cubelets
ROBOT BLOCKS

The building blocks of better thinkers.

Create. Make. Reinvent.
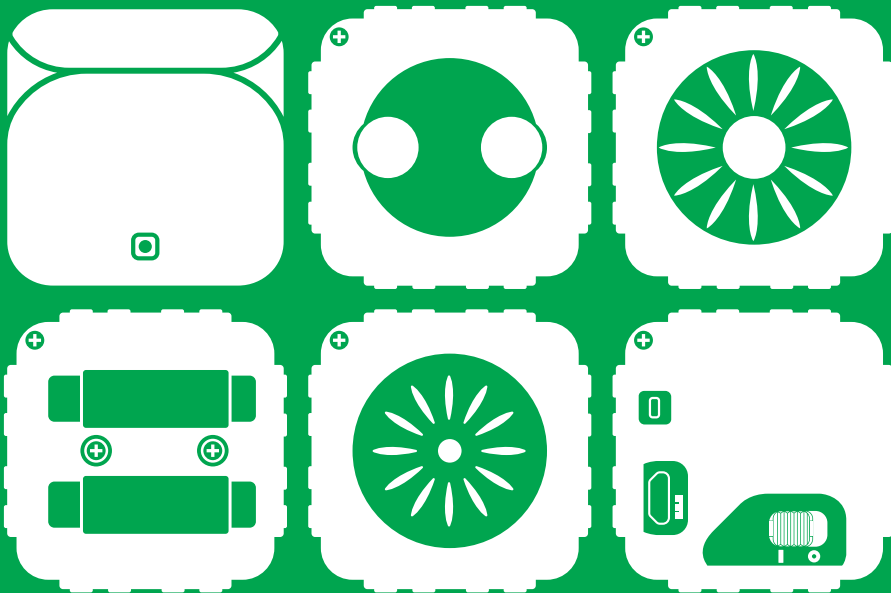Learn vital skills.
App-enriched robot play.

4+

Parents' Play Guide

Hey, parents!

We can learn a lot through play, and we can learn even more when we play with others.

Here are some questions to ask your child as you begin to play with Cubelets together.

Remember, the brain that does the thinking, does the learning!

Embrace the discomfort of sometimes not knowing the answer!

Here are a few questions to get kids thinking!

– What do you notice?

– What makes each Cubelet special?

– How many three-block robots can you build?

– What different shapes of robots can you make?

– What does each Cubelet do for this robot construction?

– Can you predict what might happen if you swap one Cubelet for another Cubelet?

Cubelets advance with you.

As our children grow, we are constantly searching for toys and games that help them learn important skills. Here are a few of the highlights your child is practicing while they're playing with Cubelets.

Each of the skills listed here is a fundamental part of computer science and computational thinking. Together, they promote the development of logic, problem solving, and the design process. Each Cubelets challenge includes a chart identifying the skills you're helping develop.

Ages 4+

Robotics Basics
Cause and Effect
Gross Motor Skills
Speaking and Questioning
Sorting
Sequencing

Ages 7+

Computational Thinking
Critical Thinking
Design and Engineering Basics
Network Basics
Collaboration Skills
Pattern Recognition

Ages 10+

Computer Science Basics
Coding Smarter
Parallel Programming
Systems Thinking
Complexity Basics
Design Thinking
Networks
Abstraction

Challenge #1

Can you invent a robot that drives on a table, but will stop if it gets to the edge?

Questions to Ask

Which Sense Cubelet can detect the table?

Which Act Cubelet makes your robot move?

Could a brick adapter help your design at all?

Hints to Consider

Distance Sense will notice a table – a Brightness Sense won't

Drive Act has wheels to move your robots – the Flashlight can't move your robot.

Try turning your edge sensor robot into a wheelie edge sensor robot!

