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## About us.

We are Modular Robotics, the makers of Cubelets® robot blocks, the building blocks of better thinkers.

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Modular Robotics is headquartered in Boulder, Colorado, USA. We believe toys shape the way children think about the world, so we design little robots to help build better thinkers.

Our goal is to make captivating robot toys that inspire an intuitive understanding of complexity, computational thinking, emergence, design, and a bunch of other vital thinking skills.

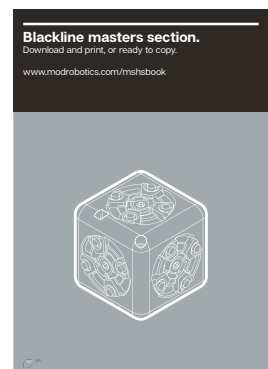
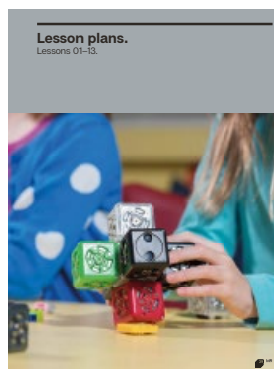
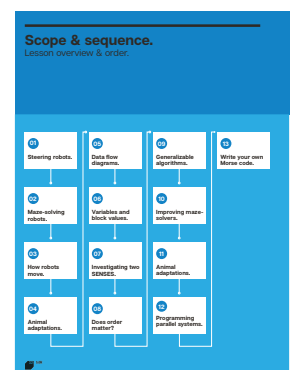
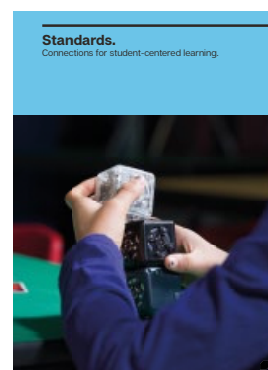
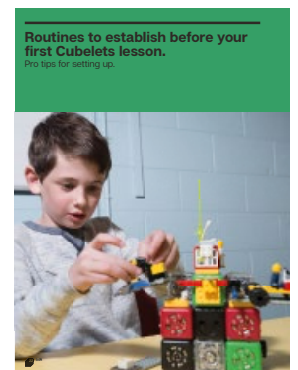
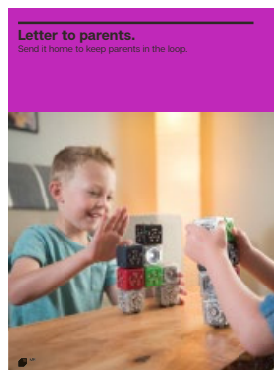
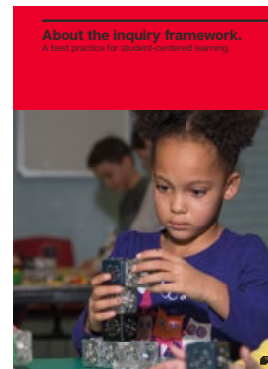
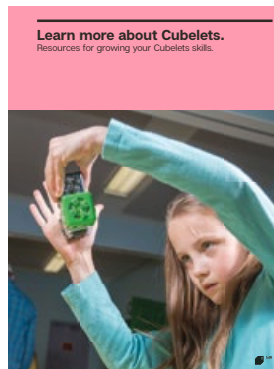
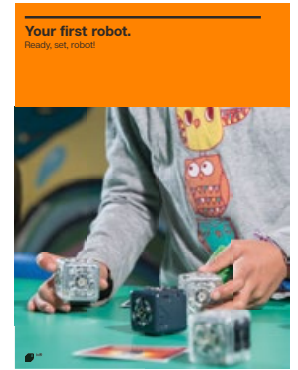
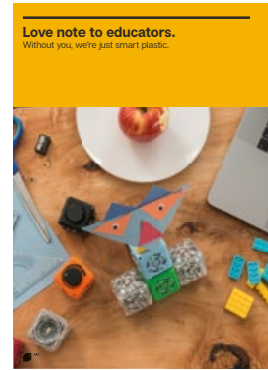
Enjoy making, exploring, and creating with Cubelets robot blocks!

