LEGO® Education WeDo 2.0

WeDo 2.0

LEGO education

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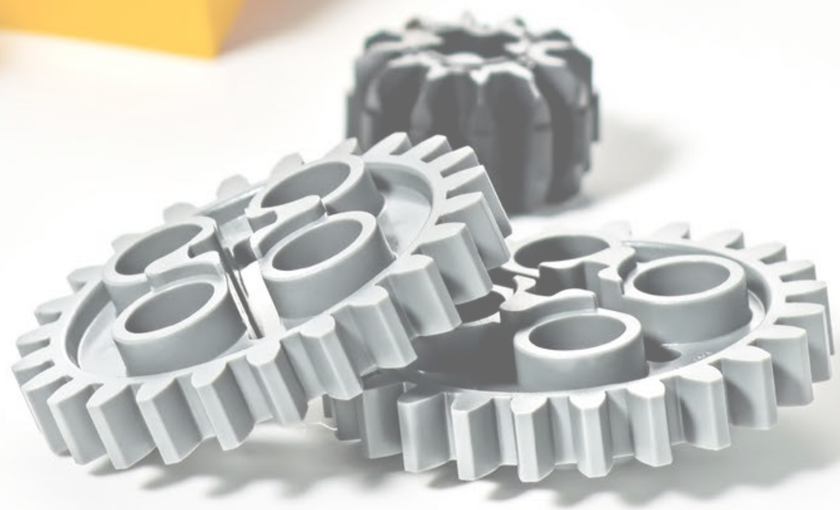


The LEGO® Education Community is an online community where teachers, administrators, and other education professionals can connect and share ideas, engage in discussions, and share lesson plans and projects.

The LEGO Education Community site is only available in English.

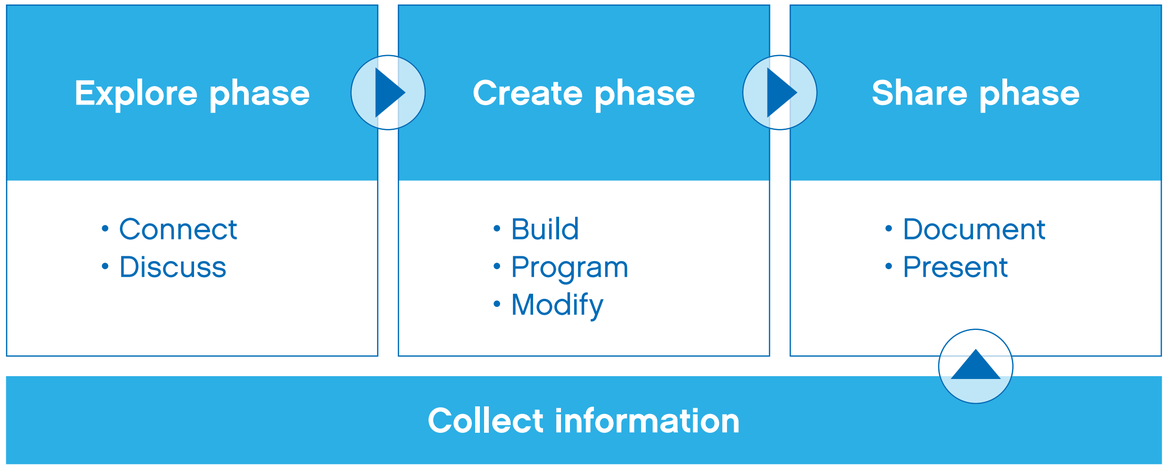
Introduction to WeDo 2.0

Welcome to the LEGO® Education WeDo 2.0 Curriculum Pack.

In this chapter, you will discover the fundamental steps required for the journey you are about to experience.

How to teach science with WeDo 2.0

WeDo 2.0 uses a project progression defined by three phases.



Explore phase

Pupils connect to a scientific question or an engineering problem, establish a line of inquiry, and consider possible solutions.

The steps of the Explore phase are: connect and discuss.

Create phase

Pupils build, program, and modify a LEGO® model. Projects can be one of three types: investigate, design solutions, and use models. Depending on the type of project, the Create phase will differ from one project to another.

The steps of the Create phase are: build, program, and modify.

Share phase

Pupils present and explain their solutions and findings using their LEGO models and the documents they have created with the integrated Documentation tool.

The steps of the Share phase are: document and present.

Important

During each of these phases, pupils will document their findings, the answers, and the process, using various methods. This document can be exported and used for assessment, display, or sharing with parents.

Document projects

Asking your pupils to document their work will help you to keep track, identify where they need more help, and evaluate their progress.

Pupils can use many different methods to express their ideas. During the ongoing documentation process, they can:

1. Take photographs of important steps of their prototypes and their final models.
2. Take photographs of their team working on important stages of the process.
3. Record a video explaining a problem they are facing.
4. Record a video explaining their investigation.
5. Make notes using the Documentation tool.
6. Find supporting pictures on the Internet.
7. Take screenshots of their programs.
8. Write, draw, or sketch on paper and then take photographs to record the information.

Suggestion

A combination of paper and digital documentation can be the most effective, depending on the age group you are working with.

Share projects

At the end of the project, pupils will be eager to share their solutions and findings. This is a great opportunity to develop their communication abilities.

Here are a few examples of how your pupils can share their work:

1. Ask the pupils to create the display where the LEGO® model will be used.
2. Ask the pupils to describe their investigations or dioramas.
3. Ask a team of pupils to present their best solution to you, another team, or to the class.
4. Invite an expert or a group of parents to your classroom for a pupil presentation.
5. Organise a science fair at your school.
6. Ask the pupils to record videos explaining their projects, and post them online.
7. Create and display posters of the projects around your school.
8. E-mail the project documents to parents, or publish them in pupils' portfolios.

Suggestion

To make this experience even more upbeat, ask each pupil to make a positive comment or to pose a question about another pupil's work during the sharing session.

WeDo 2.0 in the Curriculum

The LEGO® Education WeDo 2.0 solution combines LEGO bricks with the expectations of the National Curriculum Science programmes of study. The projects are designed to develop pupils' science practices.

In this chapter, you will be introduced to three innovative ways to use the bricks in your classroom:

- Model reality.
- Conduct investigations.
- Use design skills alongside the development of science practices.

Develop science and engineering practices with WeDo 2.0

WeDo 2.0 projects will develop science practices. They provide opportunities for pupils to work with and develop ideas and knowledge, and to gain an understanding of the world around them.

The progression and difficulty level of the projects allows pupils to develop competency while exploring and learning about key science topics. The projects have been carefully chosen to cover a wide variety of topics and issues.

WeDo 2.0 projects develop eight science and engineering practices:

1. Ask questions and solve problems.
2. Use models.
3. Design prototypes.
4. Investigate.
5. Analyse and interpret data.
6. Use computational thinking.
7. Engage in argument from evidence.
8. Obtain, evaluate, and communicate information.

The guiding principle is that every pupil should engage in all of these practices across the projects in each year group.

Science practices and the engineering habits of mind

The science and engineering practices serve as the common thread throughout the curriculum, and all requirements should, in essence, be taught through them. While the academic definition of each process is important, it is probably a good habit to verbalise the practices in a way that is understandable to pupils at that level.

The following points identify the basic principles of these practices and give examples of how they are used in WeDo 2.0 projects.

1. Ask questions and define problems.
This practice focuses on simplistic problems and questions based on observational skills.

2. Develop and use models.
This practice focuses on pupils' prior experiences and the use of concrete events in modelling solutions to problems. It also includes improving models and new ideas about a real-world problem and solution.

