



Mr.
Learnie

LearnToLearn

Curriculum Pack



45120

LearnToLearn Core Set & Curriculum pack



education

Children Should Be Allowed to Express Themselves In All Ways Possible

Thank you for choosing LearnToLearn from LEGO® Education.

In many schools around the world, children are still being taught to express themselves in a traditional way, primarily using pen and paper. Here at LEGO Education, we believe that children should also be given the opportunity to experience a progressive learning method that is more effective, motivating, and engaging.

LEGO Education provides children with opportunities to become effective learners as well as develop skills of the 21st century: Collaboration, Communication, Creativity, Critical Thinking and Problem Solving. We focus on curriculum objectives and learning standards, but we use alternative means to acquire knowledge rather than traditional pen and paper exercises.

We know from research that when we allow children to use multiple senses during the learning process, they have a far better chance of fully understanding and remembering what they have learned.

In other words, they will learn how to learn.

Welcome to the world of LEGO Education solutions!



Esben Stærk Jørgensen
President of LEGO Education



The LEGO® Education Approach to Learning

LEGO® Education LearnToLearn is an educational tool that helps elementary school students achieve curriculum goals within Engineering & Technology, Language Arts, Mathematics, Science, and Social Studies while also building and reinforcing the most fundamental learning skills of the 21st century: Collaboration, Communication, Creativity, Critical Thinking and Problem Solving. Like all classroom solutions from LEGO Education, this set is based on “Constructionism,” a school of thought pioneered by progressive theorists Jean Piaget and Seymour Papert.

Concrete Experience in a Meaningful Context

Constructionism starts with the conviction that children learn best when they experience things firsthand and within a meaningful context. Unlike simply memorizing abstract principles, hands-on experimentation with concrete materials leads to deeper engagement and more memorable learning — especially when children perceive their work as relevant.

LEGO Education and Constructionism

LEGO Education solutions combine specially selected LEGO bricks with learning activities designed by education experts and are ideal for hands-on learning. All of our solutions require students to experiment with tangible models — building memorable, curriculum-related knowledge as they construct solutions to carefully formulated challenges.

The 4C Learning Process – a Structured Learning Experience

At LEGO Education, we have turned Constructionist principles of learning and knowledge about effective learning into a practical, four-step learning process that all of our classroom solutions support.

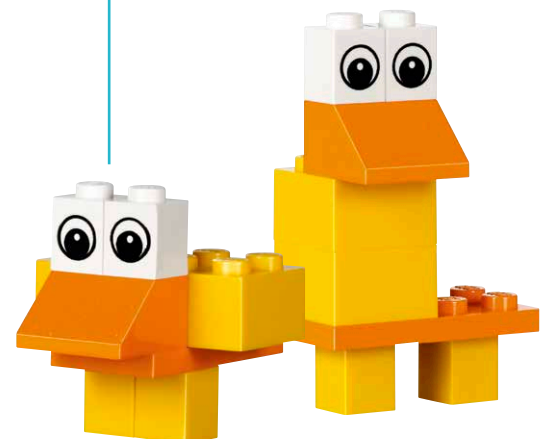
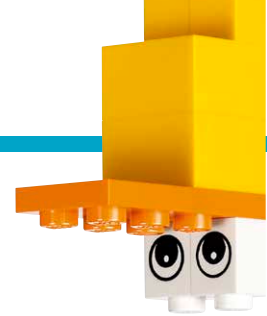
The 4C process consists of four steps:

- **Connect** phase awakens students' curiosity and the desire to learn.
- **Construct** phase encourages the student to tackle the challenge by building something functional or meaningful to him/her.
- **Contemplate** phase involves reflection and dialogue, with the teacher and other students, about what everyone has learned from their experience.
- **Continue** phase gives students opportunities to apply their newly acquired knowledge to new challenges as well as take ownership of their learning.

Throughout this process there can be iterations, as students work continuously through the steps.

Learning to Learn

In all phases of the 4C process, the teacher plays a critical role as facilitator and guide, helping students reach their solutions and promoting Collaboration, Communication, Creativity, Critical Thinking, and Problem Solving. Applying this process to curriculum content results not only in the acquisition of curriculum-related knowledge but in stronger fundamental learning skills.



Getting Started

To help you communicate the purpose and value of using LEGO® Education LearnToLearn in your classroom, templates of a letter to your school management and a letter to the parents can be found on pages 30 and 31.

Introduce LEGO Education LearnToLearn into your classroom by implementing Building License 1-3 activities. These three activities will help you create guidelines and successful management systems for using bricks in your classroom. Then progress to the activity called “Building License — Ready, Set, Learn!” in which students will demonstrate their readiness to participate in future activities. When complete, students will receive Building Licenses, which they can display proudly!

Activities

Each of the activities focus on one subject and skill of the 21st century, however they often incorporate several skills. See the top headings for the subject and skill.

Each activity consists of an Objective, which describes the key curriculum focus, Activity Steps, which suggest a natural learning flow, Discussion Questions, which prompt reflection and discussion, and an Extension, which provides more ideas. Grade Level Modifications can be found in the sidebar. Use these to modify the lesson to either lower grades (grades 1–2) or upper grades (grades 3–4). The sidebar also contains photo examples of what other students have built when doing this activity. Use them as inspiration.

Symbols

Each activity includes a suggested time frame in which to complete the Activity Steps and Discussion Questions.

In each activity, students are either working individually or with other students. The symbols indicate which way of working is suggested. However, many activities provide opportunities for students to share with others or discuss as a whole group.

Subjects

Engineering & Technology
Language Arts
Mathematics
Science
Social Studies

Skills of the 21st Century

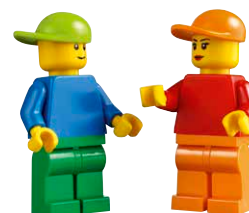
Collaboration
Communication
Creativity
Critical Thinking
Problem Solving



Time Frame Symbol



Working Individually Symbol



Working with Others Symbol

Classroom Management Tips

Here are valuable tips from teachers who have used LEGO® Education solutions in the classroom. Try as many of these as you like or adapt them to fit your needs:

Brick Management

- Write names or student numbers on the bags.
- Use a piece of thin felt, lunch tray, or other material to create a designated building space.
- Allow students to work on the floor when possible.
- Create a “lost brick bin” for any bricks that are unclaimed at the end of the activity.
- Two brick separators have been included. Keep them in a special place so that students can borrow them when needed. See the sidebar for ways to use the brick separator.

Cleanup Strategies

Try one of these methods to keep track of bricks after each activity. Students will become more and more efficient at completing these tasks:

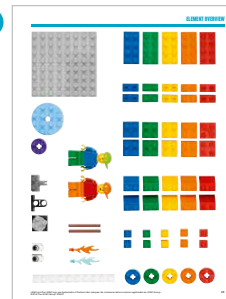
- Print and laminate a color copy of the Element Overview on page 29 for each student. At the end of each activity, have students match their bricks to the corresponding image before placing them in their bags to ensure that the sets are complete and ready to be used for the next activity. It may be helpful for students in lower grades to first separate their bricks by color and then match them with the image.
- Print and laminate a color copy of Mr. Learnie on page 28 for each student and/ or provide each student with a copy of the building instructions on pages 33–39. At the end of each activity, have students build Mr. Learnie. He is made up of every brick in the set, so if students can complete the models, they know that the sets are ready to be used for the next activity.



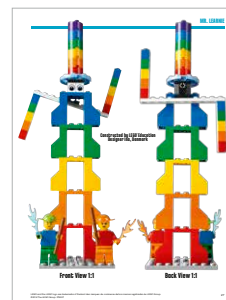
Some teachers invite students to use trays to help manage their bricks.



Use the brick separator to lift bricks or push rods out.



Element Overview (page 29)



Mr. Learnie (page 28)

Building License 1

Objective: Students will explore their LearnToLearn Sets and practice management skills.

Activity Steps

1. Invite students to think of a time when they tried something new, like a sport, instrument, or game. Remind students that when they try something new, they have to practice and become pros! Sometimes people even need to get a license to show that they are ready to do something special, like drive, or become a teacher or doctor.
2. Tell students about the LearnToLearn Sets. Since this is something new, they have to practice and become pros. Tell them that once they have practiced using the sets three times and demonstrate their readiness to do more activities, they will have their own Building License. Today is the first practice session!
3. Divide students into pairs, and tell them that each pair needs a printed copy of Mr. Learnie, one big bag, one small bag, and two baseplates. Tell them that the bags have enough bricks for two Mr. Learnies—one for each student. Hand out the materials to the students, and give them about 10 min. to build their own Mr. Learnie.
4. Compare the models in class, and ensure they all look the same.
5. Tell students to take Mr. Learnie apart and build their own models, but they can only use the bricks from their own Mr. Learnie. Give students about 20 min. to explore the set and build their models. As students build, encourage them to share their models with others.
6. Give each student a 5 min. warning before they need to clean up. Provide each student with a brick bag, and demonstrate how to use the Element Overview or Mr. Learnie model to ensure they have used all their bricks.

Discussion Questions

- What did you build during your exploration time and why?
- What are three things you noticed about your set?
- Why is it important that you and your classmates keep track of the bricks?



45–60 min.