Ages 4+

**Robotics Basics
Sequencing**

Ages 7+

**Computational Thinking
Design and Engineering Basics**

Ages 10+

**Systems Thinking
Design Thinking
Abstraction**

The Distance Sense uses infrared light to detect nearby objects. It can be pointed down to detect the presence of a table. This works best on a light-colored table.
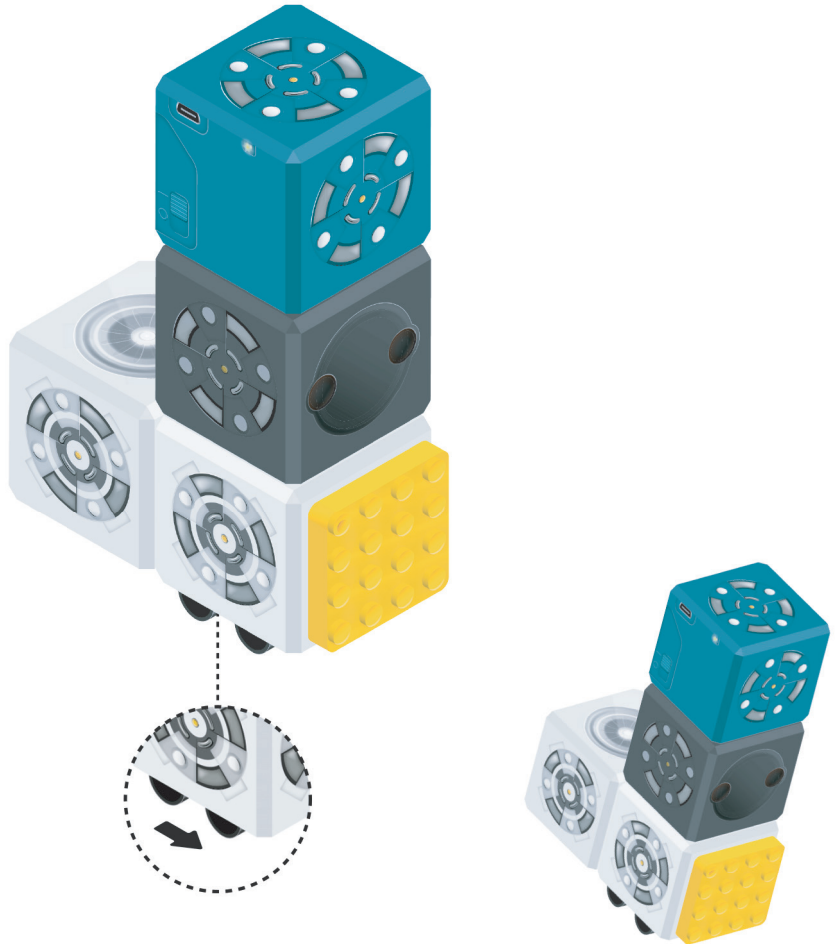
Place the Distance Cubelet at the front of the robot to detect the lack of a table as early as possible.
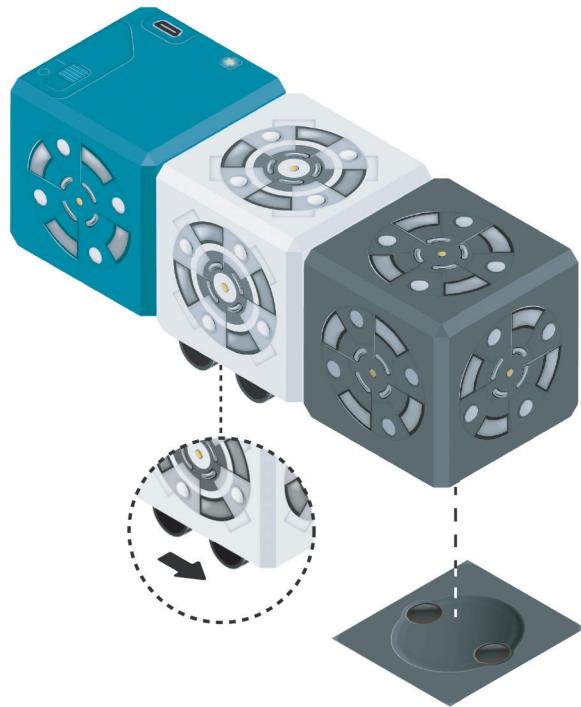
You can try other designs, like this wheelie robot, using Brick Adapters. This wheelie edge detector tilts the Distance Sense down so it can look at the table ahead.