3. Plan and carry out investigations.
This practice is about how pupils learn and follow directions for an investigation to formulate probable solution ideas.

4. Analyse and interpret data.
The focus of this practice is to learn how to gather information from experiences, document discoveries, and share ideas from the learning process.

Science practices and the engineering habits of mind

5. Use mathematics and computational thinking.
The purpose of this practice is to realise the role of numbers in data-gathering processes. Pupils read and gather data about investigations, make charts, and draw diagrams resulting from the numerical data. They add simple data sets to come up with conclusions. They understand or create simple algorithms.

6. Construct explanations and design solutions.
This practice is about ways they might go about constructing an explanation or designing a solution for a problem.

7. Engage in argument from evidence.
Constructively sharing ideas based on evidence is an important feature of science and engineering. This practice is about how pupils begin to share their ideas and demonstrate proof to others in a group.

8. Obtain, evaluate, and communicate information.
Teaching children about what real scientists do is key to this practice. The way in which they set up and complete investigations to gather information, how they evaluate their findings, and how they document, are all important elements. It is important that teachers explore a plethora of ways to have pupils gather, record, evaluate, and communicate their findings. Ideas include digital presentations, portfolios, drawings, discussion, video, and interactive notebooks.

Important

The WeDo 2.0 projects will engage your pupils in all science and engineering practices. Refer to the practices grid of this chapter to get an overview.

Use LEGO® bricks in a computational thinking context

Computational thinking is a set of problem-solving skills that are applied to working with computers and other digital devices. In WeDo 2.0, computational thinking is handled in a developmentally appropriate manner through the use of icons and programming blocks.

Computational thinking characteristics include:

- Logical reasoning
- Looking for patterns
- Organising and analysing data
- Modelling and simulations
- Using computers to assist in testing models and ideas
- Using algorithms to sequence actions

Its application in science and engineering projects enables pupils to use powerful digital tools to carry out investigations and build and program models, which might otherwise be tricky to do. Pupils use programs to activate motors, lights, sounds, or displays, or to react to sounds, tilt, or movement to implement functionalities to their models or prototypes.

Assess with WeDo 2.0

There are many ways to monitor and assess your pupils' progress through a WeDo 2.0 project. Here are some useful assessment tools:

- Anecdotal record grid
- Observation rubrics grid
- Documentation pages
- Self-assessment statements

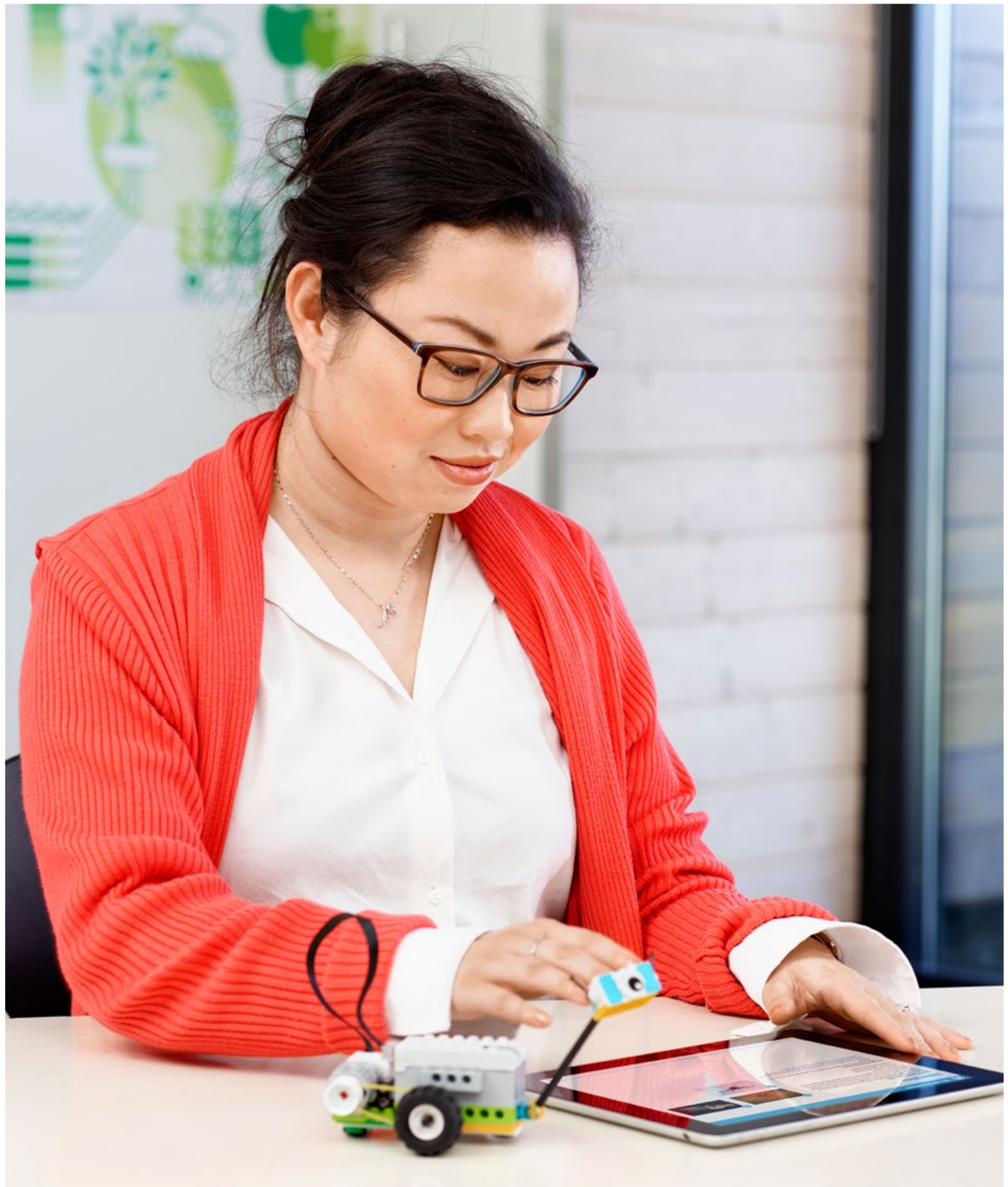
Teacher-led assessment

Developing pupils' science and engineering practices takes time and feedback. Just as in the design cycle, in which pupils should know that failure is part of the process, assessment should provide feedback to pupils in terms of what they did well and where they can improve.

Problem-based learning is not about succeeding or failing. It is about being an active learner and continually testing and building upon ideas.

Anecdotal record grid

The anecdotal record grid lets you record any type of observation you believe is important about each pupil. Use the template on the next page to provide feedback to pupils about their learning progress as required.



Anecdotal record grid

Name: Class: Project:

Emerging	Developing	Proficient	Accomplished
Notes:			

Teacher-led assessment

Observation rubrics

An example rubrics has been provided for every Guided Project. You can use the observation rubrics grid to:

- Evaluate pupil/team performance at each step of the process.
- Provide constructive feedback to help the pupil/team to progress.

Observation rubrics provided in the Guided Projects can be adapted to fit your needs. The rubrics are based on these progressive stages:

1. Emerging

The pupil 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.

2. Developing

The pupil is able to present basic knowledge only (vocabulary, for example), and cannot yet apply content knowledge or demonstrate comprehension of concepts being presented.

3. Proficient

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

4. Accomplished

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

Suggestion

You can use the observation rubrics grid on the next page to keep track of your pupils' progress.