Building License

Name: _____

Age: _____

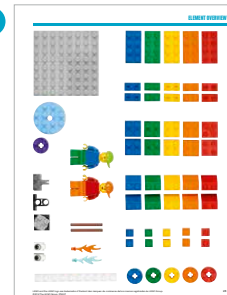
Favorite object to construct: _____



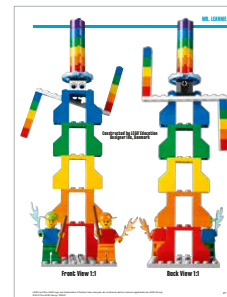
©2014 The LEGO Group



You may wish to show students the Building License (template on page 27).



Element Overview (page 29)



Mr. Learnie (page 28)

Building License 2

Objective: Students will sort and categorize bricks in multiple ways.

Activity Steps

1. Invite students to recall the last time they used their LearnToLearn Sets. Review successful methods of getting out and putting away their bricks. Remind them that they are each on their way to earning a Building License!
2. Give each student the set assigned to him/her. Allow students 10–15 min. to build whatever they want. Give them a 2 min. warning before it is time to stop building.
3. Facilitate a discussion on attributes. Hold up various bricks to show two different attributes: color and shape. Tell the students that they are going to sort their bricks into categories based on attributes. First, have students sort by color. Consider creating a sorting template for students to use.
4. Encourage students to create a name for each category. Document these names for the next activity, “Building License 3,” where students work more with names. Invite students to share their names with the person next to them and compare.
5. Ask students to repeat the sorting process by shape instead of color.
6. Ask students to clean up. They may use the Element Overview or Mr. Learnie model.

Discussion Questions

- How many categories did you make?
- How did the categories look similar and/or different?
- Which bricks were difficult to sort and why?



35–50 min.

Grade Level Modifications

Lower Grades:

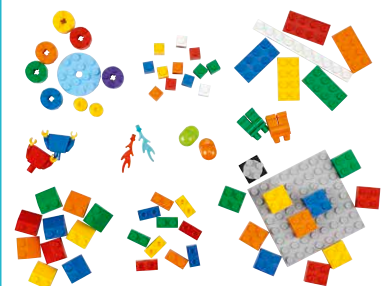
Explain that attributes are characteristics. Shape and color are two characteristics that students can use to describe the bricks. Explain that categories, in this case, are groups of bricks with similar attributes.

Upper Grades:

Ask students to sort by multiple attributes or by other attributes, such as size or number of studs (the raised parts on top of the bricks).



Solution Example: Students have sorted by color



Solution Example: Students have sorted by shape

Building License 3

Objective: Students will work together to create a set of common names for their bricks.

Activity Steps

1. Invite students to recall the names they created for different categories the last time they used their LearnToLearn Sets. Discuss how confusing it is when they call the same thing by different names. It would be helpful if they agreed on a name for each brick.
2. Have students brainstorm names for each brick based on their attributes and categories: for example, blue, round brick, green, square brick, and so forth. Ask students to agree on or vote for their favorites.
3. Create a Brick Names List on a poster with images of the bricks and the agreed-upon names next to them.
4. Tell students they will be working with a partner to practice using the brick names. Give each student his/her set. The “naming partner” says the names of five or more bricks from the Brick Names List. The “building partner” finds those bricks in his/her set and builds a model with them. Have both students look at the model and check that the building partner used the bricks that the naming partner intended. Have students take turns in each role.
5. Ask students to clean up. They may use the Element Overview or Mr. Learnie model.

Discussion Questions

- How did you decide as a class on the names?
- What was difficult about making a group decision?
- When doing the partner activity, how did having common names help?



40–50 min.

Grade Level Modifications

Lower Grades:

When it is time to practice using the brick names, choose a student helper to assist you in modeling this activity for the class.

Upper Grades:

Give the building partner a time limit of 60 secs. to build their model.



Solution Example: A model with seven bricks constructed by the building partner

Building License – Ready, Set, Build!

Objective: Students will create a Class Guidelines List and demonstrate knowledge they have gained in the last three activities to receive their Building License.

Activity Steps

1. Invite students to recall the Brick Names List they created. Tell students today that they will create a Brick Guidelines List. Ask students to brainstorm guidelines for successful building. Write them where everyone can see.
2. Have students use their LearnToLearn Sets. Tell students to gather the eight bricks shown in the sidebar by using the names from the Brick Names List.
3. Ask students to build a duck any way they want as long as they want as long as they use all eight bricks. As they build, remind them of the guidelines that they just created.
4. When students are finished building, have them label and place their ducks together so that they can compare them. How are they similar and/or different? Point out that each student used the same bricks, yet each duck is unique! As they do future activities with the sets, students can each have different ways of approaching the activities because they are unique individuals!
5. Congratulate the students on following the guidelines. Pass out a Building License for each student to complete.
6. Ask students to clean up. They may use the Element Overview or Mr. Learnie model.

Discussion Questions

- Why is it important to agree on class guidelines?
- How were the ducks similar? How were they different?
- Why is it important to recognize that everyone is unique?



40–50 min.



Eight bricks for this activity



Solution Example: Ducks constructed by students around the world!

Possible Brick Guidelines

- Help others pick up bricks that fall on the floor.
- Always check that you have all of your bricks when putting them away.
- Ask each other for help when needed.
- Solve problems together.
- Communicate with your partner.

Across the River

Objective: Students will explore bridge structures by designing and building their own bridges.

Activity Steps

1. Tell students about Emma and Thomas, who are good friends. They are on separate sides of a river. The river is very choppy, so neither one can swim to the other side. Ask students, "How can you help Emma and Thomas?" Perhaps they need a bridge!
2. Guide students in conducting research on bridges by looking at a few pictures of bridges, reading an article, or watching a short video.
3. Based on the age and ability of your students, choose a brick or bricks to represent the river. The wider the river, the more difficult the challenge. Use the two minifigures to represent the friends, Emma and Thomas.
4. Have students use their LearnToLearn Sets to build a bridge to help Emma and Thomas. Encourage students to test their bridges by making sure they can hold both minifigures.
5. Have students share their designs with the class. Ask them to compare and contrast the bridges and relate them to their research.

Discussion Questions

- How did you decide on the design of your bridge?
- What was difficult about this challenge? How did you overcome it?
- How is your bridge design different from and/or similar to other bridges?

Extension

Encourage students to write a story about how their two minifigures came to be on opposite sides of a river and why they need to get to each other. Have students share their stories with a partner or with the entire class.

Delve deeper into Engineering and Technology by designing solutions with the 9686 Simple & Powered Machines Set. Go to www.LEGOeducation.com to learn more!



30–45 min.

Grade Level Modifications

Lower Grades:

Provide pictures of bridges made from blocks or bricks as inspiration for the students.

Upper Grades:

Have students research types of bridges and choose one to build. You may give additional design constraints, such as the bridge cannot touch the brick or bricks representing the river.



Solution Example: A stable bridge constructed by Catharina, Brazil



9686 Simple & Powered Machines Set

Maggie's Wheelchair

Objective: The students will explore wheels and axles and develop an understanding of the needs of others.

Activity Steps

1. Facilitate a discussion about wheels and axles. Show students that their LearnToLearn Sets contain the bricks, shown in the sidebar, that can be used as axles and wheels.
2. Tell students about a girl named Maggie who has used a wheelchair all her life. It is her first day at a new school, and Maggie would like a new wheelchair to start the school year. She wants it to be fast, keep her safe, and look interesting and fun!
3. Have students work independently or in pairs using one LearnToLearn Set to design and construct a new wheelchair for Maggie.
4. Prompt students to test and adapt their designs until they are satisfied that Maggie can get to her class on time, safely, and in style!
5. Have students share their final designs with the class.

Discussion Questions

- How did you decide on your wheelchair design?
- What happened during testing, and how did you change your design?
- What special features did you include?

Extension

At Maggie's school, they have ramps and elevators as well as stairs so that Maggie can get to her class. Ask students to evaluate their own schools. What improvements could be made to meet the needs of everyone? Prompt students to discuss an action plan for school improvements.

Delve deeper into Engineering and Technology by exploring how wheels, axles, and other simple machines function with the 9686 Simple & Powered Machines Set. Go to www.LEGOeducation.com to learn more!



30–45 min.

Grade Level Modifications

Lower Grades:

Explain that an axle is a rod placed through the center of a wheel. Demonstrate putting together an axle and wheels with the bricks from the set (see sidebar images for examples).

Upper Grades:

Challenge students to build a wheelchair that must also include a place for Maggie's backpack.



Elements for Wheels and Axles



Solution Example: A four-wheel wheelchair constructed by Sofie, Denmark



9686 Simple & Powered Machines Set

My Machine Invention

Objective: The students will explore and demonstrate an understanding of machines and inventions by designing and building their own.

Activity Steps

1. Facilitate a discussion about machines. Invite students to give examples of machines that have already been invented. Point out that machines often help solve a problem.
2. Tell students that they are going to invent machines to solve problems. Choose a problem that aligns with a current unit of study or use one of the following: The machine must feed people, build homes, or make a family member's job easier.
3. Have students work independently or in pairs using one LearnToLearn Set to invent, design, and construct a machine.
4. Encourage them to ask each other questions and make observations. Then have students adapt their models based on these observations. You may have students take photos of each prototype to record the adaptations made.
5. As students finalize their machine inventions, have them share their final designs with other students who have also finished.

Discussion Questions

- How does your machine invention solve the problem?
- How would people use the machine?
- What was challenging about inventing a completely new machine? How did you overcome this challenge?

Extension

Prompt students to write user guides detailing steps to follow when using the machines. You may consider bringing in examples of user guides for inspiration. For students who are not proficient in writing, encourage them to record verbal instructions.

