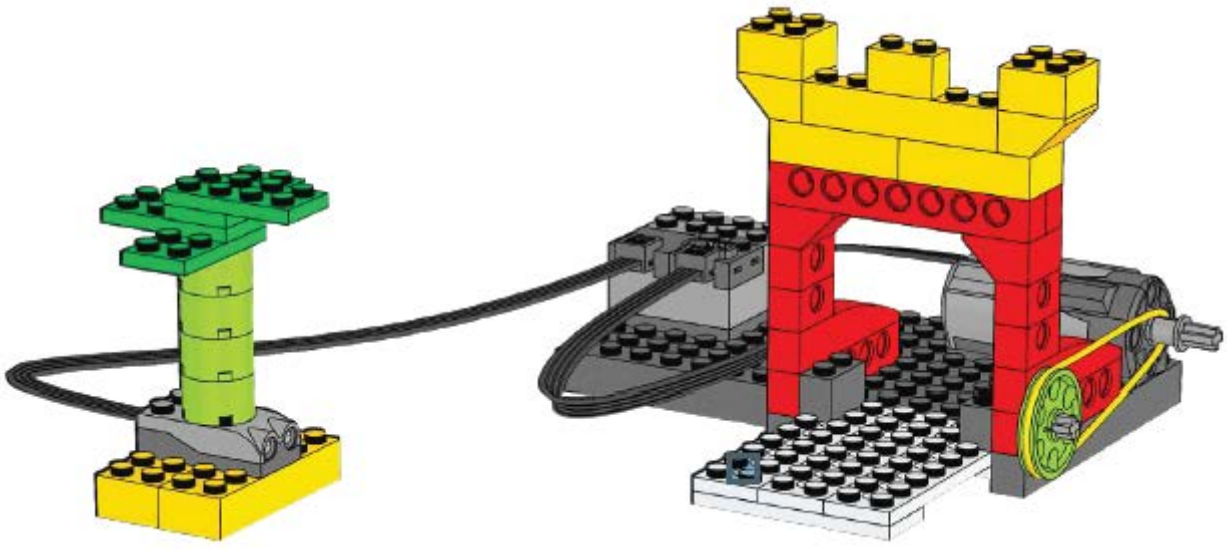
Mighty Fortress



Mighty Fortress

Introduction

The brick models and the LEGO® Education WeDo™ programs used in this activity are suitable for children from the age of seven and up, but for children at the younger end of this age range to become fully engaged in the learning process they will need to be supported and encouraged
by an adult. Much of the written text is directed towards an adult reader, but certain parts of the activity have a more child-oriented approach. It is hoped that adult guidance and support will assist in making this activity a rewarding experience.

Description

In this activity you will build and program a Mighty Fortress. The Mighty Fortress has a drawbridge and is close to a large tree. The tree has a Motion Sensor and is programmed to raise and lower the drawbridge automatically when someone passes by the tree and is detected by the Motion Sensor.

Objectives

- Using technology to create and communicate ideas
- Demonstrating knowledge and operating digital tools and technological systems
- Building and testing using feedback and knowledge of simple machines
- Tracing the transmission of motion
- Writing a script with a dialogue for at least two characters
- Acting out a story, storytelling and narrating through characters

Vocabulary

As you have already tried the LEGO Education WeDo Software, the terms used in this activity should be familiar. If you need additional guidance, we recommend referring to the Teacher's Guide, which is included in both 2000097 LEGO Education WeDo Software and 2009580 ActivityPack for LEGO Education WeDo Construction Set.

- Start Block
- Motor That Way Block
- Motor Off Block
- Display Block
- Wait For Block
- Motor This Way Block
- Number Input
- Motion Sensor Input
- Motor On For Block
- Text Input

The following words will be used in the activity and might need explaining:

- Friction
- Automatic
- Fortress
- Castle
- Belt
- On duty
- Construction
- Motion sensor
- Pulley
- Drawbridge
- Raiders

Mighty Fortress

Curriculum links

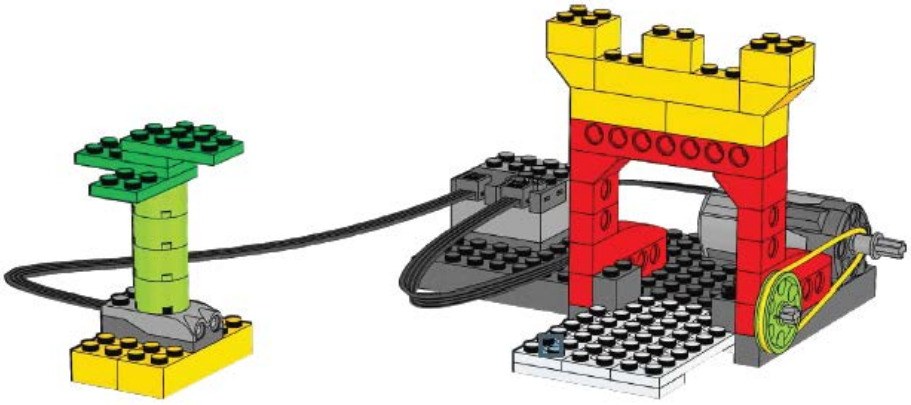
Communication	Students: • communicate verbally ideas and discuss the benefits and weaknesses of proposed solutions. • interpret illustrations.
Inquiry	Students: • use critical thinking, scientific reasoning, and problem solving to make informed decisions. • explore a topic through teamwork. • brainstorm. • build and test a model. • develop the skills necessary to do full inquiry. • Ask a simple question, complete an investigation, answer a question, and share the results with others.
Physical Science	Students should be taught to: • build and create a working model. • understand it takes energy to change the motion of objects. • investigate the effect of applying various pushes or pulls on an object. • plan and conduct a simple investigation. • describe the motion of objects • move objects by pushing, pulling, throwing, spinning, dropping, and rolling; and describes the motion. • describe the change in position of objects when moved. • explain the motion of pulleys and how they are used to move an object. • explain how friction can affect the movement of objects.
Technology	Students: • write/program a logical set of steps. • work with a technology design. • explore the way things work. • experience science through technology. • use a motion sensor to trigger an action.

LEGO® Materials Required

- 2000097 LEGO Education WeDo Software (alternatively 2000095 LEGO Education WeDo Software + 2009580 Activity Pack for LEGO Education WeDo)
- 9580 LEGO Education WeDo Construction Set

Mighty Fortress

Connect



Mia and Max love learning about history, and especially about the Middle Ages, when knights and kings lived in beautiful castles. The people who lived close to the castle or in the castle had to be protected from raiders and enemy armies. Outposts were built to use for keeping watch. These outposts were fortresses, not used for living in, but built only for defense. Often these fortresses would have a drawbridge as part of their construction. The drawbridge could be raised and lowered to keep out enemies or let in friends. After a history lesson, Mia and Max want to try to build a fortress with a drawbridge that they can raise and lower.