Observation rubrics grid

Class:		Project																
Pupils' names		Scientific understanding			English, presentation & problem-solving													
		Explore	Create	Share	Explore	Create	Share											
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		

To be used with the rubrics description in the "Guided Projects" chapter (1. Emerging, 2. Developing, 3. Proficient, 4. Accomplished).

Pupil-led assessment

Documentation pages

Each project will ask pupils to create documents to summarise their work.
To have a complete science report, it is essential that pupils:

- Document with various types of media.
- Document every step of the process.
- Take the time to organise and complete their documents.

It is most likely that the first document your pupils complete will not be as good as the next one:

- Allow them time and feedback to see where and how they can improve it.
- Ask your pupils to share their documents with each other. By communicating their scientific findings, pupils are engaged in the work of scientists.

Self-assessment statements

After each project, pupils can reflect on the work they have done. Use the following page to encourage reflection and set goals for the next project.

Pupil self-assessment rubric

Name: Class: Project:

	Explore	Create	Share
	I documented and used my best reasoning in connection with the question or problem.	I did my best work to solve the problem or question by building and programming my model and making changes when needed.	I documented important ideas and evidence throughout my project and did my very best when presenting to others.
1			
2			
3			
4			

Project reflection

One thing I did really well was:

One thing I want to improve on for next time is:

Classroom Management

In this chapter, you will find information and guidance to help with the implementation of WeDo 2.0 in your classroom.

The secret for success resides in these key elements:

- Good material preparation
- Good classroom disposition
- Good WeDo 2.0 project preparation
- Good guidance of pupils

Prepare the material

1. Install the software on the computers or tablets.
2. Open each LEGO® Education WeDo 2.0 Core Set and sort the elements.
3. Attach the labels to the relevant sorting tray compartments.
4. It is a good idea to label the box, Smarthub, motor, and sensors with a number. That way, you can assign a numbered kit to each pupil or team. You may find it helpful to also display the parts list in the classroom.
5. Put two AA batteries in the Smarthub or use the supplementary Smarthub rechargeable battery.

Suggestion

To improve your classroom experience, it is recommended that you allocate a name, from the list in the Connection Centre, to each Smarthub.

When you access the Connection Centre:

1. Press on the button on the Smarthub.
2. Locate the Smarthub name in the list.
3. Long Press on the name you wish to change.
4. At this point, you will be able to enter a name of your choice.

You can insert names following a code, such as:

- WeDo-001,
- WeDo-002,
- etc.

This will make it easier for the pupils to locate and connect with the right Smarthub.

Before you start a project

Classroom disposition

1. Designate a cabinet, trolley cart, or other space for storing the sets between sessions.
2. If not already available in your classroom, prepare a box of measuring tools, such as rulers or tape measures, and paper for collecting data and making charts.
3. Ensure that there is enough space in the classroom for the project to take place.
4. When planning the projects, ensure that there is enough time for the pupils to put their models and parts away at the end of each session.

Teacher preparation

1. Spend some time exploring the bricks in the WeDo 2.0 set, and determine key expectations for classroom use.
2. Set aside an hour to try the Getting Started Project, as if you were one of the pupils.
3. Read the overview and projects description in the “Open Projects” chapter and select the project you wish to complete.
4. Review the planning of the project you have selected.

Now you’re ready to go!

Pupil guidance

It is important to establish good classroom management habits when working with the WeDo 2.0 sets and digital devices.

It may be helpful to establish clear expectations for team roles:

- WeDo 2.0 projects are optimal for a team of two pupils working together.
- Ask the pupils to work to their strengths within their groups.
- Make adjustments to suit teams who are ready to develop new skills and improve further.
- Assign, or ask the pupils to determine, specific roles for each team member.

Suggestion

Assign a role to each pupil so that the team can foster collaboration and cooperation skills. Here are a few ideas/examples:

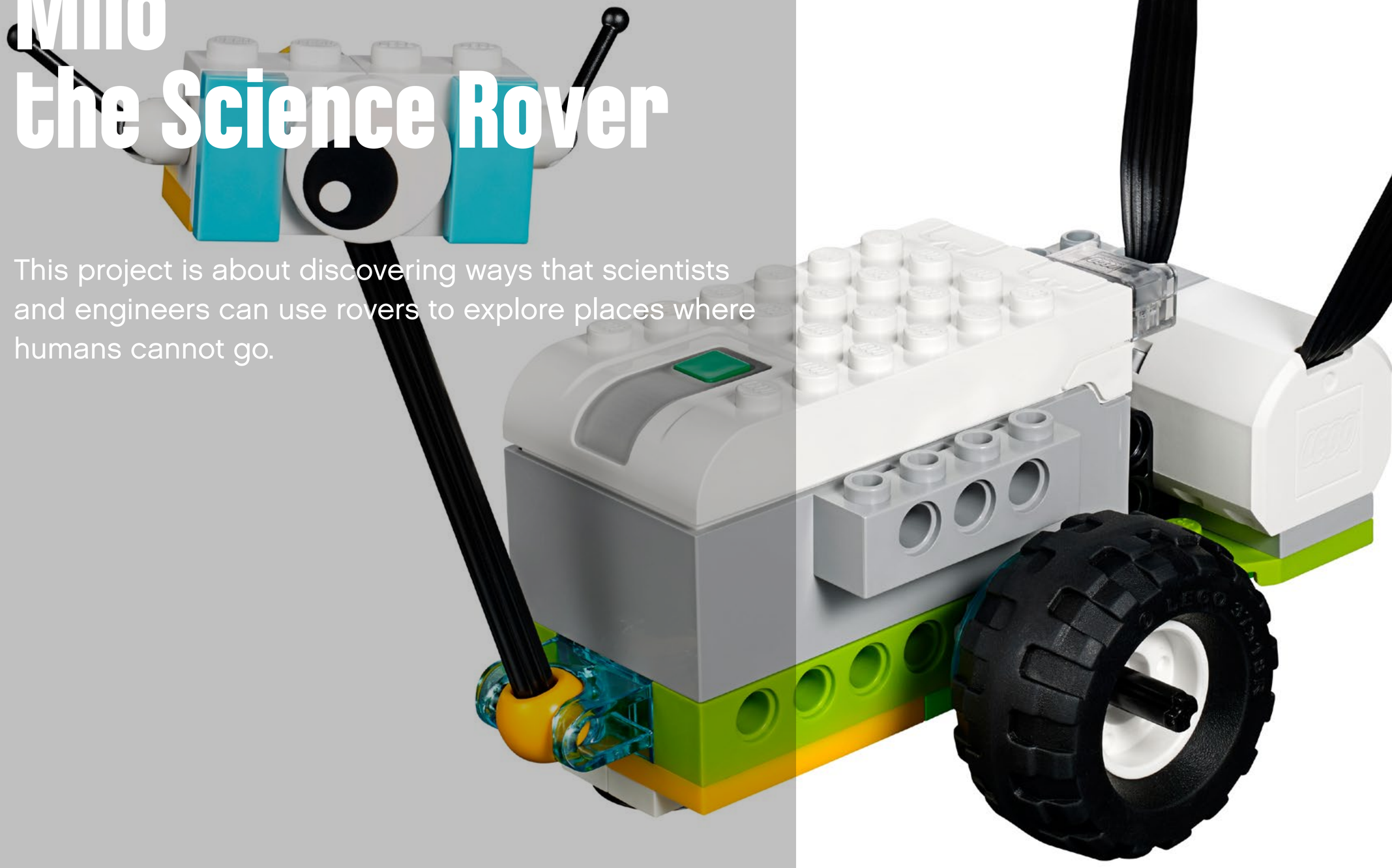
- Selector – chooses the bricks
- Builder – assembles the bricks
- Programmer – creates the program strings
- Documenter – takes photographs and videos
- Presenter – explains the project
- Team captain

It is also a good idea to rotate roles. This allows the pupils to experience all of the components involved in each project, and will help them to develop a wider range of skills.