Delve deeper into Engineering and Technology by building and programming moving machines with motors and sensors with the 45300 WeDo 2.0 Core Set. Go to www.LEGOeducation.com to learn more!



30–45 min.

Grade Level Modifications

Lower Grades:

Consider having a collage showing pictures of machines. These pictures can be used to encourage or inspire the students.

Upper Grades:

Specify a type of machine, or challenge students with design constraints, such as “the machine must contain two moving parts.”



Solution Example:
A “flying machine” constructed by Anne Katrine, Denmark



Solution Example: A “sewing maker machine” constructed by Brixijean, United Kingdom



45300 WeDo 2.0 Core Set

Scene Builders

Objective: The students will build an important scene from a story that they have read or an original story that they create.

Activity Steps

1. Discuss the important elements of stories, like setting, characters, and plot.
2. Have students use their LearnToLearn Sets to build a scene from a story. Students may build an important scene from a story that they have read recently or from an original story that they create.
3. If students have built a scene from a story that they have read, ask them to write a description of the scene and compare their description with the story. If students have built a scene from an original story, ask them to write about the scene.
4. Ask students to share what they have written with the student next to them or with the whole class, if time allows.

Discussion Questions

- How did you show the setting (time and place), plot, staging, and so forth using your bricks?
- Why did you feel this was an important scene?
- What details did you include to make your scene clear to other students?

Extension

Have students create a “good books to read” bulletin board with the completed written summaries on display in order to encourage other students to read the books.

Delve deeper into Language Arts by exploring story components, structure, and writing with the 45100 StoryStarter Core Set and StoryVisualizer software. Go to www.LEGOeducation.com to learn more!



30–45 min.

Grade Level Modifications

Lower Grades:

Students may focus on one element, such as settings or characters. When writing, students may write words or simple sentences.

Upper Grades:

Discuss more complex elements of stories with students, such as mood and conflict. When writing, students may write a paragraph or more.



Solution Example: A scene from “The Princess and the Pea” constructed by Eleanor, Denmark



Solution Example: A campfire scene from an original story constructed by Emilie, Australia



45100 StoryStarter Core Set

What's That Sound?

Objective: The students will demonstrate an understanding of letter sounds and/or words.

Activity Steps

1. Review sounds that the class has been learning. Based on students' age and ability, they may be single letter sounds, blended sounds, or words with silent sounds. Make a list of the sounds for the students, and pick one of the sounds to focus on for this activity.
2. Have the students make a list of objects that contain that sound. Then have students use their LearnToLearn Sets to build the objects. For instance, in lower grades, when learning the "s" sound, students may build a snake, slide, or sign. In upper grades, when learning the "st" sound, students may build a staircase, store, or post office.
3. Once students have finished building, ask them to share with the student next to them or with the whole class.
4. Place all the models together, take pictures, and make a class vocabulary list with the pictures.

Discussion Questions

- Is the sound a single-letter sound or blended sound and why?
- Is the sound in the beginning or end of the word you chose?
- Did anyone choose the same word? If so, what are the similarities and/or differences between your models?

Extension

Have students write or record silly sentences with alliteration or multiple occurrences of the same sound.



30–45 min.

Grade Level Modifications

Lower Grades:

Brainstorm words containing the sound before beginning to build. Emergent readers may use the correct sound but the word is spelled differently. For example, when exploring the "k" sound, students may build a "cat."

Upper Grades:

Challenge students to think about sounds that are in different parts of words. For example, the "sh" sound is in the beginning of "sheep," the middle of "fishing," and the end of "trash."



Solution Example: A transformer that demonstrates the 't' sound constructed by Cam, United Kingdom



45100 StoryStarter Core Set

Delve deeper into Language Arts by exploring other literary devices with the 45100 StoryStarter Core Set. Go to www.LEGOeducation.com to learn more!

Why Describe?

Objective: The students will explore descriptive details and words or adjectives.

Activity Steps

1. For this activity, use a recent topic or theme from any area, such as Social Studies, Science, etc. Ask students to brainstorm a list of people, places, or objects related to the topic or theme.
2. Have students use their LearnToLearn Set to build a person, place, or object.
3. Facilitate a discussion on descriptive details and words or adjectives.
4. Have students work with a partner to take turns guessing the person, place, or object that their partner built. After each incorrect guess, the student who built the model must add a descriptive detail to their model. Do this until one of the students correctly identifies the model or after three incorrect guesses.
5. Prompt students to write words or sentences describing the person, place, or object that they have built.

Discussion Questions

- What is the most important descriptive word or adjective related to your model and why?
- Why was it important to add descriptive details to your model?
- Why do people use descriptive language?

Extension

Create a class poster of the descriptive words and sentences that students created, including photos of their models. Encourage students to use it as a visual dictionary during future writing assignments.



30–45 min.

Grade Level Modifications

Lower Grades:

Explain that an adjective is a word used to describe people, places, or objects. Give some examples before asking students for a list of adjectives.

Upper Grades:

Ask students to give examples of adjectives in all their forms, such as good, better, and best.



Solution Example: The Wright Brothers working on a plane constructed by Dohyun, South Korea



45100 StoryStarter Core Set

Delve deeper into Language Arts by creating descriptive stories with the 45100 StoryStarter Core Set and using the StoryVisualizer software to record and document their writing. Go to www.LEGOeducation.com to learn more!

Block and Cover

Objective: The students will demonstrate spatial thinking, counting, and problem-solving skills while playing a strategic game.

Activity Steps

1. Facilitate a discussion on games. Tell students they will be playing a math game today. The goal of the game is to have the most studs of their color visible by the end of the game. Remind students that studs are the raised parts on top of the bricks.
2. Have students work with a partner using one LearnToLearn Set. Have each student choose a color and collect all of the bricks in that color. Then have each student place the 2x2, round brick in one of the corners of the building plate, as shown in the sidebar.
3. Prompt students to take turns placing any brick in their color on the building plate. The first brick must touch their 2x2, round brick. It can be either alongside or on top of it.
4. Have students take turns placing bricks on the building plate while always touching at least one brick of their color. (It is OK to touch the other player's color as well.) They may build on top of existing bricks, and the bricks may extend beyond the edges of the building plate.
5. When both students have placed all of their bricks, tally up the final score by counting how many studs are visible. Students may display results in a graph.

Discussion Questions

- What strategies did you use while playing the game?
- Which sizes and shapes of bricks worked best and why?
- How did you determine the score at the end of the game?

Extension

Have students work in pairs or small groups to create a problem-solving game of their own using the bricks in the set. Ask them to create a set of directions. Then, have another group in the class try their directions to see if they make sense.

Delve deeper into Mathematics by exploring the competencies for mathematical problem solving through game-like activities with the 45210 MoreToMath Core Set 1-2. Go to www.LEGOeducation.com to learn more!



30–45 min.

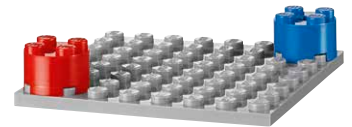
Grade Level Modifications

Lower Grades:

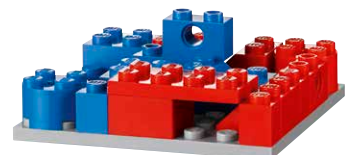
Demonstrate how the game is played by playing with a student. Also allow for a trial run of the game.

Upper Grades:

Create additional rules, such as they may not cover the other players' colors. Or have students use both building plates to make the game board larger.



Solution Example: The beginning of the game



Solution Example: The end of the game: Students were asked "How many studs are showing in each color, and which student has more?"
Red: 25
Blue: 27
Blue has more!



45210 MoreToMath Core Set 1-2

Mirror, Mirror

Objective: The students will explore colors, shapes, patterns, and symmetry.

Activity Steps

1. Review the concept of symmetry, or use this lesson as an introduction. Show students examples of symmetry, or have them research examples to share with the class. Remind students that whatever is on one side has to be on the other for a design to be symmetrical.
2. Have students use their LearnToLearn Sets to build symmetrical designs. They may do this by placing bricks on the building plate like a mosaic, or they may create a vertical design. See the photos in the sidebar for examples. It is OK if the designs are not perfectly symmetrical. Some students may focus on symmetrical shape while others focus on color.
3. When students are finished building, prompt them to share their design with a student next to them. Have students “check” each other’s designs and give suggestions for improvements if needed.

Discussion Questions

- How did you decide on your design?
- How did you check that your design is symmetrical?
- Show me the middle of your design (the symmetry line). Are there more lines of symmetry?

Extension

Have students work in pairs. Prompt one student to build a design with his/her LearnToLearn Set and the other student to build the mirror image of the design using his/her set.



30–45 min.

Grade Level Modifications

Lower Grades:

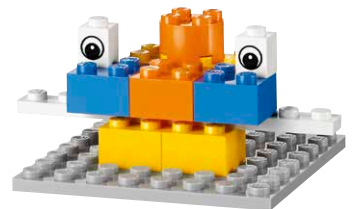
Place a temporary line down the middle of the building plate to emphasize that whatever they build on one side, they must build on the other.

Upper Grades:

Discuss symmetry lines (vertical versus horizontal) and have students place a mirror along the symmetry line to see the symmetrical design. Then remove the mirror and check that their design is symmetrical. You may also introduce diagonal lines of symmetry.



Solution Example: Mosaic design constructed by Maria, Brazil



Solution Example: Vertical design constructed by Vinicius, Brazil



45210 MoreToMath Core Set 1-2

Delve deeper into Mathematics by exploring the competencies for mathematical problem solving with the 45210 MoreToMath Core Set 1-2. Go to www.LEGOeducation.com to learn more!