Now try the following:

- Build a Mighty Fortress.
- Program the drawbridge of the Mighty Fortress to be raised automatically when someone comes near.

Here are some other ways of connecting:

Have you ever seen a fortress? Or a drawbridge? How would you describe it for someone who had not seen it? What other ways did people have in the Middle Ages for keeping a lookout?

Let's imagine we're in a fortress and we're on duty. It's our job to keep watch. How would we be dressed? What would our fortress and drawbridge look like?

Mighty Fortress

Construct

Build the model

Build the model following the step-by-step instructions, or create your own model.
If you create your own you may need to change the example program.

To operate the drawbridge on the Mighty Fortress best, make sure that the pulleys and belt can move freely. This will help to prevent friction, so that the drawbridge can work properly.

When the drawbridge has been built, notice how pulleys are used. Pulley systems are simple machines.

Our model…
Uses a motor to turn a small pulley...
The small pulley moves a belt…
The belt moves a large pulley...
The large pulley has an axle attached to the center of it …
The side of the drawbridge is connected to this axle and the drawbridge moves when the axle does.
Try this idea or create your own!

Program the model

Program the drawbridge to be raised automatically when somebody passes the tree where the Motion Sensor is. Follow the step-by-step instructions shown below.

Try our program or create your own!

During the running sequence indicated above, the Text Input shows:
• Enter!

Hint
See the Software section of the Teacher's Guide for the Background List relating the Block numbers to their descriptive names.

Mighty Fortress

Contemplate

Investigate the movements the drawbridge makes.
Try the following, and make notes of your observations.

- Watch the motor and the pulleys as they move:
  - How does it work?
  - What starts the movement?
  - Write down or draw what happens.

- Discuss why a drawbridge was an important part of the defenses of a fortress.

Continue

- Use various scrap materials and build a scenery around the fortress.
- Write a story including a script for Mia and Max to act out.
- Tell and act out your story. Practice reading through your script, making the drawbridge go up and down at the right moments.

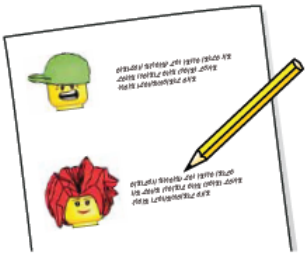
Narrator:_____

Max:_____

Mia:_____

Max:_____

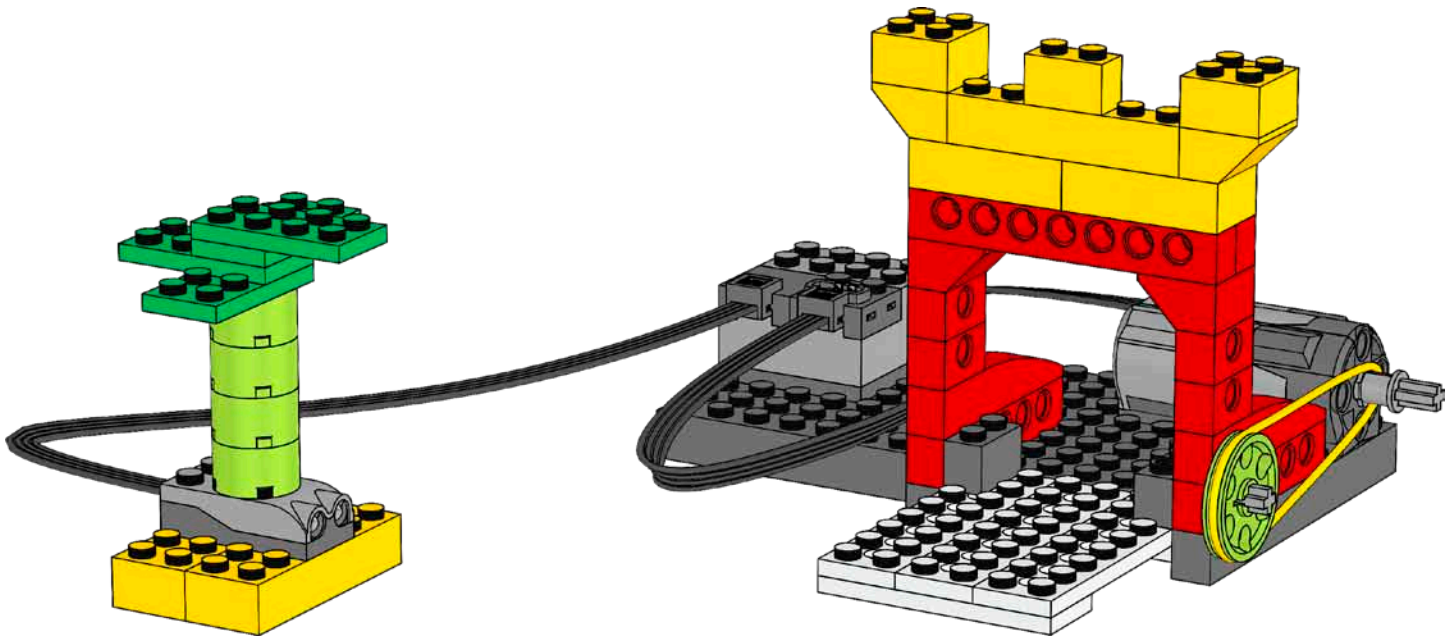
Mia:_____

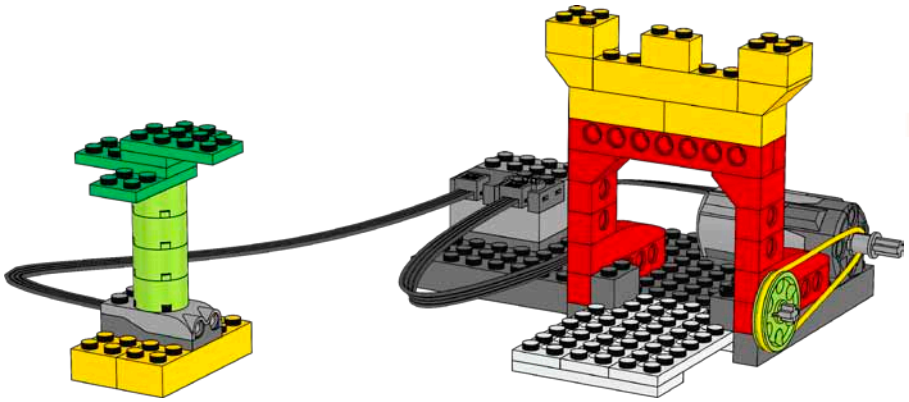


Try making some changes to the model and the program.

Tip
Use this task to focus on genre characteristics by asking the students to write e.g. a fairy tale.
”Once upon a time….”, Good vs. Bad, group of 3, Magic, ”Happily ever after” etc.