Getting Started Projects

Getting Started Project – Part A

Milo the Science Rover



This project is about discovering ways that scientists and engineers can use rovers to explore places where humans cannot go.

Quick glance: Getting Started Project, part A

Preparation: 30 min.

- For information regarding general preparation, please see the “Classroom Management” chapter.
- Read through this project so you have a good idea of what to do.
- Prepare to introduce this project to your pupils.
- Define your expectations and theirs.
- Determine the end result of this project: Everyone should have a chance to build, program, and document.
- Make sure that timing allows for expectations to be met.

Explore phase: 10 min.

- Start the project using the introductory video.
- Have a group discussion.

Create phase: 20 min.

- Ask the pupils to build the first model from the provided building instructions.
- Ask them to program the model using the sample program.
- Allow pupils time so they can make their own experiments and change the parameters of the program.
- Challenge them to discover new programming blocks on their own.

Share phase: 10 min.

Some suggestions for sharing include:

- Make sure your pupils take photographs of their models.
- Make sure they write their names and comments in the Documentation tool.
- Ask the pupils to export the results of their projects and share them with their parents.

Important

It is recommended that you complete the four Getting Started Projects in a single sequence. If not, it is recommended that you complete these before moving on to other projects. This will give the pupils ample time to explore the materials. Approximate timing for the four Getting Started Projects is:

- Part A: Milo the Science Rover: 40 min.
- Part B: Milo’s Motion Sensor: 15 min.
- Part C: Milo’s Tilt Sensor: 15 min.
- Part D: Collaborate: 15 min.

Explore phase

Use the introductory video

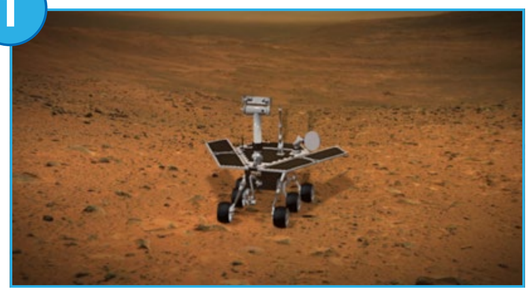
Scientists and engineers have always challenged themselves to explore remote places and make new discoveries. To make this possible, they have designed spacecraft, rovers, satellites, and robots that enable them to collect data and make visual observations of previously inaccessible places. They have succeeded many times, but have also failed many times. Remember that failure presents a chance to learn. Use the following ideas to start thinking like a scientist:

1. Scientists send rovers to Mars.
2. They use submarines in water.
3. They fly drones into volcanoes.

Questions for discussion

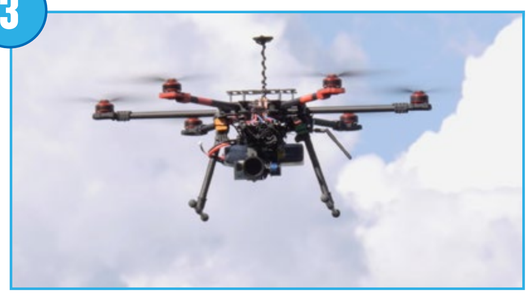
1. What do scientists and engineers do when they cannot go where they want to explore?
   Scientists and engineers see these situations as challenges that need to be overcome. With proper resources and commitment, they will develop prototypes of possible solutions and ultimately choose the best option.

1



2

3



Create phase

Build and program Milo

Pupils should follow the building instructions to build Milo the Science Rover.

1. Build Milo the Science Rover.

This model will give pupils a “first build” experience with WeDo 2.0.

Important

Make sure everyone can connect the motor to the Smarthub, and the Smarthub to the device.

2. Program Milo.

This program will start the motor at power eight, travel in one direction for two seconds, and then stop.

The motor can be started in both directions, stopped and turned at different speeds, and activated for a specific amount of time (specified in seconds).

Suggestion

Give pupils time to change the parameters of this program string. Let them discover new features, such as adding sound.

Use this opportunity to guide pupils to the Design Library, where they can find inspiration to explore other program strings.

Share phase

Present

Before you move on to the next part of the Getting Started Project, allow the pupils to express themselves:

- Have a short discussion with your pupils about scientific and engineering instruments.
- Ask your pupils to describe how science rovers are helpful to humans.

Document

- Introduce the pupils to the Documentation tool.
- Ask them to take photographs of themselves together with their models.

Getting Started Project – Part B

Milo's Motion Sensor

In this section, pupils will be introduced to the use of the Motion Sensor to detect the presence of a special plant specimen.

Using a Motion Sensor

Explore phase

Rovers sent to remote locations need to have sensors so that they can complete tasks without the need for constant human attention.

Questions for discussion

1. How are science instruments important to the tasks that scientists have to complete?
   Rovers are fitted with sensors that tell them when to move and when to stop. This makes them suitable for carrying out research In remote locations.

Create phase

Your pupils will follow the provided building instructions to create a robotic arm that incorporates the Motion Sensor, making it possible for Milo to detect the plant sample. They will also build a plant sample on a LEGO® round plate.

The provided program string will make the rover move forward until it detects the presence of the sample object. It will then stop and make a sound.

Ask the pupils to record a sound that will signify the rover's discovery.

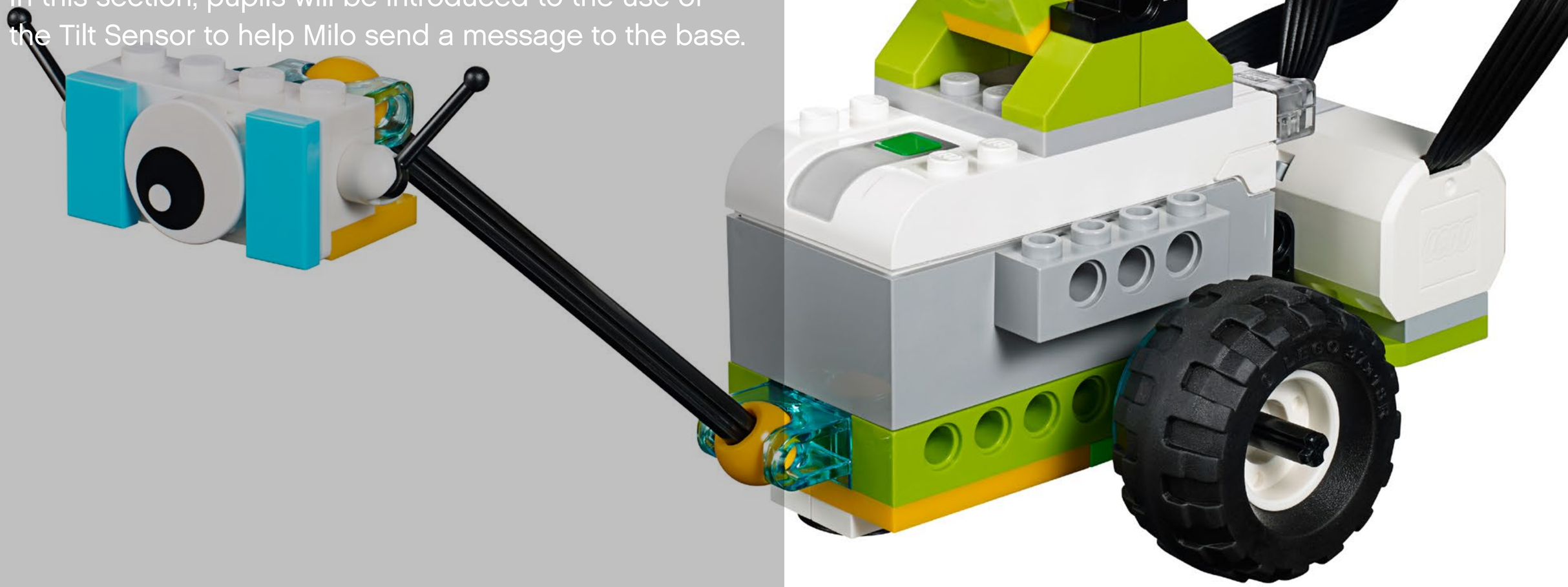
Share phase

Ask your pupils to record a video of their mission. They will practice using the camera and recording themselves, which will be useful for future projects.