Challenge #2

Can you invent a robot that behaves like a character in a story you read?

Questions to Ask

Which character traits are most important to show with this robot?

Is there anything or anyone this character would run toward — or away from?

Do you have a specific part of the story you are thinking about?

Hints to Consider

Not all character models need to be able to move — a child might choose to focus on physical character traits instead of motives.

Think about a time in the story when the character moved — or changed their mind. Why did they do that?

Try building a setting for your character to be in!

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Challenge #3

Can you invent a robot that moves forward until it sees something and then stops?

Questions to Ask

Which Sense Cubelet can detect objects?

What normally happens when the Distance Cubelet sees an object?

Which Personality Swap do you think might help you with this challenge?

Hints to Consider

The Distance Cubelet can see objects, but the Brightness Cubelet cannot.

The closer an object is, the faster the robot will move. In order to take on this challenge with just the Discovery Set, you will need the Cubelets App and Bluetooth Hat.

Another word for opposite is "inverse." You can choose to reprogram any ONE Cubelet for this challenge.

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Challenge #4

Can you invent a robot that can signal for help in Morse code?

Questions to Ask

Do you know what the signal for help is in Morse code?

Can you make the SOS signal using the Flashlight Cubelet?

Which Cubelet do you think will be the most efficient to program?

Hints to Consider

In Morse code, people signal for help using SOS (three short dots, three long dashes, three short dots).

Think about how you can make the Flashlight light up. You can use the SENSE Cubelets, remote control, or Personality Swap.

Try reprogramming the Flashlight Cubelet for the simplest solution!

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- **Sorting**
- **Sequencing**

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- **Critical Thinking**
- **Design and Engineering Basics**
- **Collaboration Skills**

Ages 10+
- **Computer Science Basics**
- **Coding Smarter**

Challenge #5

Can you invent a robot that explores its environment and changes directions when it detects a nearby object?

Questions to Ask

Which Sense Cubelet can detect objects?

How is this different from any other robot you've built?

Which Cubelet will it make the most sense to reprogram first?

Hints to Consider

The Distance Sense Cubelet can detect objects — the Brightness Cubelet cannot!

There is a Personality for the Drive Cubelet that helps your robot construction change directions.

Consider starting with programming your ACT Cubelet before anything else. This is often the simplest solution.

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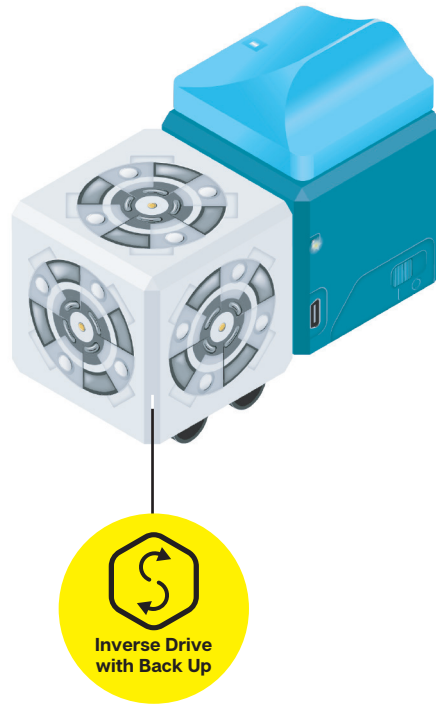
This robot requires a Personality Swap. We recommend swapping Personalities before assembling the final robot construction.

First connect the Bluetooth Hat and Battery Cubelet.
Power on the Battery and pair with the Cubelets App.