Hint
Adjust the program to suit the timing of the story.





9580


2x
4527947


3x
4527945


4x
370021


2x
389421

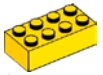

2x
370221

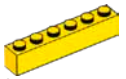

2x
366021

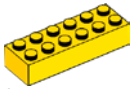

2x
4160390


1x
300424


2x
300324

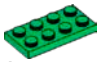

2x
300124


1x
300924


2x
4181143


2x
366024


1x
4544151


4x
302028


4x
4527943


1x
4494219


1x
4211622


2x
4211815

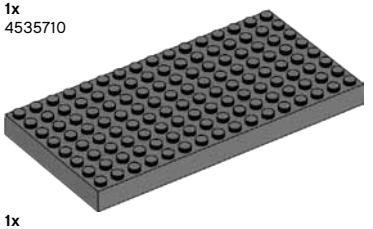

1x
4211087

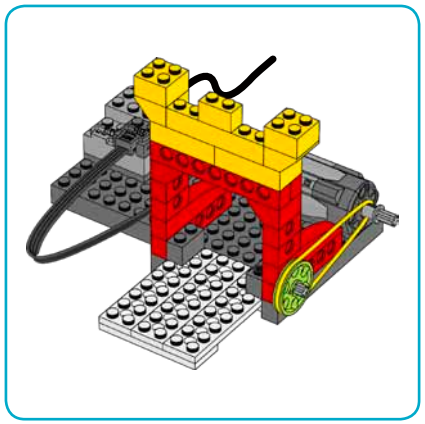

3x
4210935


1x
4586108