Getting Started Project – Part C

Milo's Tilt Sensor

In this section, pupils will be introduced to the use of the Tilt Sensor to help Milo send a message to the base.



Introduce the use of a Tilt Sensor

Explore phase

When rovers locate what they are looking for, they send a message back to the base.

Questions for discussion

1. Why is communication between a rover and its base so important?
   If a rover successfully completes a series of tasks, but fails to send back the results, the mission will be deemed a failure. A communication link between the remote rover and the base is essential.
2. How do we communicate with rovers?
   Currently, satellites are used to transmit radio signals between the base and the rover.

Create phase

Using the Tilt Sensor and the provided building instructions, your pupils will build a device that can send a message back to the base.

The program string will trigger two actions, depending on the angle detected by the Tilt Sensor:

- If tilted down, the red LED will light up.
- If tilted up, a text message will appear on the device.

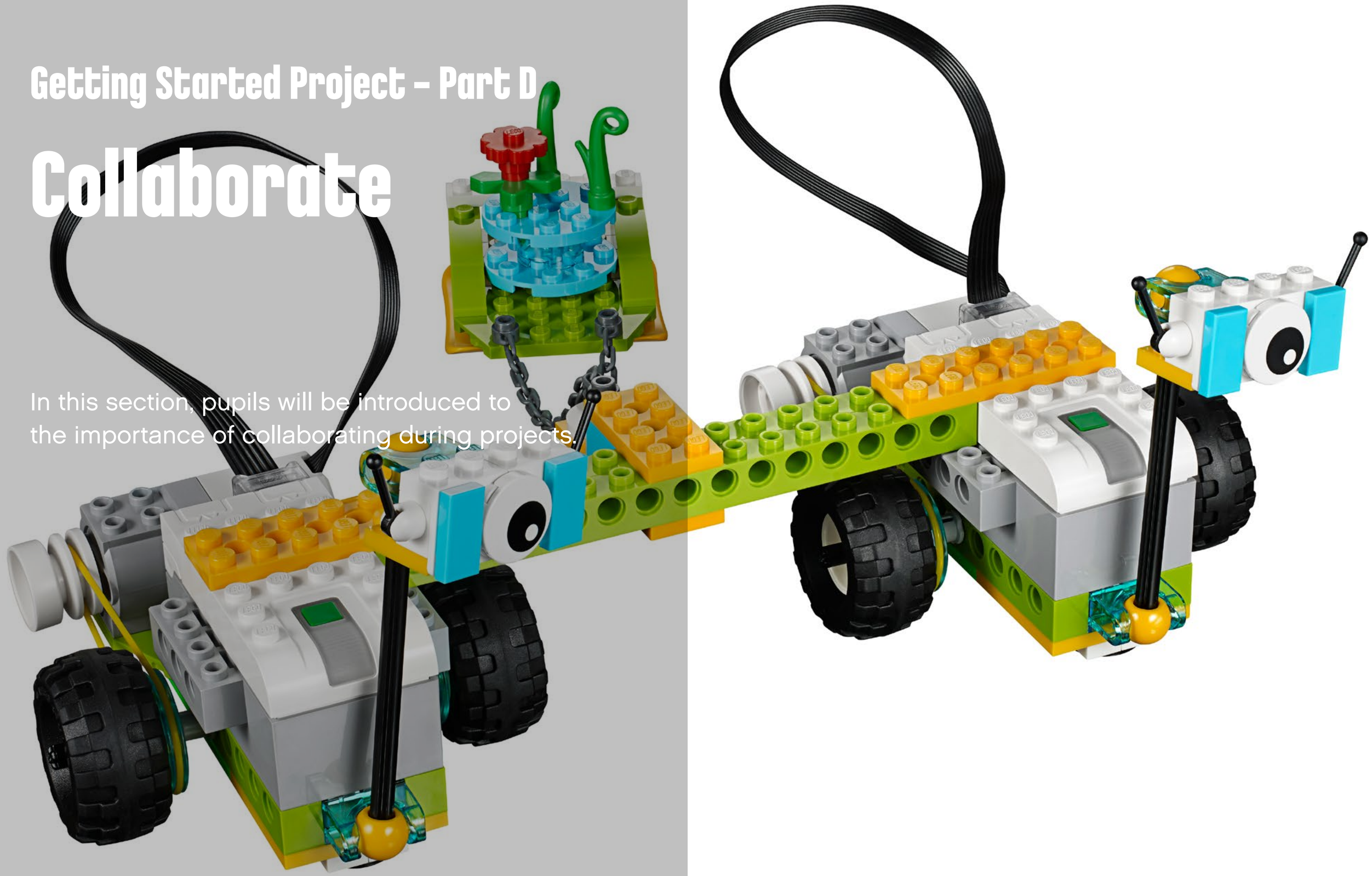
Share phase

Make sure that each pupil takes a screenshot of their final program. Ask them to practise documenting the program strings they used in their project.

Getting Started Project - Part D

Collaborate

In this section, pupils will be introduced to the importance of collaborating during projects.



Collaborate with other rovers

Explore phase

Now that your rover has found the plant sample, it is time to carry it back. But wait. It might be too heavy! Let's see if you can collaborate with another rover to move the sample forward together.

Create phase

Pair up the teams to complete this final part of the mission:

1. Ask them to build the transportation device, physically connecting the two rovers together.
2. Let pupils create their own program strings to move the specimen from a point A to a point B.
   Pupils could use the following program strings.
3. When everyone is ready, ask the teams to carefully move their plant samples.

Suggestion

Note that you can connect up to three Smarthubs to the same tablet; for teams working on their own. See the "Toolbox" chapter for instructions.

Share phase

Ask the pupils to discuss their experiences:

- Why is it important to collaborate when solving a problem?
- Give an example of good communication among teams.

Finally, ask the pupils to complete their document with the Documentation tool while collecting and organising important information.

Important

Because not all the WeDo motors are the same, teams will have to collaborate in order to succeed.

Build with WeDo 2.0

WeDo 2.0 has been designed to provide opportunities for pupils to sketch, build, and test prototypes and representations of objects, animals, and vehicles that have a real-world focus.

The hands-on approach encourages pupils to be fully engaged in the designing and building process.

Electronic parts

Smarthub

The Smarthub acts as a wireless connector between your device and the other electronic parts, using Bluetooth Low Energy. It receives and executes program strings from each device.

The Smarthub features:

- Two ports to connect sensors or motors
- A light
- A power button

The Smarthub uses AA batteries or the supplementary Rechargeable Battery as a power source.

