

Track and Field

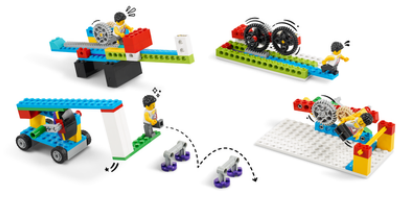
Which can you do best? Running, jumping, or throwing? Let's get out onto the track and find out!

 30-45 min.

 Beginner

 Grades 3-5

 Hybrid



Teacher Support

Key objectives

Students will:

- Become familiar with using this set to build moving models
- Explore how pushing and pulling affects a mechanism's motion
- Make predictions about how the forces acting on an object can change its motion

Things you will need

- LEGO® Education BricQ Motion Essential Set (one for every two students)

Additional resources

[Building instructions book "B," pages 2 – 3](#)
[Assessment Rubric](#)

Educational standards

- NGSS 3-PS2-2
- NGSS 3-5-ETS1-1
- ISTE: 4c
- CCSS.ELA-LITERACY.SL.3.1

Lesson extension

- CCSS.MATH.CONTENT.3.MD.C.7.B

Hybrid learning resources

[Personal Learning Kit lesson plan](#)

Prepare

- Review the online student material. Use a projector to share this material with your students during the lesson.
- Make sure that you've covered the relevant concepts (*i.e., push and pull forces*) in an earlier lesson.
- Consider the abilities and backgrounds of all of your students. Differentiate the lesson to make it accessible to everyone. See the *Differentiation* section below for suggestions.

Engage

(Whole Class, 5 Minutes)

- Watch the student video [here](#), or access it via the online student material.
- Facilitate a quick discussion about which forces are involved in running, jumping, and throwing during track and field events.
- Ask questions, like:
 - Which forces are needed to make the athletes move when they're doing track and field events? (*Athletes push with their bodies, using their muscles to run, jump, and throw.*)
- Tell students that they'll be building a mechanism that can represent a track and field event. Explain that they won't be given building instructions but should instead use the pictures on pages 2-3 in their building instructions books as guidance.
- Tell them that each group:
 - Can copy the models shown in the pictures on pages 2-3 of the building instructions book, add to them, or invent their own designs
 - Should aim to make at least two track and field event models with moving parts.
- Distribute sets to all student groups.

Explore

(Small Groups, 30 Minutes)

- Have the students work in pairs to design and build their models
 - Note: There aren't specific building instructions for this lesson. However, students can refer to the pictures on pages 2-3 of the building instructions book for inspiration. They're also welcome to design their own models.
 - You can find support for building in the *Tips* section below.
 - Once the students have finished building, encourage them to test out their models.
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Explain

(Whole Class, 5 Minutes)

- Gather your students together to share what they've built.
 - Ask questions, like:
 - How did your models represent the events that you chose? (*e.g., move fast, make something jump, etc.*)
 - Which forces or types of forces are at work in your model? (*e.g., push, pull, balanced, unbalanced, gravity*)
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Elaborate

(Whole Class, 5 Minutes)

- If time allows, have the students try each other's models.
 - Allow time for the students to disassemble their models, sort the bricks back into the trays, and clean up their workstations.
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Evaluate

(Ongoing Throughout the Lesson)

- Ask guiding questions to encourage them to "think aloud" and explain their thought processes and reasoning in the problem-solving decisions they made during the challenges.

Observation Checklist

- Measure your students' proficiency in describing the forces at work in their models.
- Create a scale that matches your needs. For example:
 1. Needs additional support
 2. Can work independently
 3. Can teach others

Self-Assessment

- Have each student choose the brick that they feel best represents their performance.

performance:

- Green: With some help, I can describe the forces at work in my model.
- Blue: I can describe the forces at work in my model.
- Purple: I can describe and explain the forces at work in my model, and I can help a friend understand, too.

Peer-Feedback

- In their teams, have the students discuss their experiences working together.
 - Encourage them to use statements like:
 - I liked it when you....
 - I'd like to hear more about how you....
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Tips

Model Tips

- This image shows four models that the students can use as inspiration.
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Differentiation

Simplify this lesson by:

- Assigning each group a specific inspiration model to build as a starting point
- The cam arm and gear train are great models because these mechanisms can easily make something move

Increase the difficulty by:

- Having the students decorate and add character to their models using the extra bricks to give it a sporting theme
 - Choosing a random element and challenging your students to find a way to use it in a model
 - Challenging your students to combine two or more different mechanisms into a single complex model
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Extensions

(Note: This will require additional time.)

Students can calculate the amount of space required for their models on a tabletop athletics field by multiplying the lengths of its sides to find its area. Have them work out how big the tabletop athletics field would have to be to fit everyone's models.

CCSS.MATH.CONTENT.3.MD.C.7.B

1:1 Hybrid Learning

Download the Personal Learning Kit lesson plan from the hybrid learning resources.