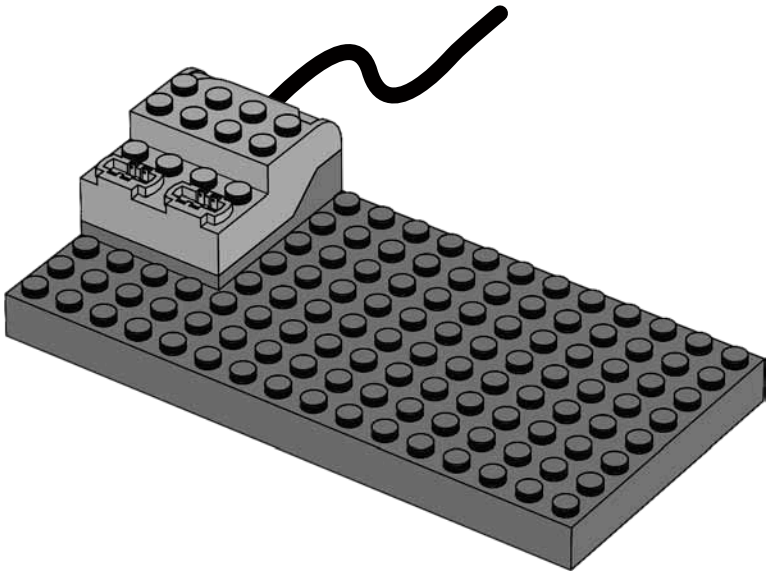

1x
4506083


1x
4535710

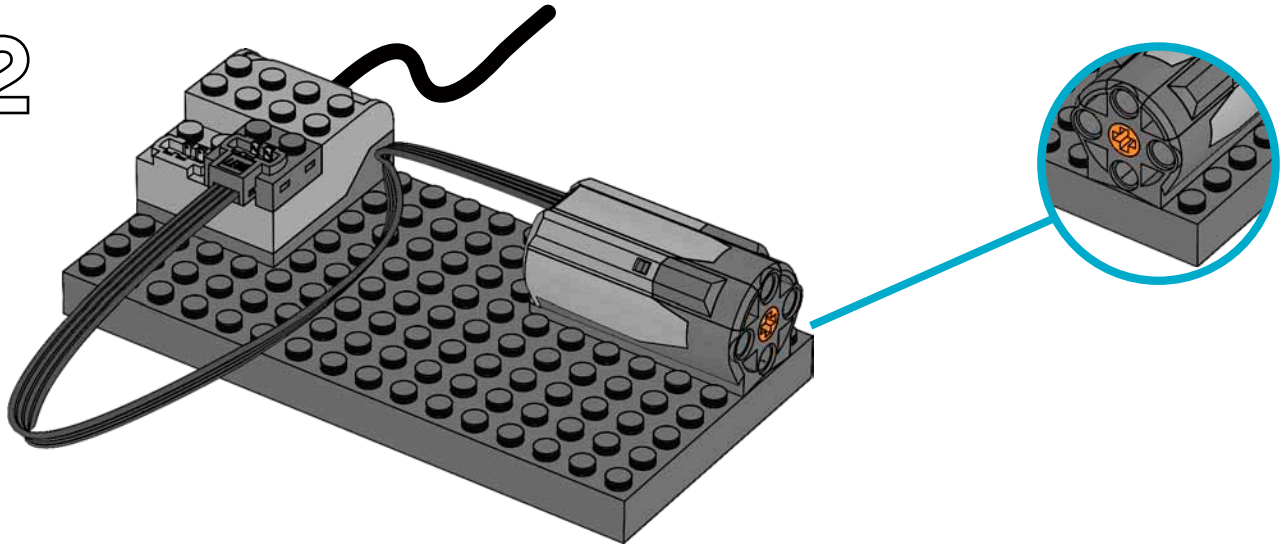

1x
4217133



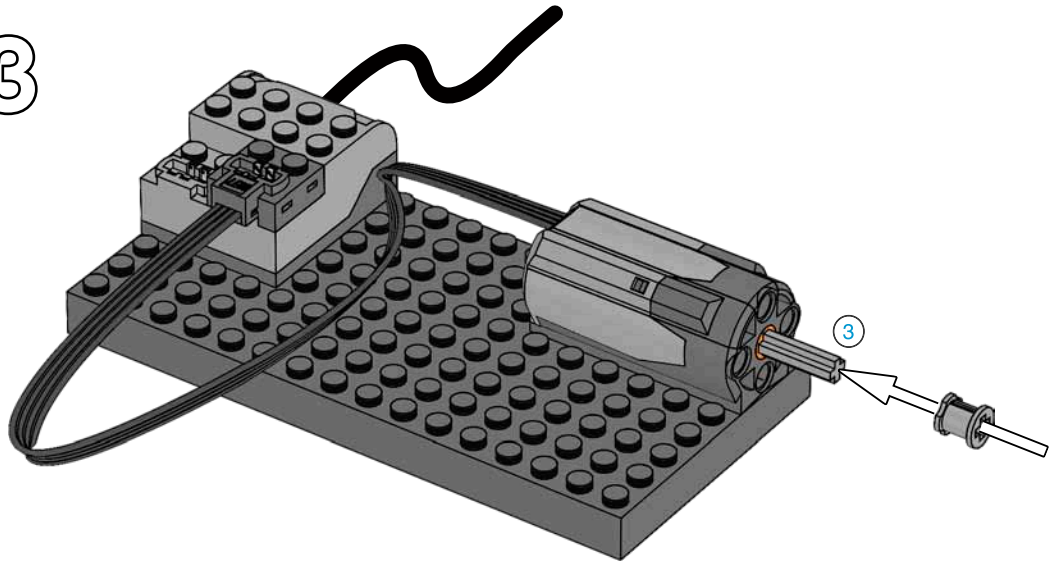
1



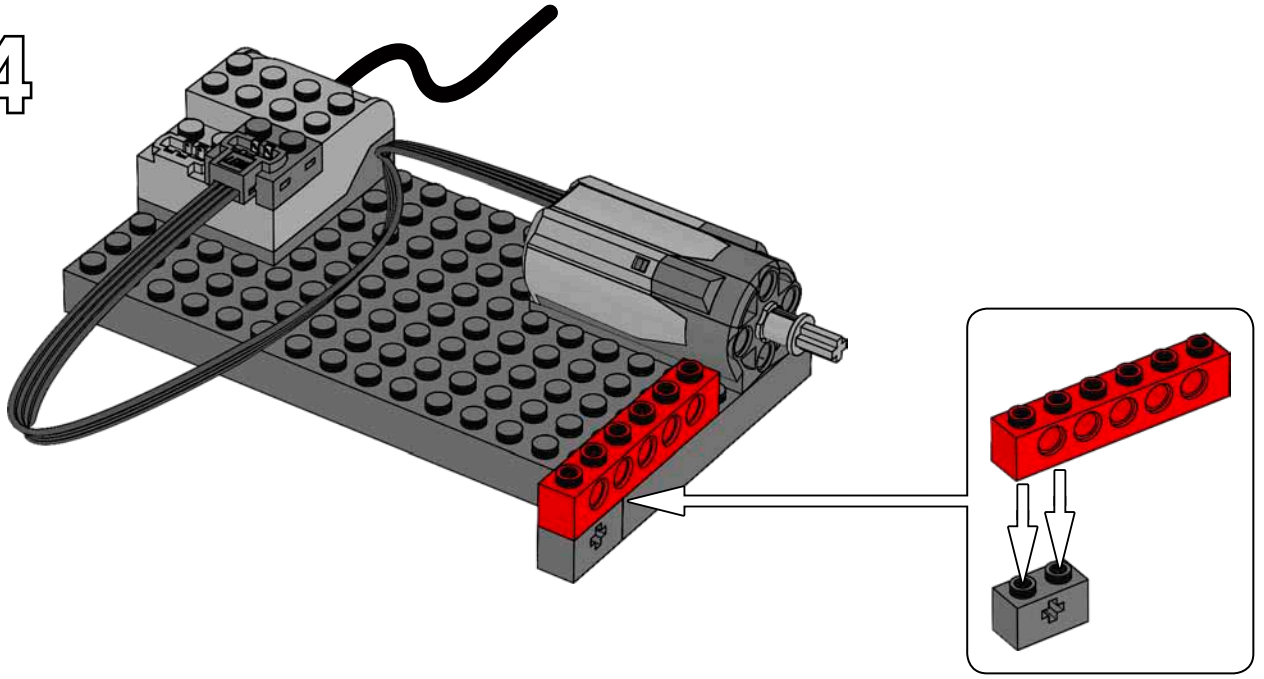
2

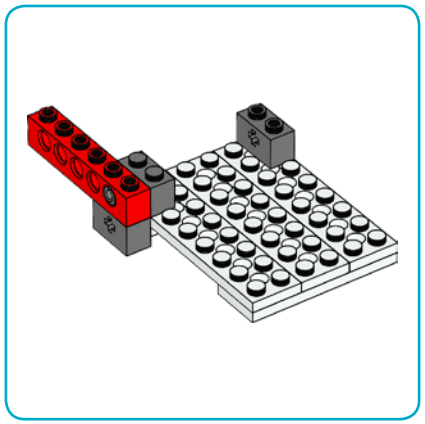


3

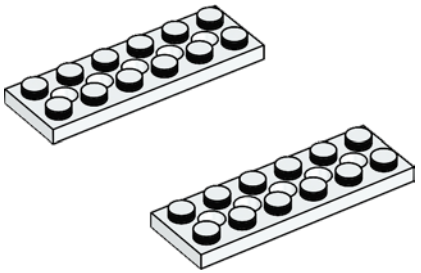


4