The Bluetooth connection procedure between the Smarthub and your device is explained in the WeDo 2.0 Software.

The Smarthub will use colour patterns to signal messages:

- Flashing white light: Waiting for a Bluetooth connection.
- Blue light: Bluetooth connection is established.
- Flashing orange light: The power provided to the motor is at its limit.

Electronic parts

Smarthub Rechargeable Battery
(supplementary item)

Here are some guidelines for the Smarthub Rechargeable Battery:

- To maximise the hours of play available without the adaptor connected, make sure that the battery is fully charged before you begin.
- There are no special requirements for charging patterns.
- Preferably, store the battery in a cool place.
- Recharging is recommended If the battery has been installed in the Smarthub, without use, for more than one month.
- Do not let the battery charge for an extended period of time.

Medium Motor

A motor makes other things move. This Medium Motor uses electricity to make an axle rotate.

The motor can be started in both directions, can be stopped, and can run at different speeds for a specified amount of time (seconds).

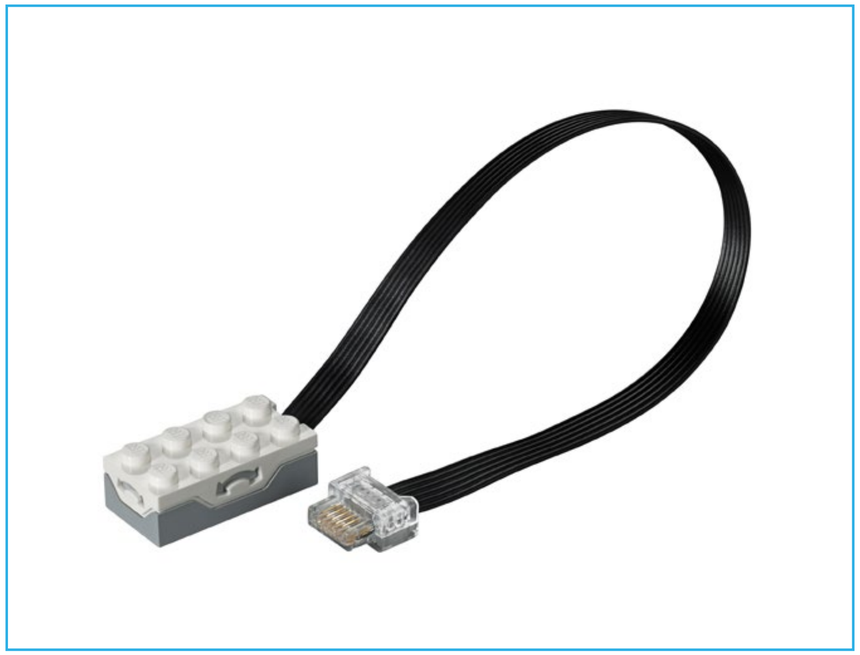
Electronic parts: sensors

Tilt Sensor

To interact with this sensor, tilt the part in different directions, following the arrows.
The sensor can detect changes in six different positions:

- Tilt this way
- Tilt that way
- Tilt up
- Tilt down
- No tilt
- Any tilt

Make sure that the icon in your program corresponds to the position you are trying to detect.



Motion Sensor

This sensor detects changes in distance from an object within its range,
in three different ways:

- Object moving closer
- Object moving further away
- Object changing position

Make sure that the icon in your program corresponds to the position you are trying to detect.

Part names and primary functions

As pupils use the bricks, you may want to discuss proper vocabulary as well as functions for each part in the set.

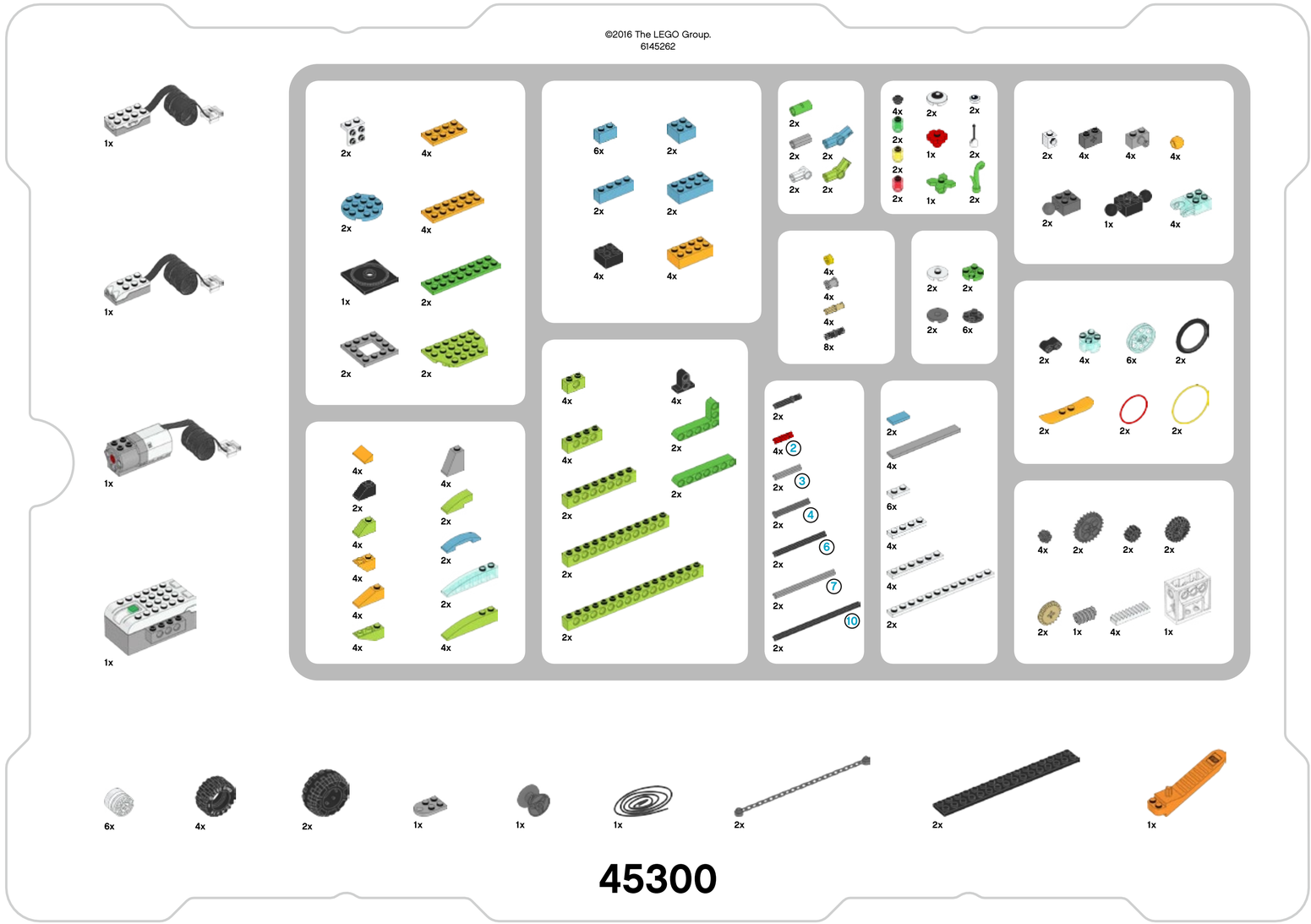
- Some of them are structural parts that hold your model together.
- Some parts are connectors that link elements to each other.
- Some parts are used to produce movement.