What's Behind My Back?

Objective: The students will expand their knowledge of mathematical terms related to positions, numbers, and colors while communicating with a partner.

Activity Steps

1. Facilitate a discussion on communication by talking about being clear and specific when speaking.
2. Have students work with a partner using their LearnToLearn Sets. Have one partner pick five bricks from his/her set, and have the other partner pick out the exact same bricks from his/her set. Ask all students to take out their gray building plates as well.
3. Have the partners sit back-to-back, and ask one student to build a secret model on his/her building plate, so that the other student cannot see it.
4. Prompt the partner who built the secret model to explain to the other partner how to build an exact copy by using descriptive language, such as on top of, on the side, underneath, and so forth.
5. When the students are finished, ask them to compare and contrast the two models. If time allows, have students switch roles and repeat.

Discussion Questions

- How does it feel to communicate with someone without looking at them?
- What would make this activity easier and why?
- Why is it important to be able to clearly communicate to others?

Extension

Play the model memory game. Hide a prebuilt model and show it to students for a few seconds, then ask them to try to build the model from memory. Show the model as many times as needed for students to complete the replica.

Delve deeper into Mathematics by exploring the competencies for mathematical problem solving with the 45210 MoreToMath Core Set 1-2. Go to www.LEGOeducation.com to learn more!



30–45 min.

Grade Level Modifications

Lower Grades:

Allow students to ask questions or briefly look at the model a few times during the building process. You may also prompt them to build less complex models, such as towers.

Upper Grades:

Have students use more bricks, and prompt them to build more complex models. You may also add a time limit.



Have your students sit back-to-back like the minifigures in this model.



Solution Example: Models constructed by Shahad and Rikke, Denmark. After placing them side by side, they noticed the differences between the two models.



45210 MoreToMath Core Set 1-2

Balancing Act

Objective: The students will explore balance, weight, and scales.

Activity Steps

1. Facilitate a discussion on “balance.” You may ask students to demonstrate balance by standing on one foot or discuss how they play on a teeter-totter. Talk about the long part that they sit on (the beam), and the part in the middle that doesn’t move (the fulcrum) around which the effort (the force) and load (weight) move.
2. Show students an example of a balance scale. Discuss the scale’s components and purpose. Tell students that they are going to build scales.
3. Have students use their LearnToLearn Sets to build scales. You may demonstrate building the balance mechanism by using the bricks in the sidebar image. Encourage students to experiment with their scale by adjusting the position of the fulcrum and the distance of the effort and load.
4. As students finish building, have them take turns with a partner placing bricks or “weight” on one side of the scale. Ask students to discuss their findings.

Discussion Questions

- When placing weight on one side, how did you know which side was heavier and which was lighter?
- How did you know when the scale was balanced?
- Were there any bricks that looked different but were the same weight?

Extension

Tell students that there are many kinds of scales. Have students research other kinds of scales and build them or invent their own kind of scale.

Delve deeper into Science by exploring levers and balance with the 9686 Simple & Powered Machines Set. Go to www.LEGOeducation.com to learn more!



30–45 min.

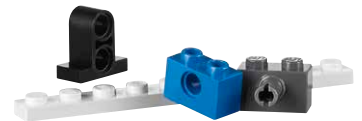
Grade Level Modifications

Lower Grades:

Explain that a lever is the plank that goes up and down and the fulcrum is the middle that stays in the same place.

Upper Grades:

Have students use the white, 1x10 plates from both sets to create a really long lever. Remind them to be sure to remember to put one white, 1x10 plate back in each set at cleanup.



Elements for Balance Mechanism



Solution Example: A scale constructed by LEGO® Education designer Ina, Denmark



9686 Simple & Powered Machines Set

Brick Biology

Objective: The students will explore and demonstrate an understanding of animals and where they live (habitats).

Activity Steps

1. Facilitate a discussion on animals and their habitats. You may structure the activity around a specific animal or group, such as domestic, wild, or endangered animals.
2. Tell students they will be working with a partner. Prompt students to work together to choose an animal.
3. Have students use one of their LearnToLearn Sets to build the animal they chose. They will use the other set during the next step.
4. Then, ask students to construct their animal's habitat with the other partner's LearnToLearn Set. Remind students to keep the sets separate in order to make cleanup easier.
5. Encourage students to share and discuss, first with another group, then with the whole class, if time allows.

Discussion Questions

- What are the characteristics of your animal and its habitat?
- How has the animal adapted to live in this habitat?
- Is the animal endangered? If so, why or how is it endangered?

Extension

Encourage students to write words, sentences, or paragraphs about their animals and habitats. Let students keep models in front of them while writing, because this will help them use more descriptive words. You may consider taking photos of each model and displaying them in the room alongside their writing.

Delve deeper into Science by building wild animals and making them come to life by programming with the 45300 WeDo 2.0 Core Set. Go to www.LEGOeducation.com to learn more!



30–45 min.

Grade Level Modifications

Lower Grades:

Before starting the activity, you may wish to show pictures of animals and review where they live. Write a list of them for students to choose from.

Upper Grades:

Have students research specific animals and incorporate their research into their models.



Solution Example: A turtle constructed by Cooper and Josie, United States



Solution Example: A beach, the turtle's habitat, constructed by Cooper and Josie, United States



45300 WeDo 2.0 Core Set

Super Structures

Objective: The students will explore structure, stability, and weight as they build towers.

Activity Steps

1. Facilitate a discussion on towers. You may show pictures or videos of real-life towers.
2. Tell students they are going to make their own towers. Have students work with a partner using one LearnToLearn Set to build the tallest tower possible.
3. When students are finished building, have the class take a “gallery walk” to see all of the different designs.
4. Decide, as a class, on a way to measure the towers to see which is the tallest.
5. Have a class discussion on the strategies used to create the tallest towers possible. Ask what worked well and what did not work well.
6. Have the students predict which tower in the classroom is the most stable structure if the surface the models are on starts to shake. Have them explain why they think so.

Discussion Questions

- What did you learn when looking at the designs of others?
- How did you work together?
- How else could you have measured the towers?

Extension

Because towers are extremely tall, they can be very unstable. Discuss the concept of center of gravity. Have the students test the stability of their structures by shaking the baseplates gently. Discuss how to create an accurate test to find the most stable structure in the classroom. Conclude by having students reflect on their hypothesis.



30–45 min.

Grade Level Modifications

Lower Grades:

Provide students with guidance for building stable towers, such as creating a wider base, and using as many bricks as possible from the set.

Upper Grades:

Give students a time limit for how long they have to design and build.



Solution Example: A skyscraper constructed by Lexi, United States



45300 WeDo 2.0 Core Set

Delve deeper into Science by testing structures with an earthquake simulator with the 45300 WeDo 2.0 Core Set. Go to www.LEGOeducation.com to learn more!

Worms and Birds

Objective: Students will explore the principles of computational thinking by participating in a strategic game.

Activity Steps

1. Tell students about the worm and the bird, who are very hungry. The worm really wants to reach the apple so it can eat it, but it has to be very careful, because the bird wants to eat the worm.
2. Have students take out the required bricks and set them up on the baseplate as shown in the sidebar.
3. Explain to students that the worm needs to reach the apple without touching the bird, and the only way to do this is by using the bricks in front of them. They need to calculate the number of studs on the bricks, and that number represents the number of studs on the baseplate that students can move their worm.

Each brick has an assigned action.

- | | |
|---------------------|--------------------|
| Red: move forward | Yellow: turn left |
| Blue: move backward | Round: spin around |
| Orange: turn right | |

4. Tell students they need to choose their bricks carefully; for example, altogether there are four studs on one of the red bricks, so the worm can move four studs forward. They should not attach the bricks to the baseplate but leave the ones they used in a separate pile. Have students work independently to complete the task.
5. Ask students which bricks they used and to compare solutions. Explain to students that all solutions are correct and there are several ways to achieve the same result.

Discussion Questions

- How did you decide which route to take?
- What was the most difficult part of the task?
- How is your LEGO® brick solution similar to computer coding?

Extension

Have students work in pairs to build the extension model shown in the sidebar. This time explain that one student controls the worm and the other student controls the bird. The objectives are for the worm to reach the apple and the bird to catch the worm before it reaches the apple.

Delve deeper into computational thinking by exploring the principles of computational thinking with the 45300 WeDo 2.0 Core Set. Go to www.LEGOeducation.com to learn more!



30-45 min.

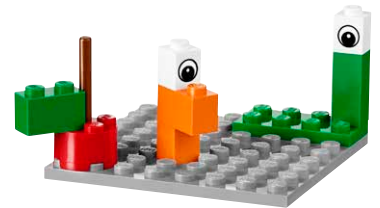
Grade Level Modifications

Lower Grades:

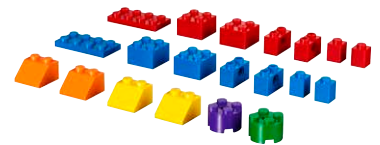
In pairs, let students create three different routes.

Upper Grades:

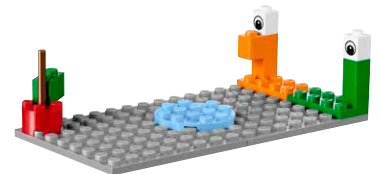
Have students create more obstacles and complete the game again.



Solution Example: The beginning of the game



Elements for the game



Solution Example: The beginning of the extension game



45300 WeDo 2.0 Core Set

A Place to Call Home

Objective: The students will explore house designs from different cultures.

