGSS for support. Be specific about the way you will implement the program so readers will understand exactly how the program will help students succeed in math.)**

WeDo 2.0 offers several resources to support implementation into the classroom including various types of curriculum. **(Insert relevant curriculum information in the paragraph above:)**

The WeDo 2.0 solution contains everything needed to ignite students' desire to learn while enhancing skills in science, engineering, technology, and coding. It includes over 40 hours of pre-prepared guided and open projects with step-by-step directions that enable lessons to meet all students' needs – no matter their ability level.

## Key Learning Values

- WeDo 2.0 strengthens students' understanding of the eight science and engineering practices, including asking questions and solving problems, modeling, prototyping, investigating, analyzing and interpreting data, computational thinking, creating evidence based arguments, and obtaining, evaluating, and communicating information.
- Develop your students' competencies through hands-on projects covering key science topics such as physical-, life-, earth- and space sciences, engineering and technology. Improve problem solving, critical thinking, communication, collaboration, and integrate the use of relevant digital tools to improve computational thinking skills.
- Work with simple machines: gears, levers, pulleys, and transmission of motion.

### Included in the Storage Bin:

Every WeDo 2.0 Core Set is delivered in a sturdy, plastic storage bin that comes with a sorting tray and contains:

- 280 LEGO system building elements
- WeDo 2.0 Smarthub - The Smarthub is an electronic system based building brick that is part of the LEGO Power Functions (LPF) 2.0, a new technology platform for LEGO Education. It has built-in Bluetooth low energy to wireless connect to the control software/App. It is powered from a battery source, 2 AA batteries or a rechargeable battery pack. It has two I/O ports to connect to external motors, sensors or any new component



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belonging to the LPF 2.0 system. It has a built-in RGB light surface that can show up to 10 different colors that be controlled by the software/App

- Medium Motor – The Medium Motor can be programmed to clockwise and counter-clockwise and to move at different power levels. Axles or other LEGO® system bricks and other LEGO elements can be attached to the motor.
- Motion sensor – The Motion Sensor detects objects within a range of 15 centimeters depending on the design of the object. The motion sensor can also be used as a range detector and can detect if an object is close or far away (up to 15 cm).
- Tilt sensor – The Tilt Sensor reports the direction it is tilted. A new functionality in the WeDo 2.0 Tilt sensor is “shake” mode. The Tilt Sensor detects changes within six different positions: Tilt This Way, Tilt That Way, Tilt Up, Tilt Down, No tilt, Any tilt (shake).
- Sticker sheet for labeling sorting tray compartments

Each WeDo 2.0 Core Set contains all of the building elements required to build the Get Started Project, along with the base and design library models featured in the WeDo 2.0 Curriculum Pack.

Two students share one Core Set to boost collaboration skills.

## Curriculum

WeDo 2.0 gives you more than 40 hours of teaching material over 17 projects that capture motivation and engagement across key science topics, including: physical sciences, life sciences, earth and space sciences and engineering.

You'll also get access to the Design Library, which gives students ideas and inspiration for new models that they can build on their own time.

The 17 projects include:

- One Getting Started project divided in 4 parts, to teach the basic functions of the WeDo 2.0 platform.
- Eight Guided Projects linked to curriculum standards, which provide teachers with a step-by-step instructional experience for completing each project.
- Eight Open Projects linked to the curriculum standards, which provide teachers with a more free-flowing, open-ended experience.

Each project offers around three hours of engagement and is delivered in three phases: explore, create, and share. The explore phase connects students to the real-world problem they will be asked to solve. In the create phase, students build, program and modify their designs. Lastly, in the share phase students document and present their findings to their peers.

Every project in the pack also contains suggestions for extended learning opportunities entitled “Create More” and “Investigate More”. These extensions provide students with additional challenges to delve deeper into the research, design, building, and programming phases of their project.

The Design Library offers students design and programming support, and contains inspiration models for them to build and modify if they have extra time. This gives students a place to hone their skills; learning new building and programming techniques without direct oversight from the teacher.



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## Software and apps

The WeDo 2.0 software provides an excellent platform for science learning, offering an innovative way for students to model reality, conduct investigations, and use design skills.

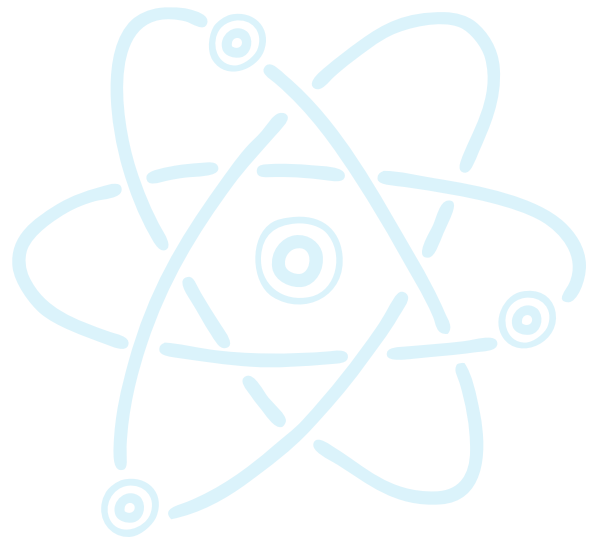
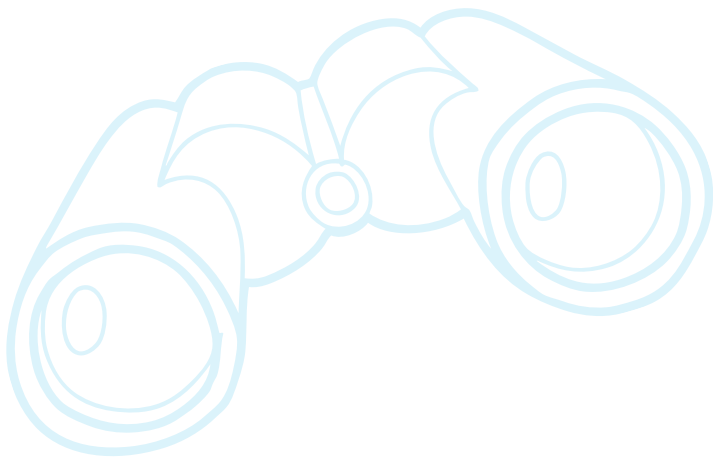
Programming is an important part of 21st century learning. The WeDo 2.0 software teaches programming in an intuitive way – letting students bring their creations to life while sharpening their computational thinking skills like logical reasoning, pattern recognition, and modeling simulations. The software also features a colorful drag and drop interface that is easy for students to use and understand.

## Assessment Tools & Documentation

The WeDo 2.0 solution give you access to a full suite of integrated assessment and documentation tools. With the integrated documentation tool, students can create a complete portfolio of work from which you can assess their progress and findings.

WeDo 2.0 also includes both teacher-led and student-led assessment tools:

- Anecdotal record grid  
The anecdotal record grid lets you record observations and deliver feedback to students about their learning progress as needed.
- Observation rubrics  
Use the observation rubrics grid to evaluate student performance during each step of the process and/or provide constructive feedback to help progress.
- Student-led assessment tools  
Enables students to reflect upon the work they have completed in an organized manner. They will be able to complete a report showing the work they have done using the integrated documentation tool.



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