Important

Remember that these categories are guidelines. Some parts have many functions and can be used in many ways.

Suggestion

Use the cardboard box when sorting the parts in the WeDo 2.0 storage box. This will help you and your pupils when viewing and counting the parts.



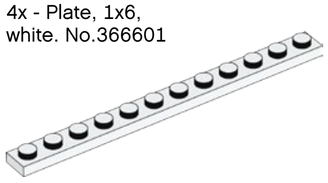
Structural parts


2x - Angular plate, 1x2/2x2,
white. No.6117940


6x - Plate, 1x2,
white. No.302301

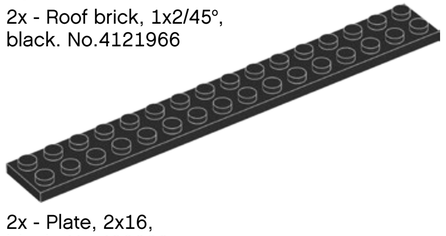

4x - Plate, 1x4,
white. No.371001

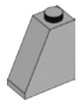

4x - Plate, 1x6,
white. No.366601

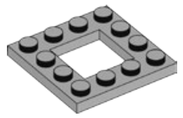

2x - Plate, 1x12,
white. No.4514842

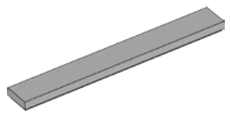

4x - Beam with plate, 2-modules,
black. No.4144024


2x - Roof brick, 1x2/45°,
black. No.4121966

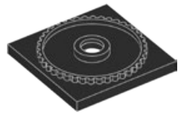

2x - Plate, 2x16,
black. No.428226


4x - Roof brick, 1x2x2,
grey. No.4515374


2x - Frame plate, 4x4,
grey. No.4612621


4x - Tile, 1x8,
grey. No.4211481

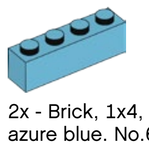

4x - Brick, 2x2,
black. No.300326

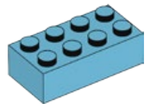

1x - Bottom for turntable, 4x4,
black. No.4517986


2x - Tile, 1x2,
azure blue. No.4649741


6x - Brick, 1x2,
azure blue. No.6092674

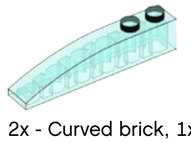

2x - Brick, 2x2,
azure blue. No.4653970


2x - Brick, 1x4,
azure blue. No.6036238


2x - Brick, 2x4,
azure blue. No.4625629

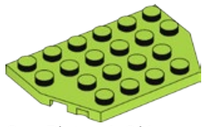

2x - Curved plate, 1x4x2/3,
azure blue. No.6097093


2x - Round plate, 4x4,
azure blue. No.6102828

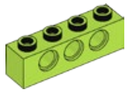

2x - Curved brick, 1x6,
transparent light blue. No.6032418

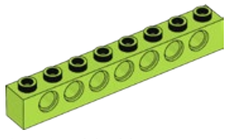

4x - Roof brick, 1x2/45°,
lime green. No.4537925

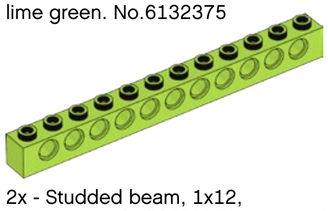

4x - Inverted roof brick, 1x3/25°,
lime green. No.6138622

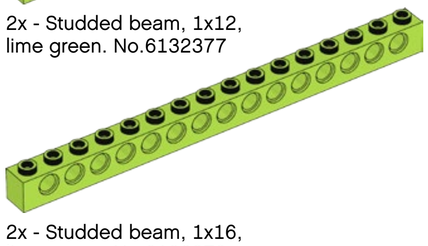

2x - Plate, 4x6/4,
lime green. No.6116514


4x - Studded beam, 1x2,
lime green. No.6132372


4x - Studded beam, 1x4,
lime green. No.6132373

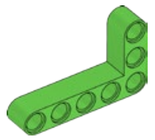

2x - Studded beam, 1x8,
lime green. No.6132375

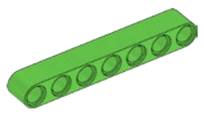

2x - Studded beam, 1x12,
lime green. No.6132377

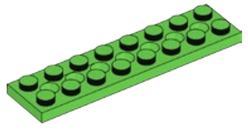

2x - Studded beam, 1x16,
lime green. No.6132379


2x - Curved brick, 1x3,
lime green. No.4537928


4x - Curved brick, 1x6,
lime green. No.6139693

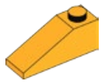

2x - Angular beam, 3x5-modules,
bright green. No.6097397

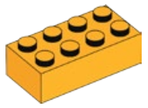

2x - Beam, 7-modules,
bright green. No.6097392

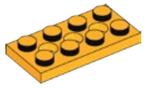

2x - Plate with holes, 2x8,
bright green. No.6138494

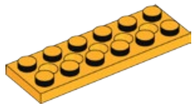

4x - Roof brick, 1x2x2/3,
bright orange. No.6024286


4x - Inverted roof brick, 1x2/45°,
bright orange. No.6136455


4x - Roof brick, 1x3/25°,
bright orange. No.6131583


4x - Brick, 2x4,
bright orange. No.6100027


4x - Plate with holes, 2x4,
bright orange. No.6132408


4x - Plate with holes, 2x6,
bright orange. No.6132409

Connecting parts

2x - Brick with stud on side, 1x1,
white. No.4558952

2x - Angular block 1, 0°,
white. No.4118981

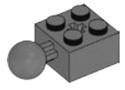
4x - Bushing, 1-module,
grey. No.4211622

2x - Bushing/axle extender, 2-module,
grey. No.4512360

4x - Brick with connector peg, 1x2,
grey. No.4211364

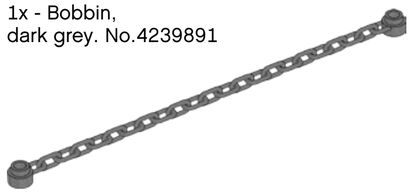
1x - Plate with hole, 2x3,
grey. No.4211419

4x - Studded beam with crosshole,
1x2, dark grey. No.4210935



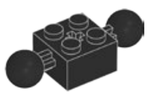
2x - Brick with 1 ball joint, 2x2,
dark grey. No.4497253

1x - Bobbin,
dark grey. No.4239891



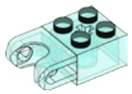
2x - Chain, 16-modules,
dark grey. No.4516456

8x - Connector peg, with friction,
2-modules, black. No.4121715



1x - Brick with 2 ball joints, 2x2,
black. No.6092732

1x - String, 50 cm,
black. No.6123991



4x - Brick with ball bearing, 2x2,
transparent light blue. No.6045980

2x - Angular block 3, 157,5°,
azure blue. No.6133917

2x - Angular block 4, 135°,
lime green. No.6097773

2x - Tube, 2-modules,
bright green. No.6097400

4x - Connector peg, without friction/
axle, 1-module/1-module,
beige. No.4666579

4x - Ball with crosshole,
bright orange. No.6071608

4x - Bushing/pulley, ½-module,
yellow. No.4239601

Movement parts

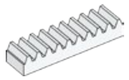
6x - Hub/pulley, 18x14 mm,
white. No.6092256

1x - Worm gear,
grey. No.4211510

2x - Rubber beam with crossholes,
2-modules, black. No.4198367

4x - Axle, 2-modules,
red. No.4142865

2x - Bevel gear, 20-tooth,
beige. No.6031962



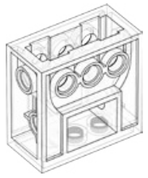
4x - Gear rack, 10-tooth,
white. No.4250465