Activity Steps

1. Facilitate a discussion on key elements of a specific culture. You may choose one from a recent unit of study.
2. Tell students that people often construct houses that fit the specific needs of their culture. The type of house often depends on the geography of the area, availability of resources, lifestyles of the people, and needs of their culture. Discuss these influences in relation to the specified culture.
3. Have students use their LearnToLearn Sets to construct a house for people from the specified culture.
4. When students are finished building, have them share their houses with the person next to them and explain the special features that make them suited to the specified culture.

Discussion Questions

- What materials would your house be made of in the real world?
- How would people build the house you designed in the real world?
- How does your house accommodate the needs and environment of the specified culture?

Extension

Ask students to consider how houses would be different in the future. They may discuss how new inventions and technology would influence houses. Invite students to build a house of the future. Take photos of the original and new models so that students can compare and contrast the two.

Delve deeper into Social Studies by exploring community and other areas of the world with the 45110 BuildToExpress Core Set. Go to www.LEGOEducation.com to learn more!



30–45 min.

Grade Level Modifications

Lower Grades:

Ask students to build the house he/she lives in before trying to build one from another culture, as this will be more relatable.

Upper Grades:

Ask students to consider that people with unique roles in a culture may need unique houses. Have students incorporate these differences into their houses.



Solution Example: A house constructed by Mu, Singapore



Solution Example: A castle constructed by Seungyeon, South Korea



45110 BuildToExpress Core Set

Community Planner

Objective: The students will explore communities and the needs of citizens.

Activity Steps

1. Facilitate a discussion about communities by asking students to describe the community in which they live.
2. Tell students they are going to build a community. This community needs places like stores, schools, restaurants, emergency services, and so forth.
3. Have students use their LearnToLearn Set to build one of the places in their community. Have them label their model with their names and the name of the place.
4. As students finish building, have them organize their buildings. Facilitate a class discussion as students observe and analyze all their models together. Ask students about what they need to add or change to make sure the citizens have everything they need.
5. Continue modifying the community until the whole class is satisfied that it is complete, and then ask students to create a name for their community.

Discussion Questions

- How did you work together to complete the community?
- What are the most important components of the community and why?
- How does this community compare to the community that you live in?

Extension

Have students design posters, brochures, or business cards that promote the business or describe the function of the place they created.



45–60 min.

Grade Level Modifications

Lower Grades:

Start out by having students make a list of buildings they see in their community. When they start to build their model, have them refer to the list, if needed.

Upper Grades:

Discuss the idea of trading goods and services.



Solution Example: A "burger house" constructed by William, United Kingdom



Solution Example: A community created by teacher Amy's class, United Kingdom



45110 BuildToExpress Core Set

Delve deeper into Social Studies by exploring community and other areas of the world with the 45110 BuildToExpress Core Set. Go to www.LEGOeducation.com to learn more!

People Perspectives

Objective: The students will demonstrate understanding of the characteristics of important people.

Activity Steps

1. Facilitate a discussion about the roles of people in communities all over the world. Ask students to give examples of people who have important roles within a community. You may choose to focus on a specific person that the class has been learning about.
2. Prompt the students to think about details and important characteristics of this person. This may include what the person looked like, what they did, who they knew, and so forth.
3. Have students use their LearnToLearn Set to construct a model that represents the person, including the details they recalled.
4. When students are finished building, prompt them to write words or sentences about the person they chose. Once they are done writing, have students share in small groups or with the whole class, if time allows.

Discussion Questions

- What key details are most important about the person that you chose?
- What were the most important bricks in your model?
- How did this person affect the community or world?

Extension

Ask students to consider what new roles our communities and world will need in the future. Ask students questions, such as: Who will fill these roles? How can you and your classmates become people who will benefit the community or world? Ask students to write or discuss how they will affect their community or world in the future.

Delve deeper into Social Studies by sharing different perspectives and expressing ideas with the 45110 BuildToExpress Core Set. Go to www.LEGOeducation.com to learn more!



30–45 min.

Grade Level Modifications

Lower Grades:

Students may focus on a type of community helper rather than a specific person, such as a police officer, firefighter, teacher, or the mayor.

Upper Grades:

Students may focus on historical figures from recent units of study from different eras, cultures, and so forth, such as famous political leaders, activists, authors, and artists.



Solution Example: A lifeguard constructed by Charlotte, Australia



Solution Example: A drummer constructed by Jungyoung, South Korea



45110 BuildToExpress Core Set

Building License Cards

Print enough copies so that each of your students will have a license. Cut out the cards and give one to each student after finishing "Building License — Ready, Set, Build!" You may choose to print pictures of the students and have them paste them on top of the minifigures. You may also choose to laminate the cards after students fill them in.

Building License

Name: _____

Age: _____

Favorite object to construct: _____



©2014 The LEGO Group

Building License

Name: _____

Age: _____

Favorite object to construct: _____



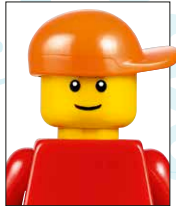
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Building License

Name: _____

Age: _____

Favorite object to construct: _____



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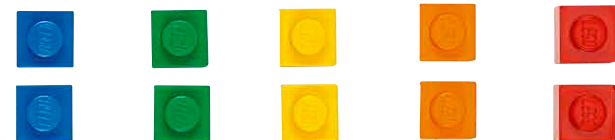
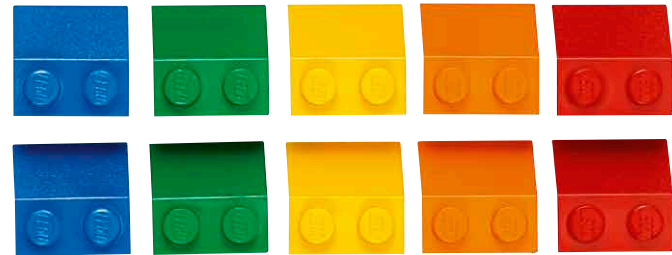
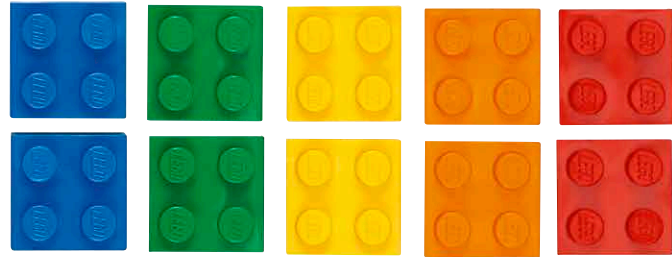
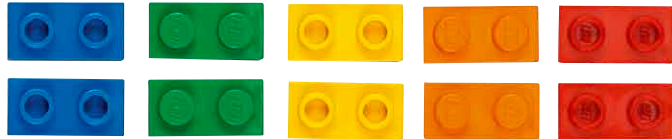
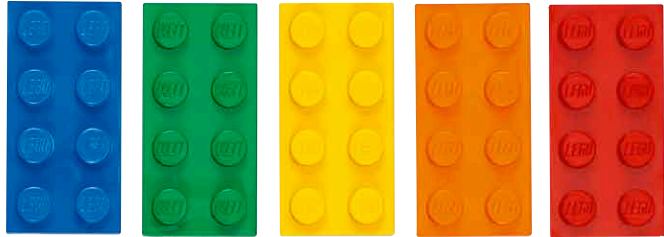
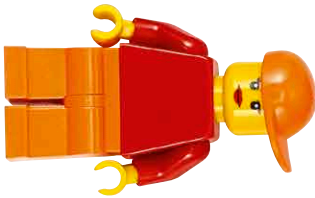
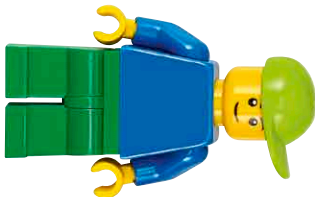
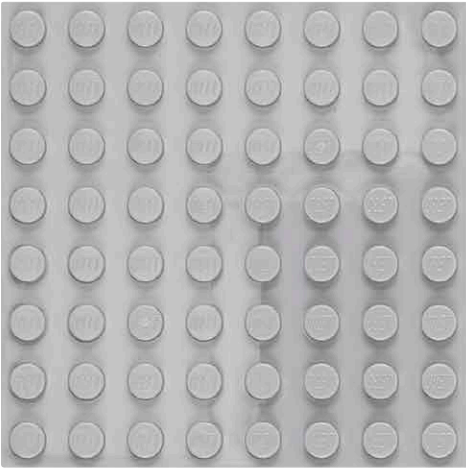
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Constructed by LEGO® Education
Designer Ina, Denmark

Front View 1:1

Back View 1:1



Dear School Management

I am writing to inform you about LEGO® Education LearnToLearn, a unique and cross-curricular tool I feel will be a valuable addition to my classroom.

The LearnToLearn solution is based on the educational theory of Constructionism, which is rooted in the belief that children learn best when they experience things firsthand and within a meaningful context.

I truly believe that this hands-on experimentation with concrete materials will lead to deeper engagement and development of skills of the 21st century: Collaboration, Communication, Creativity, Critical Thinking and Problem Solving.

Perhaps the best news is that the cost of an entire classroom implementation of LEGO Education LearnToLearn is very small, so we could even finance it with the classroom budget.

In summation, I would like to quickly review the benefits of integrating this solution:

- Directly addresses several areas of our curriculum.
- Constructionist approach to learning, resulting in higher student engagement and memorable experiences.
- Supports fundamental, skills of the 21st century.
- Very affordable, i.e., doesn't compete with books, etc.
- Reputable company in education for over thirty years.