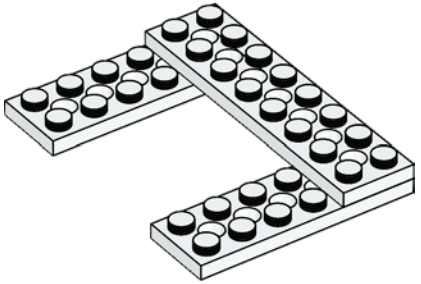




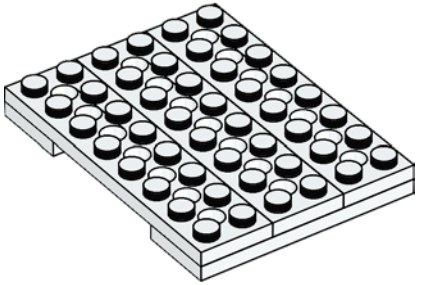
5



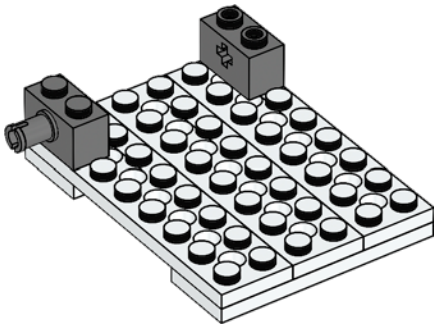
6



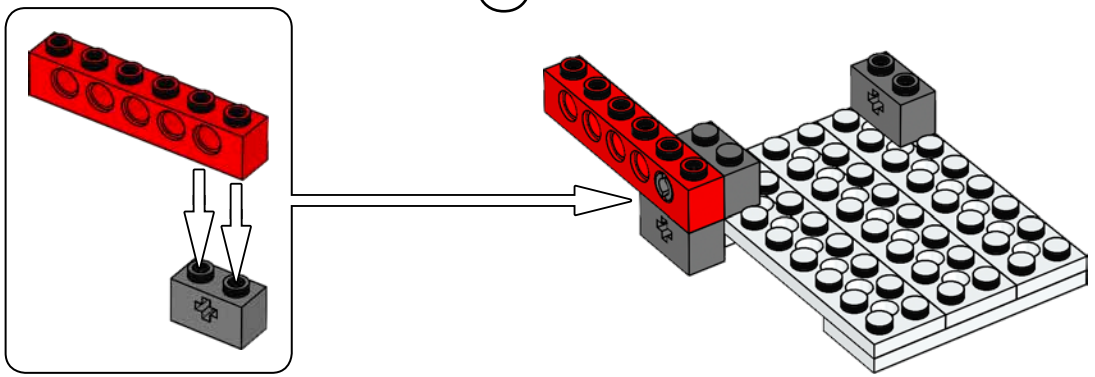
7



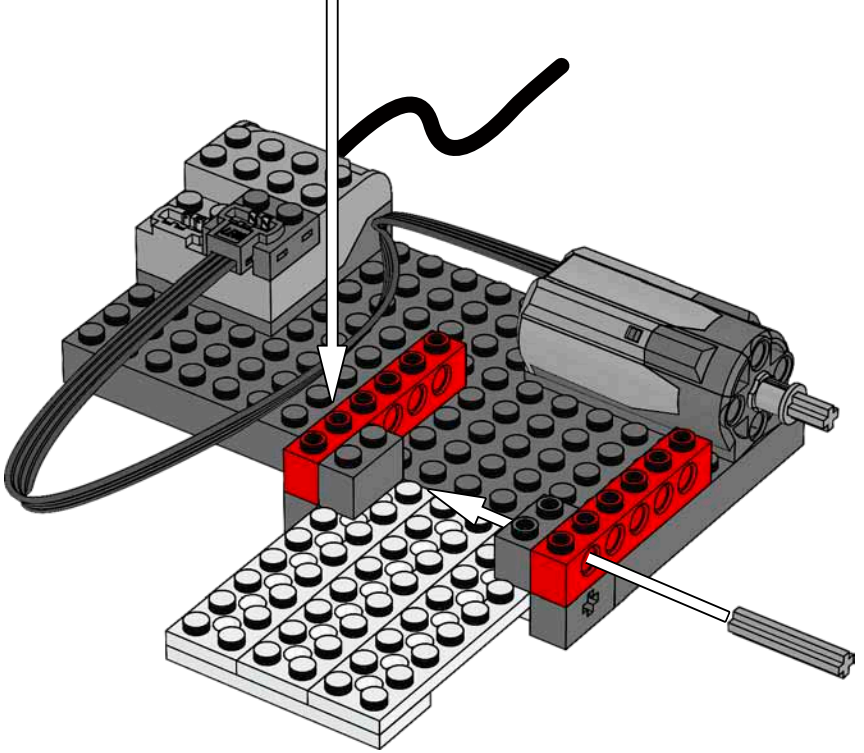
8



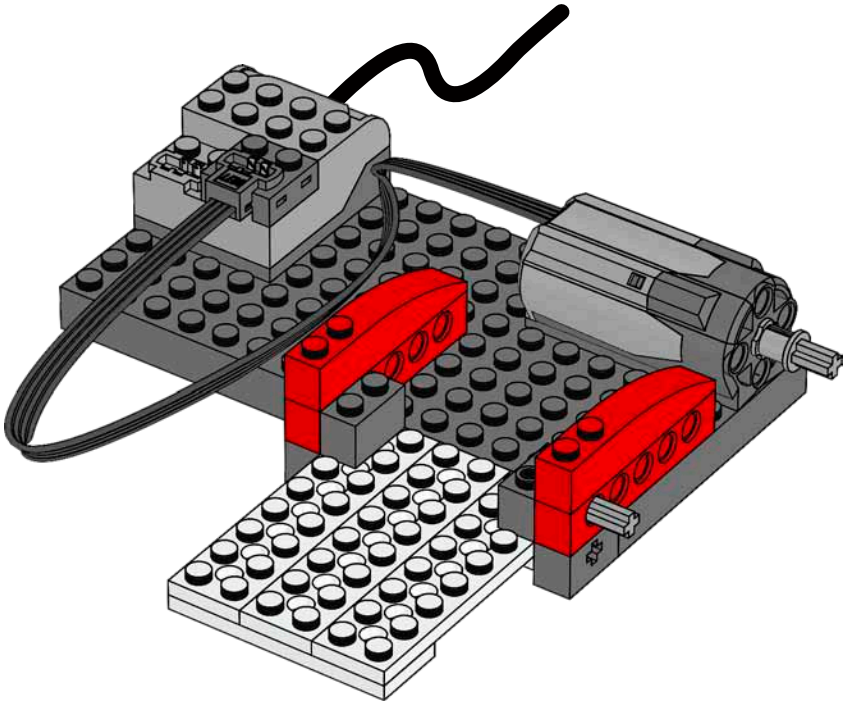
9



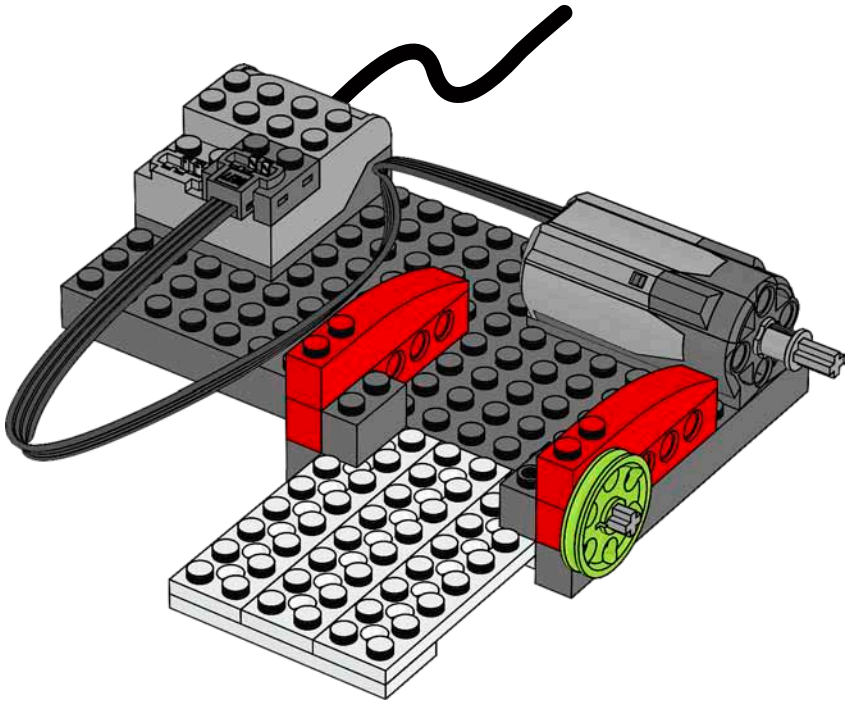