Attach the Drive Cubelet. Select Personality Swap, then tap to select the Drive Cubelet from the block map.

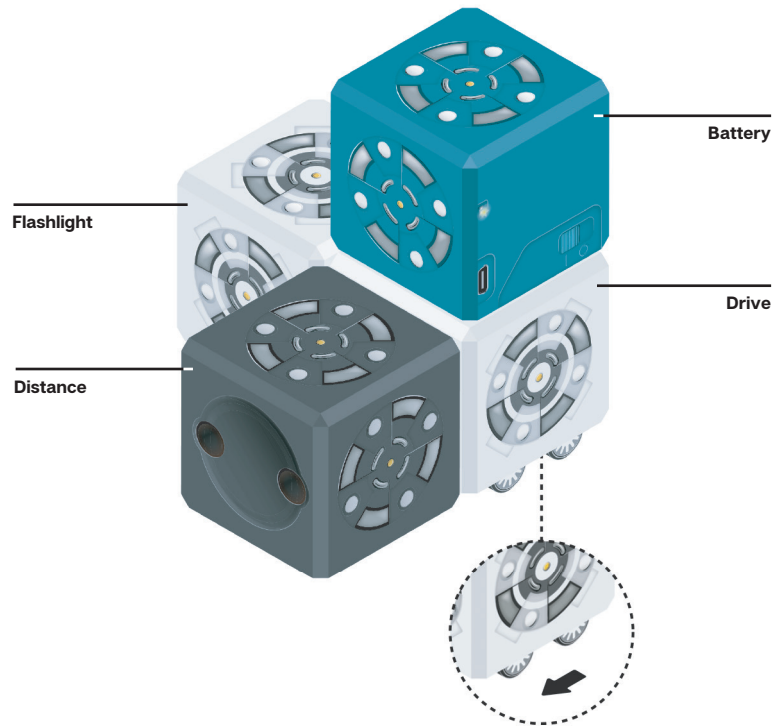**Inverse Drive with Back Up**

Tap to select the "Inverse Drive with Back Up" Personality from the list. Then tap Confirm.

After the swap successfully completes, remove the Drive Cubelet and set it aside.

Build the robot construction pictured below.

1

Battery

Flashlight

Drive

Distance

When you power on your robot construction, it will move forward until it sees an object. Once it detects a nearby object it will quickly back up. Depending in the weight distribution and surface it is driving on, it may do a wheelie spinning in circles until it detects another object.

Experiment with the placement of the Brick Adapters to adjust how your robot spins as it backs up. Different layouts will result in different behaviors.

When you're done playing, use the Cubelets App to reset the Drive Cubelet to the default Personality using Personality Swap.

2

Challenge #6

Can you invent a robot that can be steered with a flashlight in a darkened room?
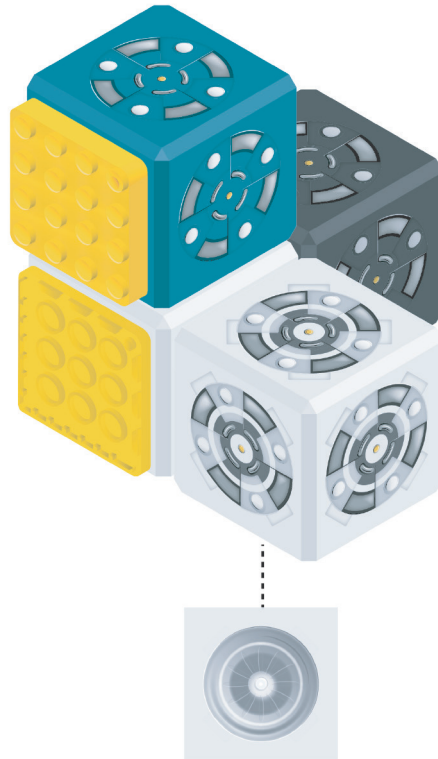
Questions to Ask

Which Sense Cubelet can detect light?

How can you create a robot that turns?