I truly hope you are as excited about this idea as I am, and I look forward to hearing your thoughts and fielding any other questions you may have.

Thank you for your time.



Dear Parent

Our class will begin using a new learning tool called LEGO® Education LearnToLearn. I am writing to let you know what we're doing with this tool, how it works, and how I expect it to benefit your child.

Learning by Doing

For over thirty years, LEGO Education has been developing educational solutions based on a well-established educational theory that holds that children learn best and remember more through hands-on experience with physical things.

Teaching Required Subjects Using a Hands-on Approach

In our class, we'll be incorporating LearnToLearn across the areas of Engineering & Technology, Language Arts, Mathematics, Science, and Social Studies. However, instead of memorizing the abstract principles and formulas related to these subjects, your child will use LEGO bricks to construct knowledge in the subject areas as well as building skills of the 21st century.

Learning to Learn

With the integration of this solution into our curriculum, it is my hope that your child will not only learn subjects more effectively but will also improve his/her collaboration, communication, creativity, critical thinking, and problem-solving skills.

Most importantly, your child will be learning to learn in a new and exciting way. Our goal is that this new solution stimulates all children's love of learning.

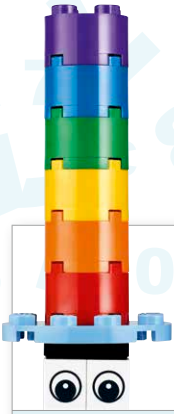
I look forward to sharing the results with you at our next parent-teacher conference.

Sincerely yours,



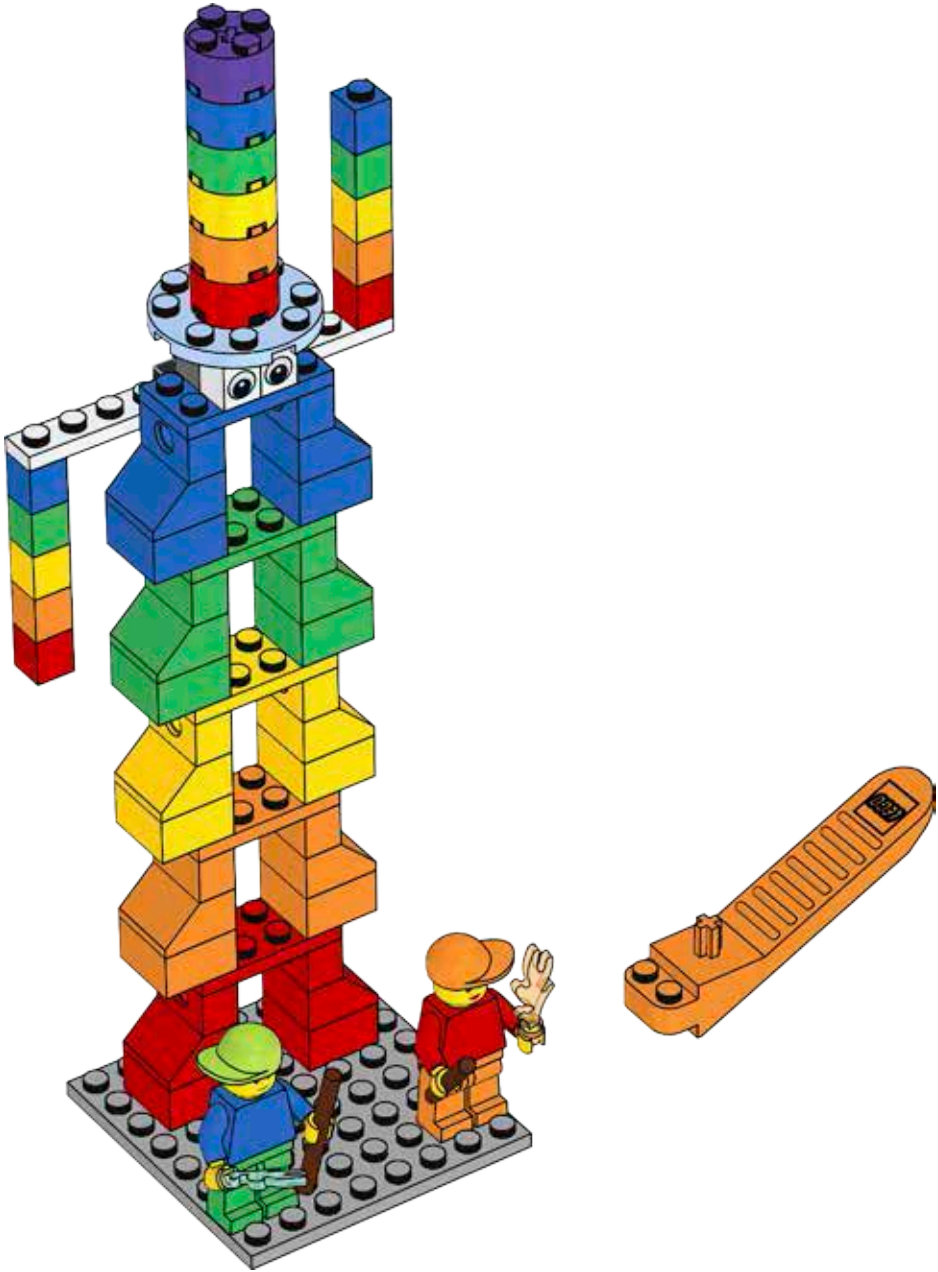
LEGO® Education Product Grid

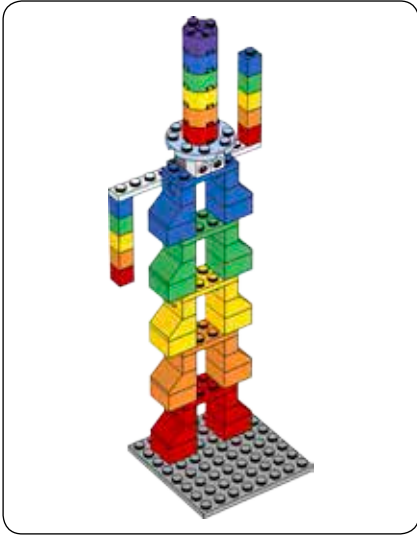
Now that you have tried LearnToLearn, you probably want more LEGO® Education Sets to explore the subject areas and further develop your students' skills of the 21st century. Look at the chart below to see which sets would best complement your curriculum based on your favorite LearnToLearn activities. Then go to www.LEGOeducation.com for availability and ordering information!



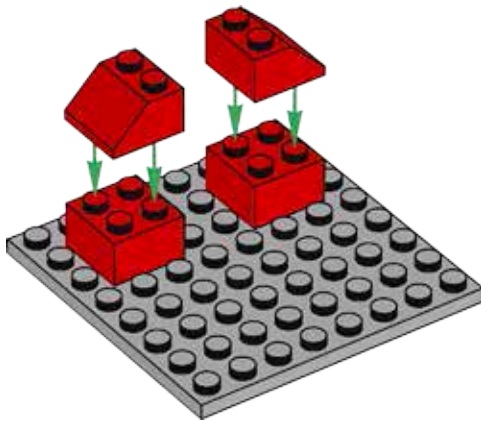
	45100 StoryStarter Core Set and StoryVisualizer software	45110 BuildToExpress Core Set	45300 WeDo 2.0 Core Set	45210 MoreToMath Core Set 1-2	9689 Simple Machines Set	9686 Simple & Powered Machines Set
Engineering & Technology Activities						
Across the River						
Maggie's Wheelchair						
My Machine Invention						
Language Arts Activities						
Scene Builders						
What's That Sound?						
Why Describe?						
Mathematics Activities						
Block and Cover						
Mirror, Mirror						
What's Behind My Back?						
Science Activities						
Balancing Act						
Brick Biology						
Super Structures						
Worms and Birds						
Social Studies Activities						
A Place to Call Home						
Community Planner						
People Perspectives						