10



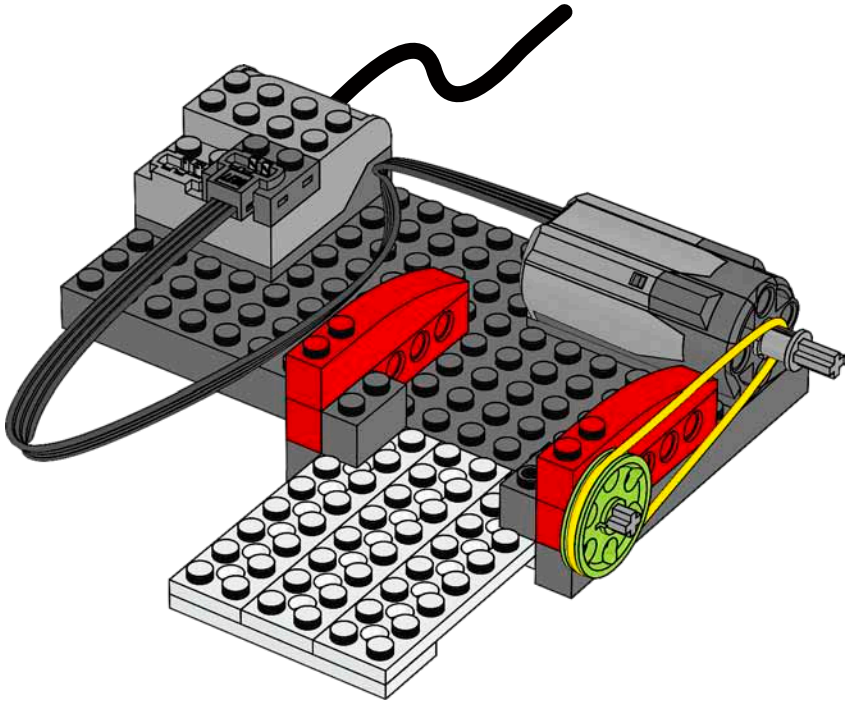
11



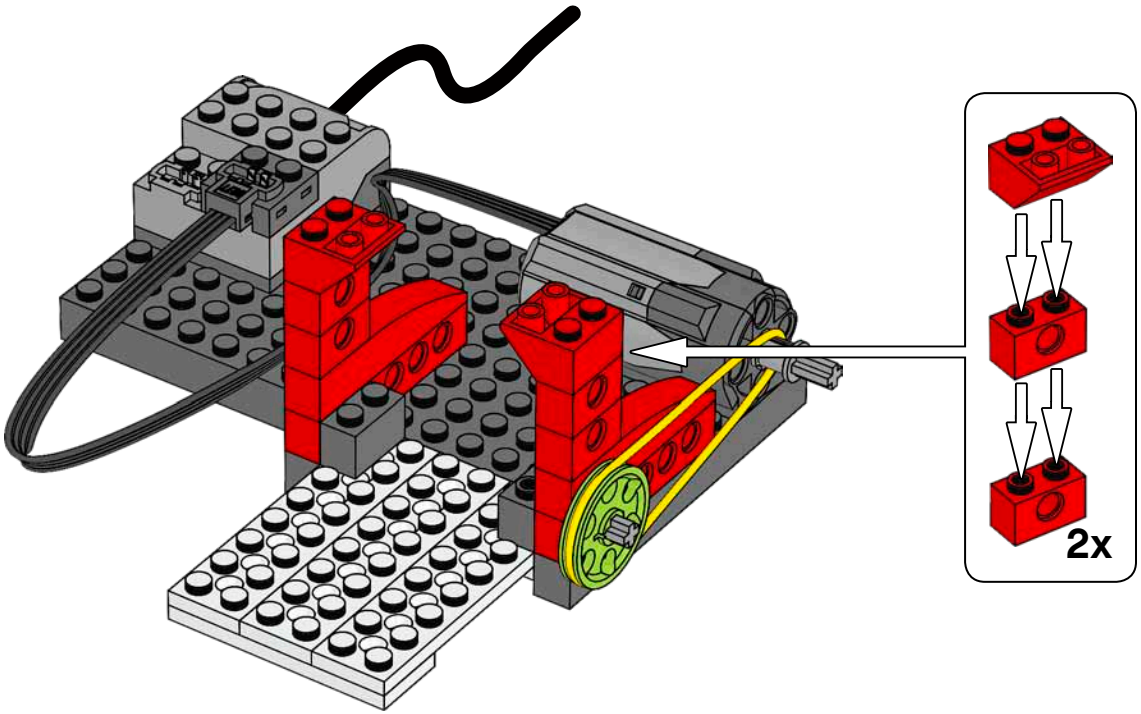
12



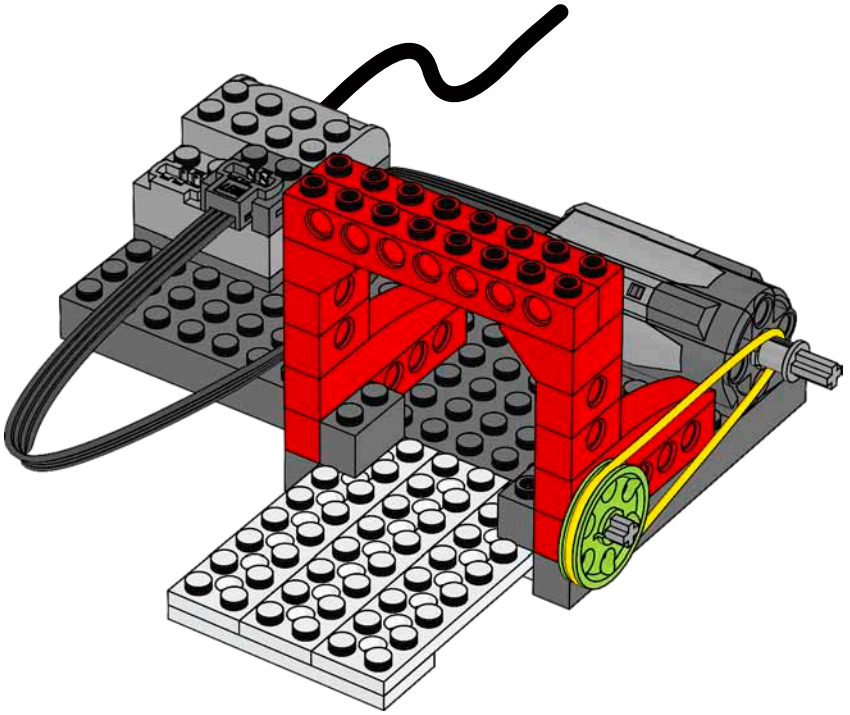
13



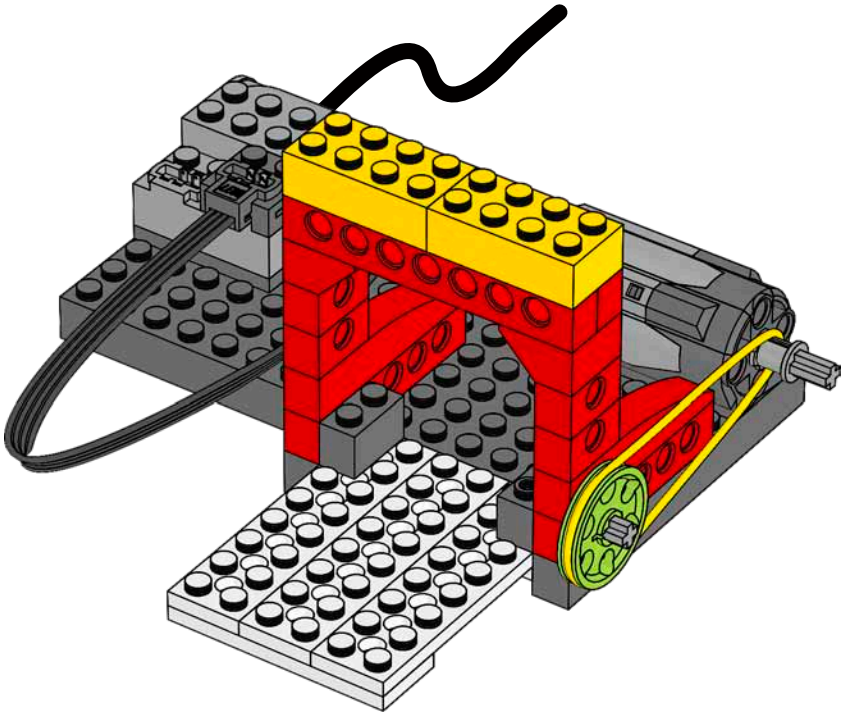
14



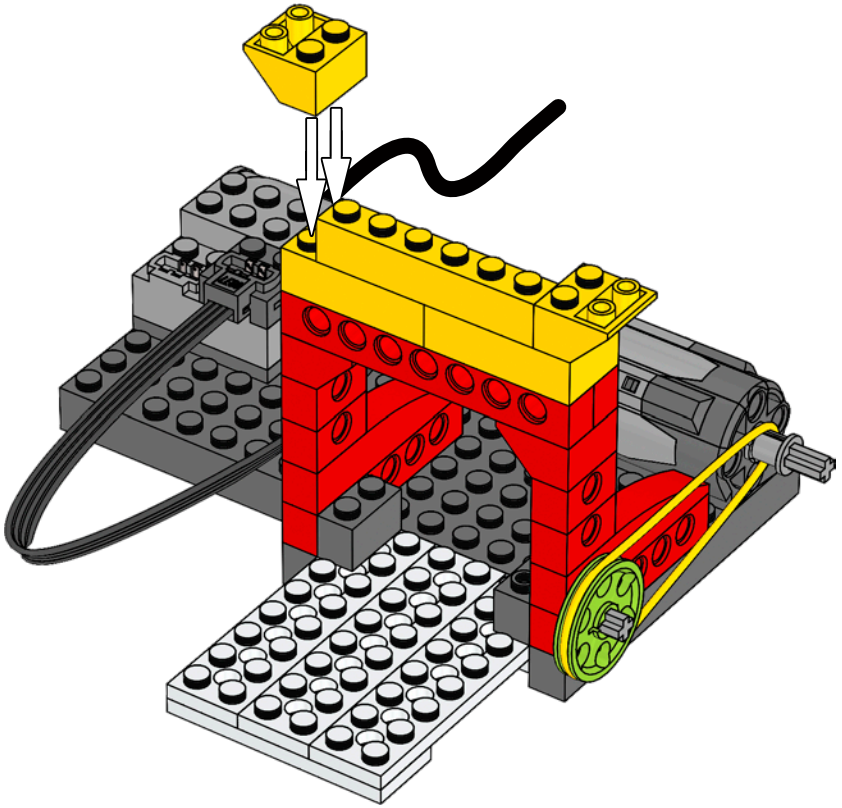
15



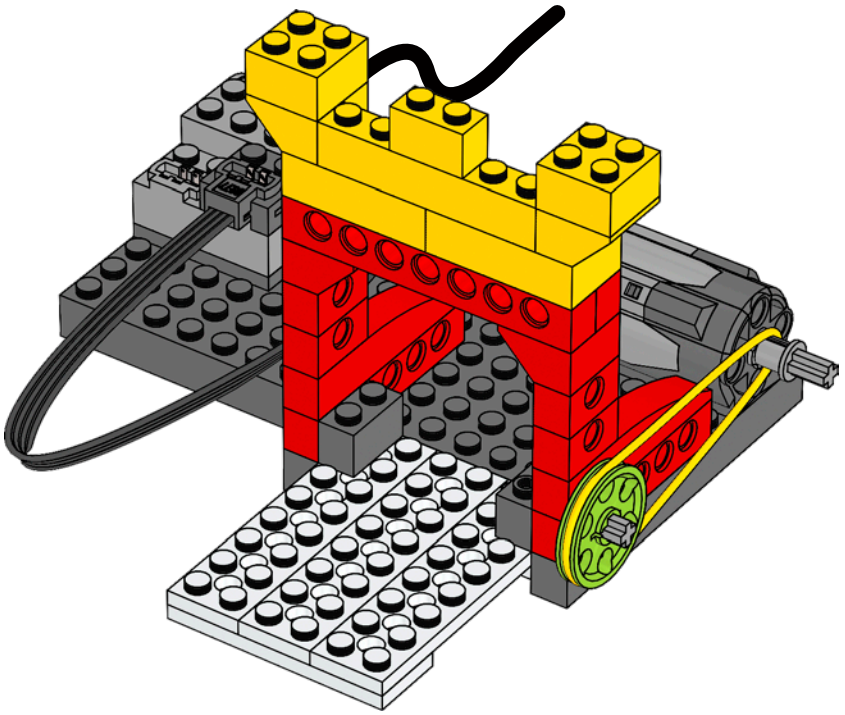