4x - Gear, 8-tooth,
dark grey. No.6012451

2x - Double bevel gear, 12-tooth,
black. No.4177431

2x - Connector peg with axle,
3-modules, black. No.6089119

2x - Belt, 33 mm,
yellow. No.4544151



1x - Gear block,
transparent. No.4142824

2x - Gear, 24-tooth,
dark grey. No.6133119

2x - Double bevel gear, 20-tooth,
black. No.6093977

2x - Axle, 3-modules,
grey. No.4211815

2x - Snowboard,
bright orange. No.6105957

4x - Round brick, 2x2,
transparent light blue. No.4178398

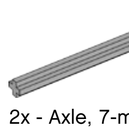
2x - Tyre, 30.4x4 mm,
black. No.6028041

2x - Axle with stop, 4-modules,
dark grey. No.6083620

2x - Belt, 24 mm,
red. No.4544143

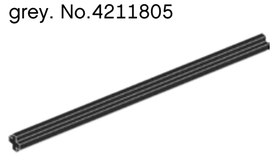
6x - Hub/pulley, 24x4 mm,
transparent light blue. No.6096296

4x - Tyre, 30.4x14 mm,
black. No.4619323

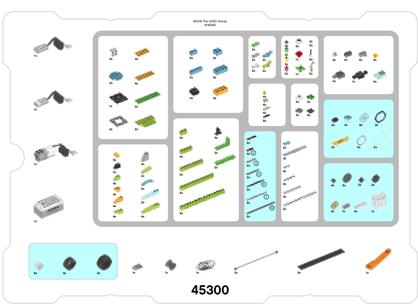


2x - Axle, 7-modules,
grey. No.4211805

2x - Tyre, 37x18 mm,
black. No.4506553



2x - Axle, 10-modules,
black. No.373726



Decorative parts

2x - Antenna,
white. No.73737

2x - Round tile with eye, 1x1,
white. No.6029156

2x - Round tile with eye, 2x2,
white. No.6060734

2x - Round plate with 1 stud, 2x2,
white. No.6093053

2x - Round tile with hole, 2x2,
dark grey. No.6055313

4x - Round plate, 1x1,
black. No.614126

6x - Skid plate, 2x2,
black. No.4278359

2x - Round brick, 1x1,
transparent green. No.3006848

2x - Grass, 1x1,
bright green. No.6050929

2x - Round plate, 2x2,
bright green. No.6138624

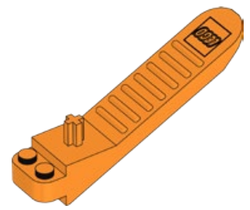
1x - Leaves, 2x2,
bright green. No.4143562

2x - Round brick, 1x1,
transparent yellow. No.3006844

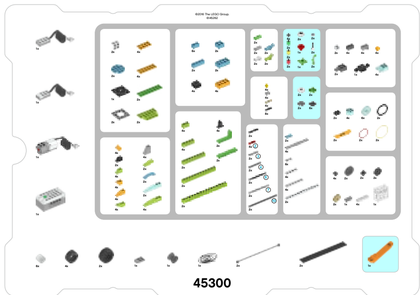
2x - Round brick, 1x1,
transparent red. No.3006841

1x - Flower, 2x2,
red. No.6000020

Brick separator



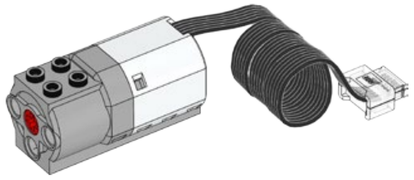
1x - Element separator,
orange. No.4654448



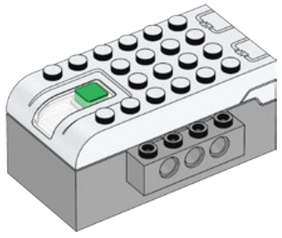
Electronic parts

1x - Tilt Sensor,
white. No.6109223

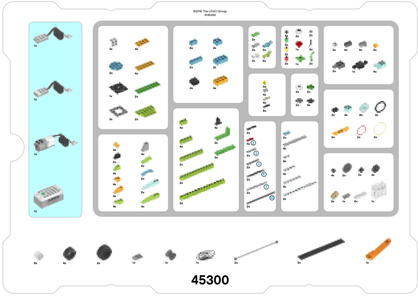
1x - Motion Sensor,
white. No.6109228



1x - Medium Motor,
white. No.6127110



1x - Smarthub,
white. No.6096146



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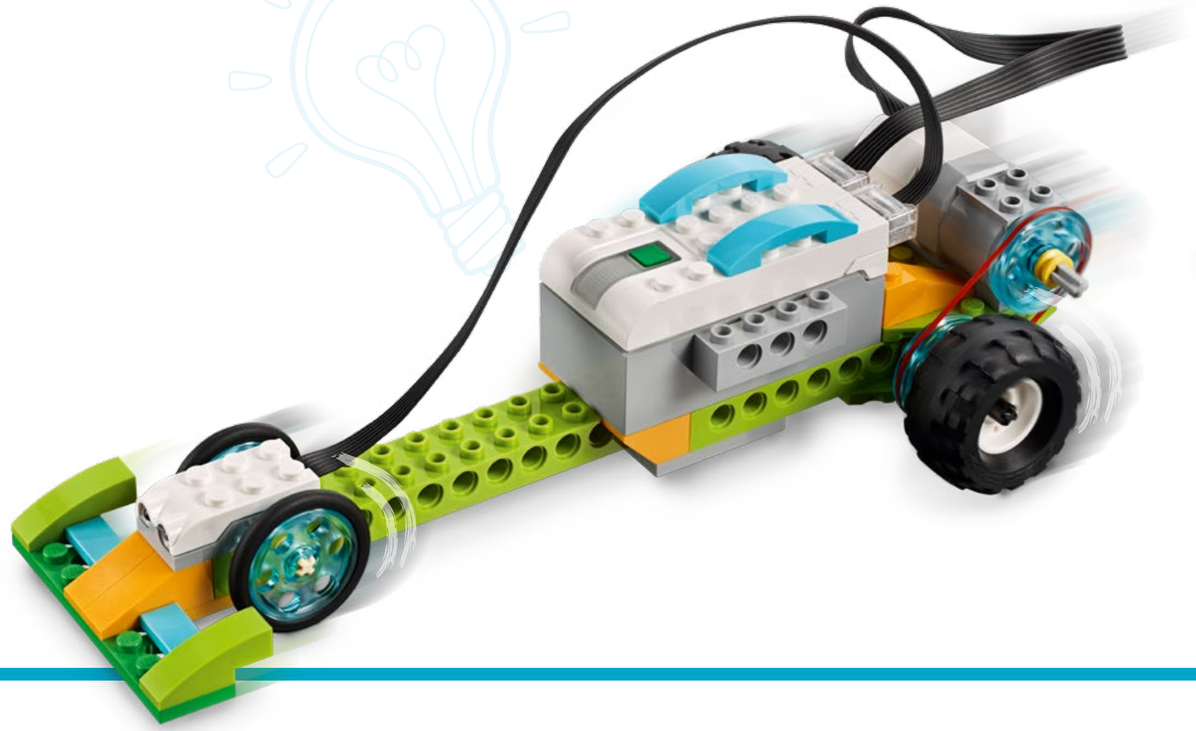

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