Mr. Learnie

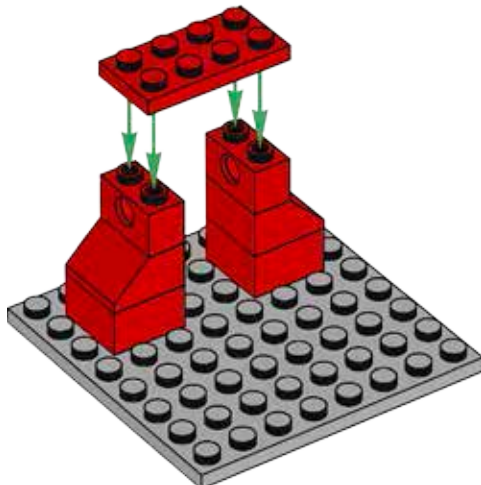




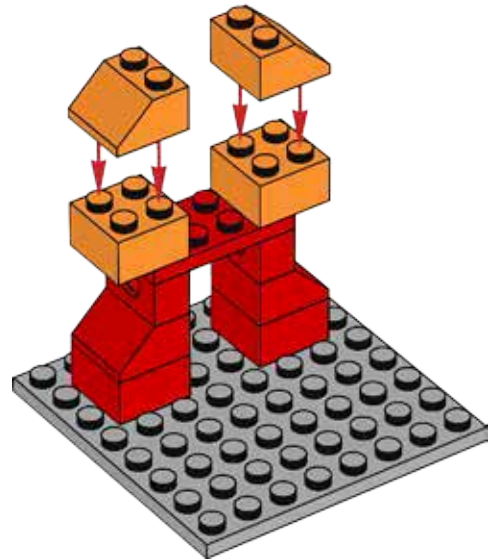
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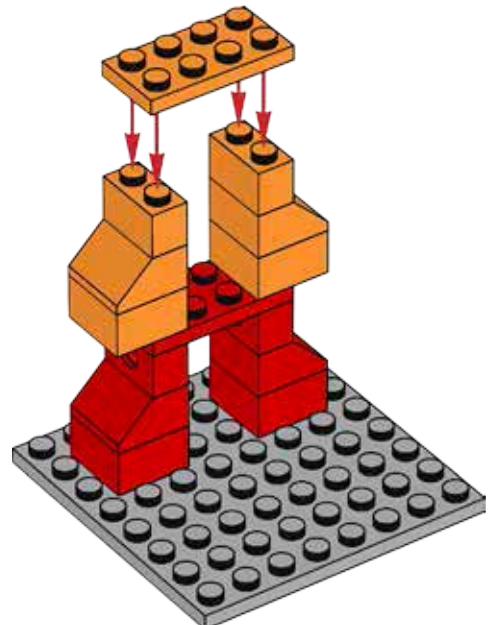
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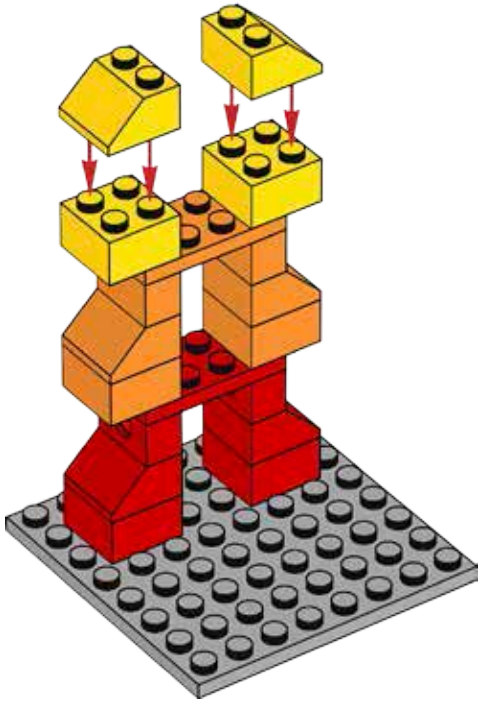
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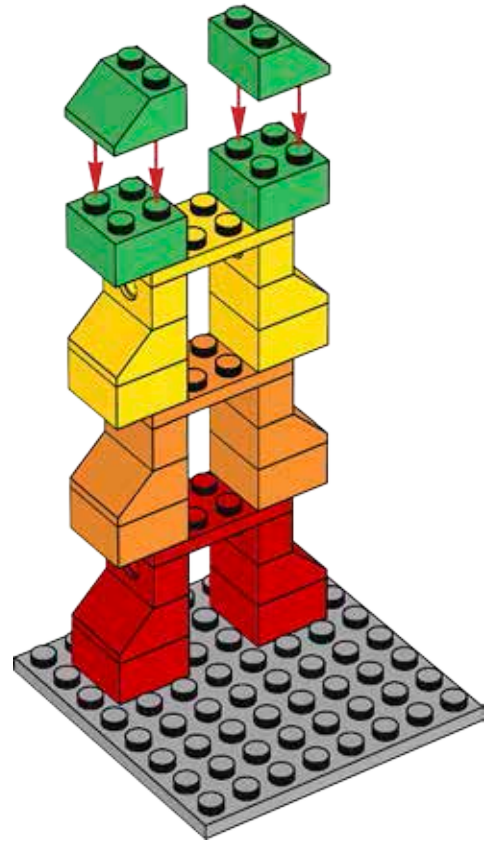
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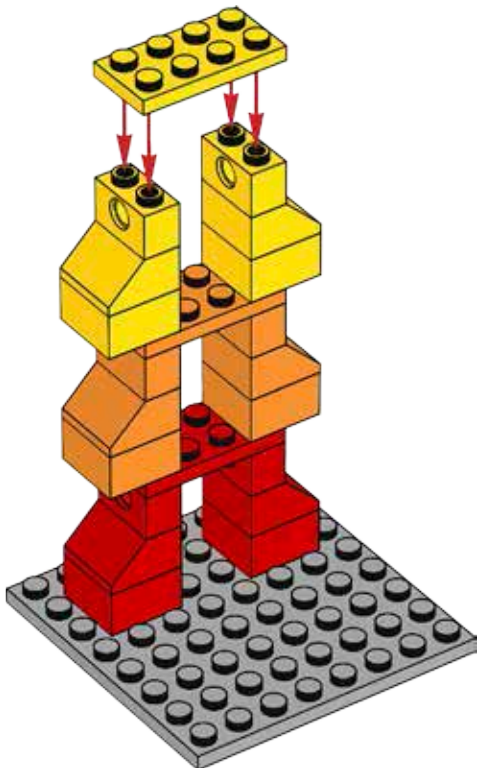
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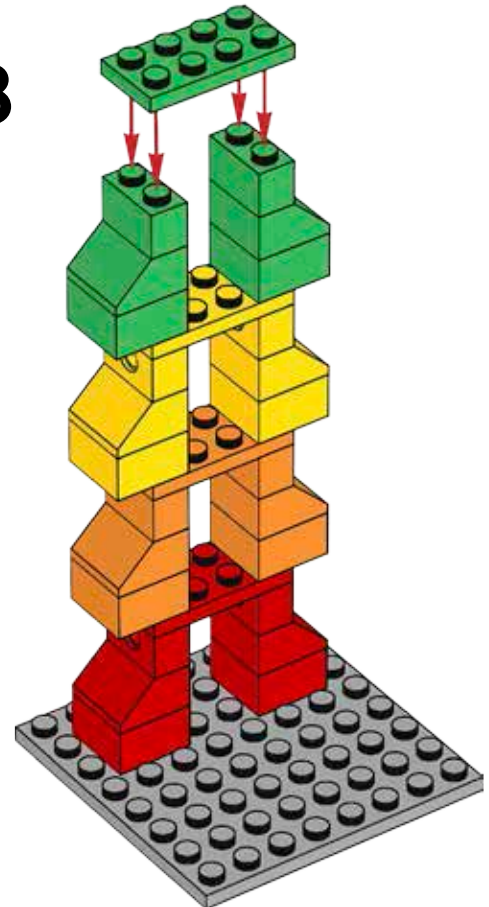
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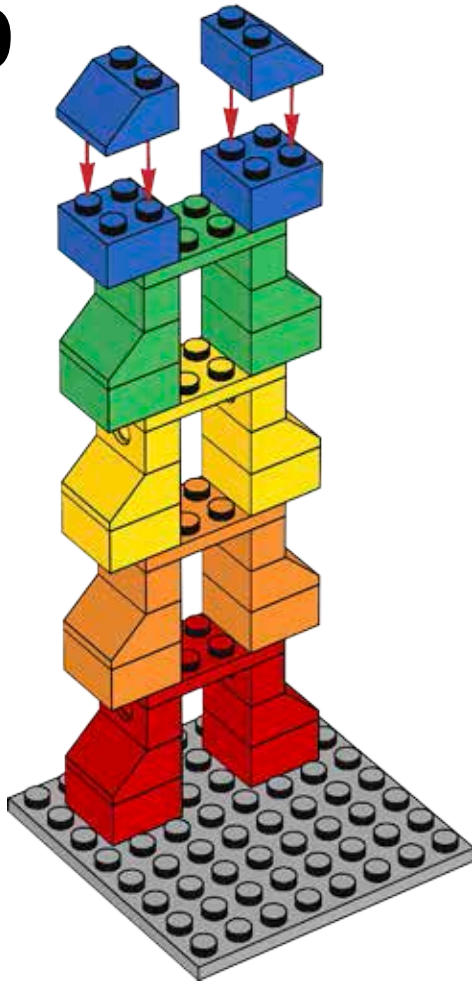
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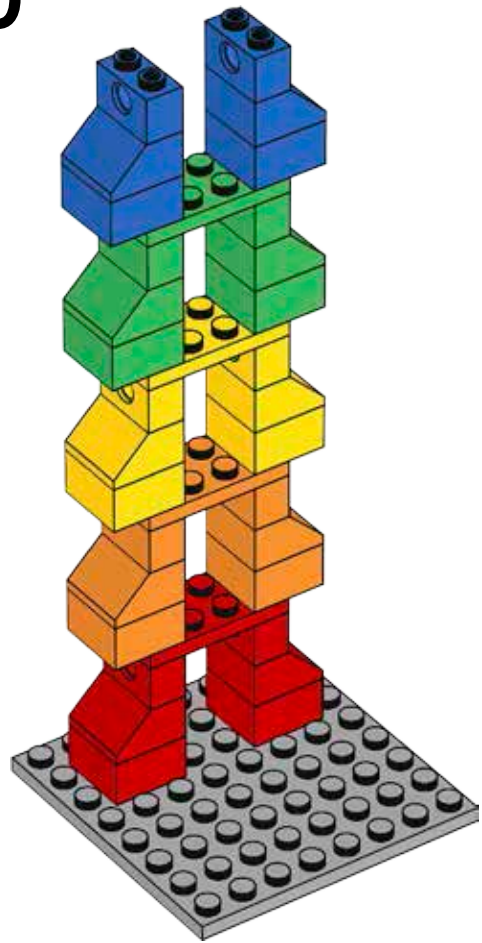
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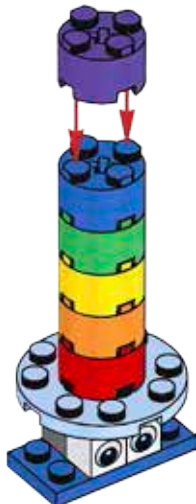
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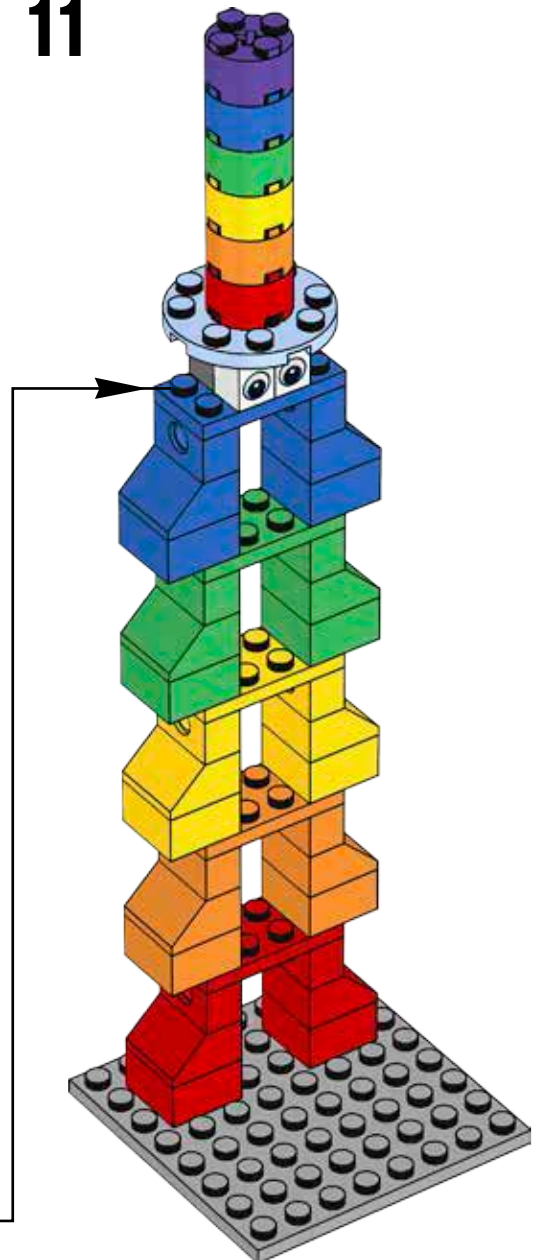
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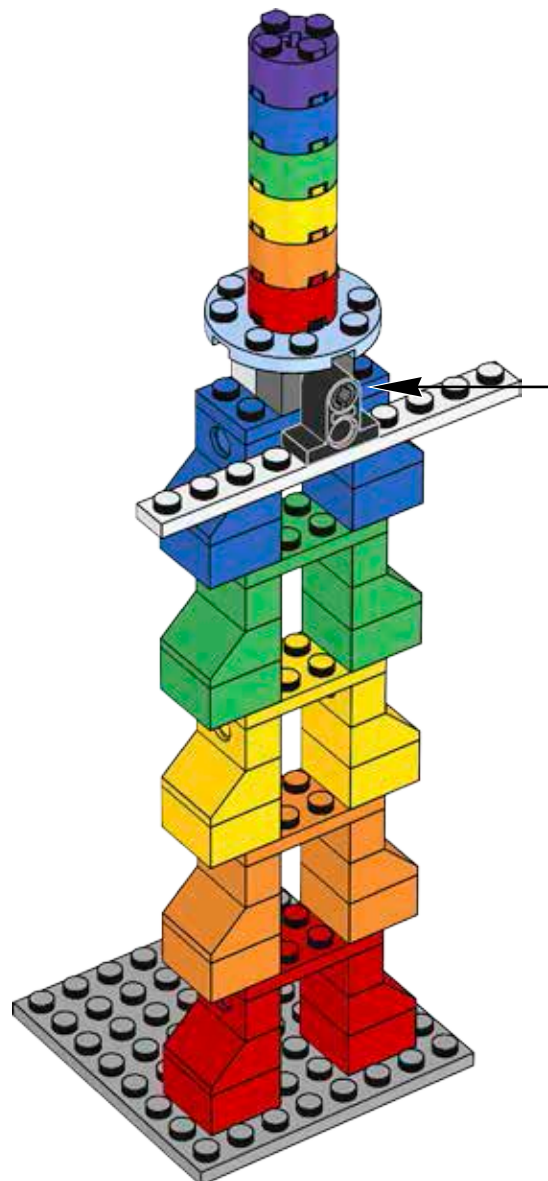
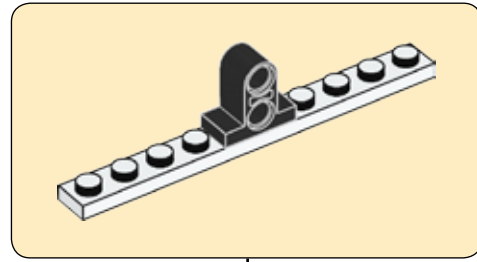
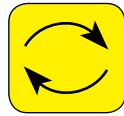
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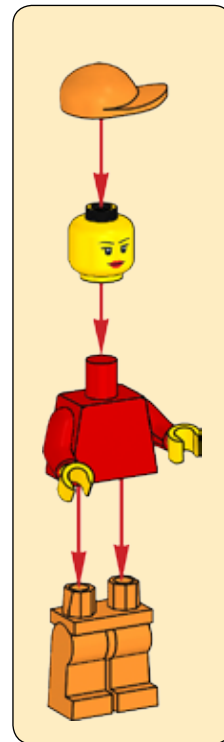
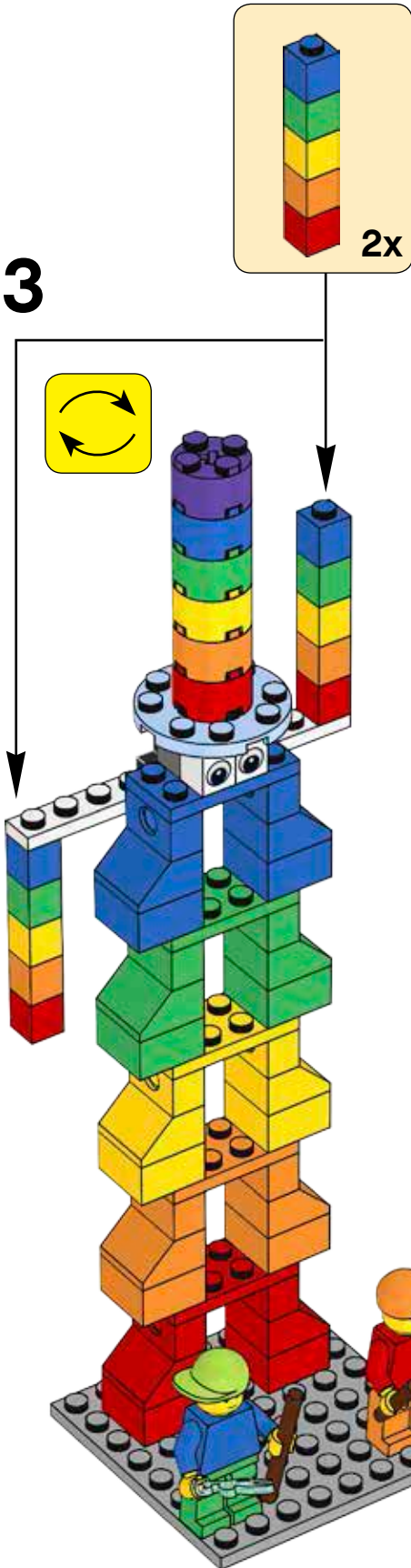
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Thank You