16

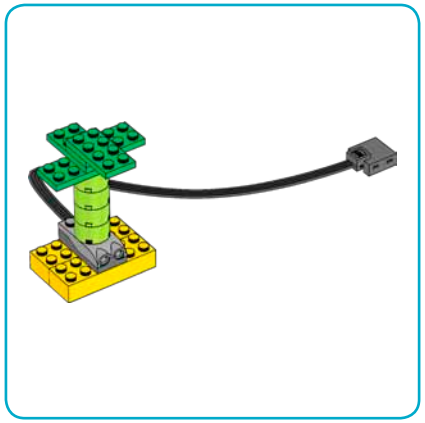


17

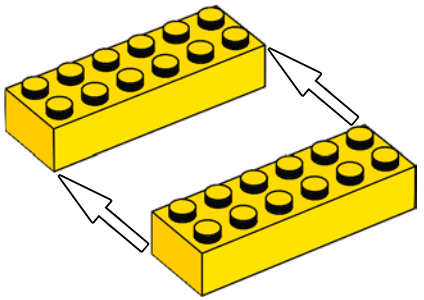


18

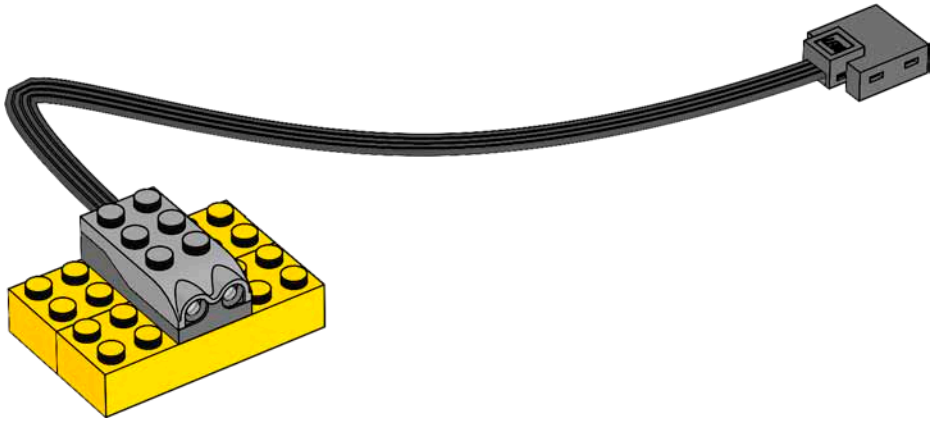




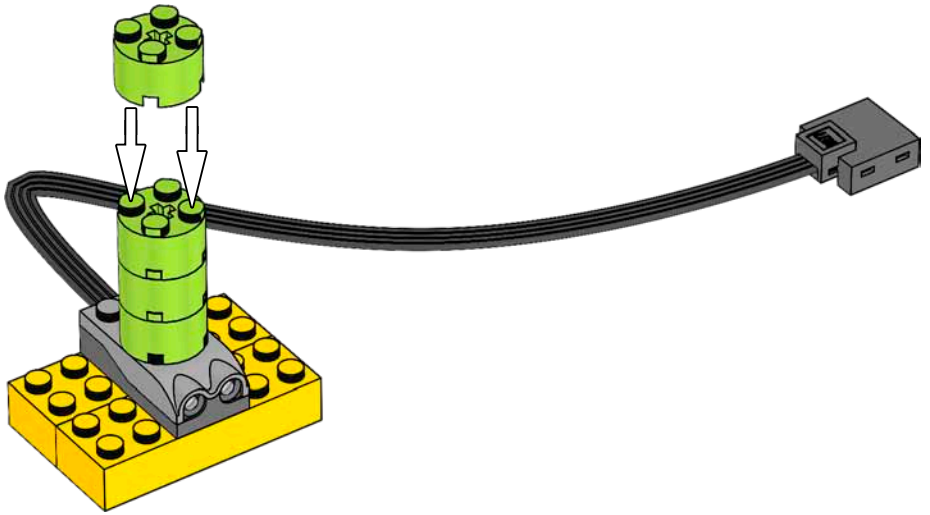
19



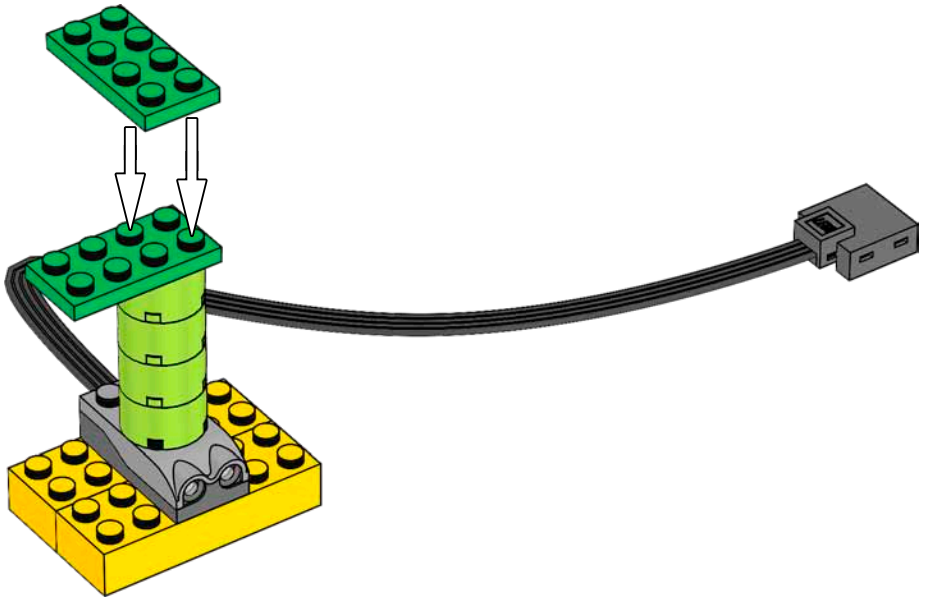
20



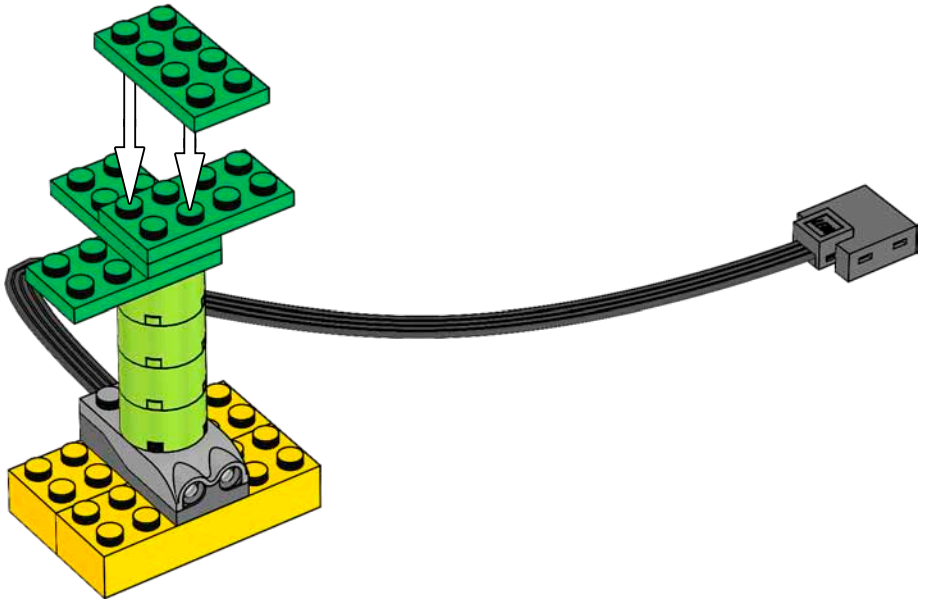
21



22



23



24