Is there a way to make the Brightness Cubelet only respond to bright lights?

Hints to Consider

The Brightness Cubelet can detect light — the Distance Cubelet cannot!

Check out the Discovery Guide that came in the box for some ideas about building steering robots!

We made a Personality that helps the Brightness Cubelet ignore dim lights (low data values). Can you find it?

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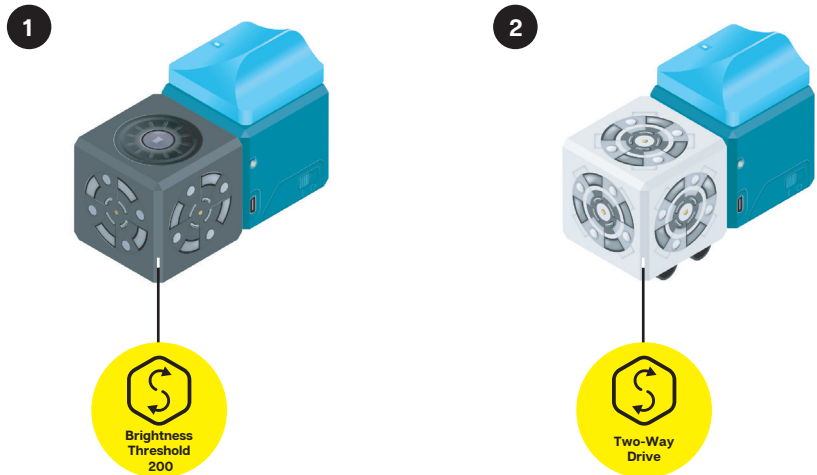**Design Thinking**
Networks
Abstraction

Challenge #6
Walkthrough

This robot requires multiple Personality Swaps. We recommend swapping Personalities before assembling the final robot construction.

First connect the Bluetooth Hat and Battery Cubelet.
Power on the Battery and pair with the Cubelets App.

Attach the Brightness Cubelet. Select Personality Swap, then tap to select the Brightness Cubelet from the block map.

1 Brightness Threshold 200

2 Two-Way Drive

Tap to select the "Brightness Threshold 200" Personality from the list.
Then tap Confirm.

After the swap successfully completes, remove the Brightness Cubelet and set it aside for a moment. Attach the Drive Cubelet.
Select Personality Swap, then tap to select the Drive Cubelet from the block map.

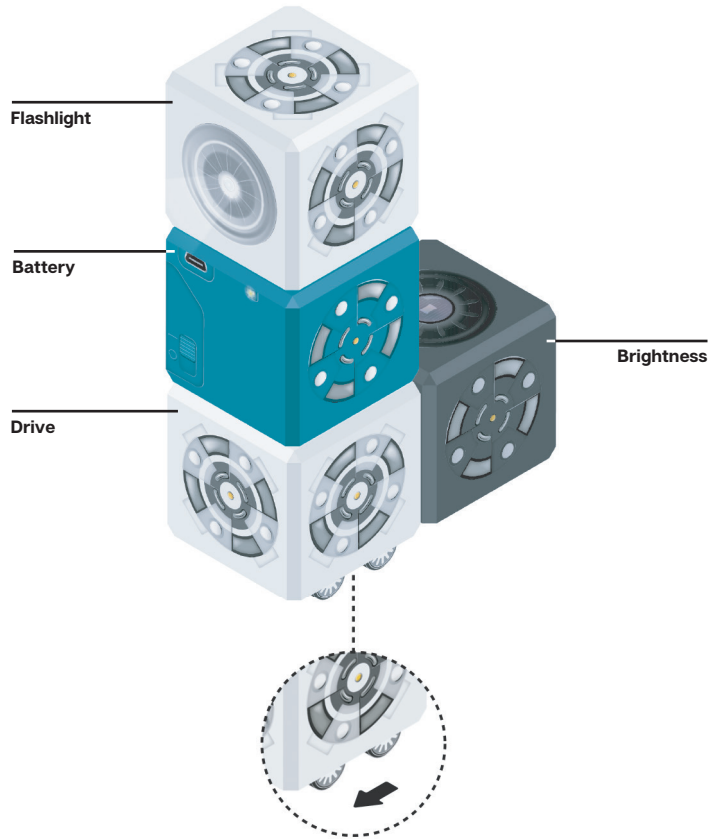Tap to select the "Two-Way Drive" Personality from the list.
Then tap Confirm.