We would like to thank all those who helped test activity ideas and provided student models. We would also like to thank the following teachers for their amazing cooperation in co-developing LearnToLearn:

Lynne Boucher, STEAM Teacher, US

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Amber Buser, Third Grade Teacher, US

Teresa Dailey, Second Grade Teacher, US

Dr. Shirley Disseler, Assistant Professor of Elementary Education and Middle Grades Coordinator, US

Holly Doe, Enrichment and Technology Teacher, US

Michelle Faucher-Sharples, Elementary Teacher, US

Nancy Foote, Middle School Teacher, US

Linda Graham, Year Three Teacher, Wales

Erin Hardy, Second Grade Teacher, US

Jenifer Hearn, Elementary Teacher, US

Madlen Hempel, First Grade Teacher, DE

Wendy Henderson, Elementary Teacher, US

Clarissa Jackson, First Grade Teacher, US

Jason Kyle, Elementary Computer/Technology Teacher, US

Amy McIvor, Primary Teacher, UK

Stephanie Nicholls, Primary Teacher, UK

Teresa Nicholls, Primary Teacher, UK

Rachel Parry, Primary Teacher, UK

Bo Pedersen, Primary Teacher, DK

Maridel Schonert, Elementary Teacher, US

Garrett Sims, Elementary Teacher/STEM Educator, US

Carole Townsend, Primary Teacher, UK

Rebekka Trukenmüller, Primary Teacher, DE

Hans Wischmann, Primary Teacher, DE

Christine Zaremba, Technology Coordinator, US



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