After the swap successfully completes, remove the Drive Cubelet and set it aside.

Build the robot construction pictured below. Note the direction of the Drive Cubelet gears, and Brick Adapters.

1

Flashlight

Battery

Brightness

Drive
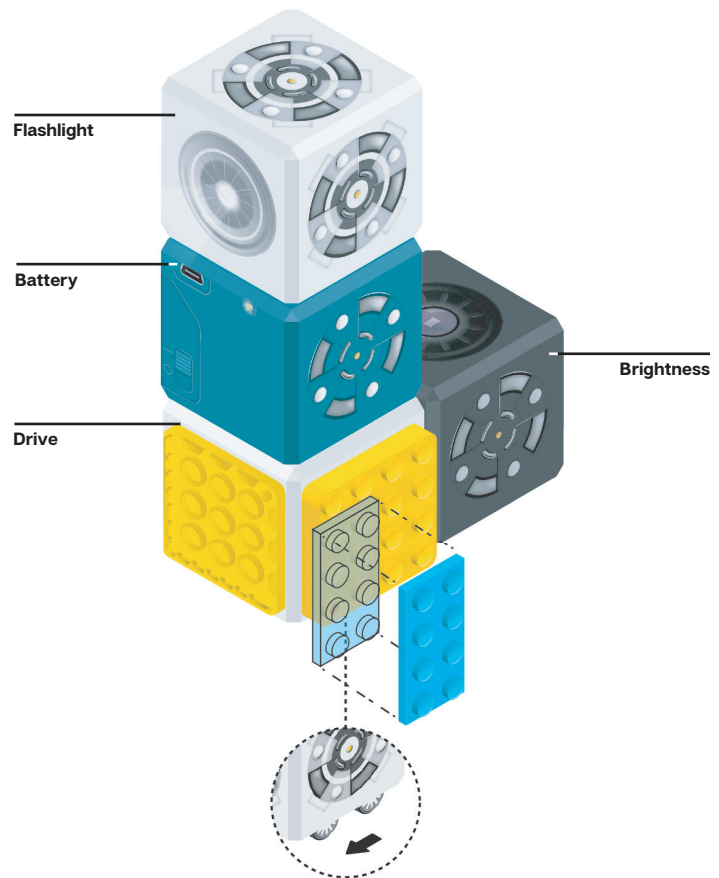
You'll also need a thin LEGO brick that reaches one "stud-length" beyond the bottom of the Brick Adapter as pictured.

Power on your robot construction in a dark room and use a flashlight, or other bright light, to trigger a wheelie that turns the robot construction. When you're done playing, use the Cubelets App to reset the Cubelets to their default Personalities using Personality Swap.

2

Flashlight

Battery

Brightness

Drive

Challenge #7

Can you design a robot that represents an animal (whether real or imaginary)?

Questions to Ask

What does your animal respond to: light or objects?

How might you use the brick adapters and building bricks to help me visualize your animal?

Are there any Personality Swaps that can help you design the animal you have in mind?

Hints to Consider

Start by choosing your primary SENSE and ACT Cubelets. You can always add more later!

The brick adapters can be useful not only for adding decorations, but also for balancing your robot!

Start using Personality Swap on ACT Cubelets first. Then try other Cubelets.

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Cubelets
ROBOT BLOCKS

Cheers, Parents!

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We hope you love your Cubelets® robot blocks!

Your stories about Cubelets® inspire us.
If you'd like to share your story or if you need help,
please contact support@modrobotics.com