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Modular Robotics 

# What's inside.

- Educator resource hub & social.
- Love note to educators.
- Your first robot.
- Learn more about Cubelets.
- About the inquiry framework.
- Cubelets catalog.
- Letter to parents.
- Maintenance & support.
- Routines to establish.
- Classroom management.
- Standards.
- Scope & sequence.
- Lesson plans.
- Blackline masters.



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# Hello.

Dear Educator,

You are one of the most important people in the lives of your students, and your work is hard. Thank you for everything you do for your students every single day!

In this bundle, and on our free educator resource hub (found at [modrobotics.com/thehub](http://modrobotics.com/thehub)), we have tried to make it easy to introduce Cubelets to your students. However, the best advice we have, echoed by educators around the globe, is just go for it!

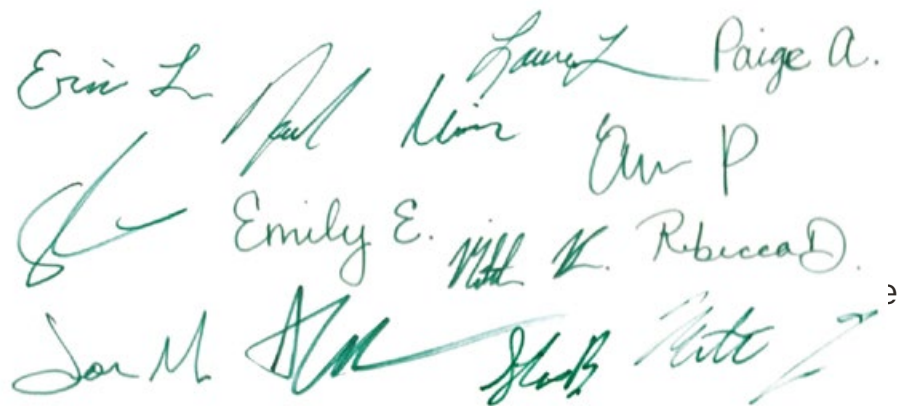
Cubelets were designed specifically for kids. Try learning alongside your students so they can see how you learn. Cubelets are the perfect tool for think-alouds because students may be able to help you!

As you look through these getting started lessons and resources, keep in mind that we are always here for you. If you have any questions – even specific to your students, classroom, or school – feel free to email our support team at [support@modrobotics.com](mailto:support@modrobotics.com). They'll be able to connect you to the resources you need and can also refer you to our Education Design Team.

We hope you enjoy these little robot blocks as much as we do!

Sincerely,

The Team at Modular Robotics



A collection of handwritten signatures in green ink, arranged in three rows. The first row contains 'Erin L.', 'Paul', 'Laura', and 'Paige A.'. The second row contains 'Le', 'Emily E.', 'Matt K.', and 'Rebecca D.'. The third row contains 'Jan M.', 'Alex', 'Shelby', and 'Katie'.

# Your first robot.

Start with the Distance, Battery, and Drive Cubelets. They represent the three types of Cubelets you need to build a robot construction.



**SENSE**



**THINK**



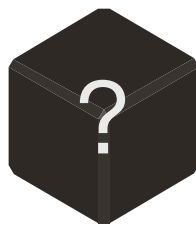
**ACT**

To build a robot construction, you need:

(1) **SENSE** Cubelet  
(Any SENSE Cubelet)

(1) **THINK** Cubelet  
(Battery always required)

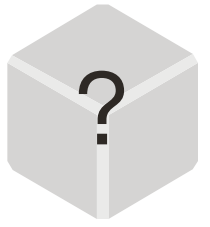
(1) **ACT** Cubelet  
(Any ACT Cubelet)



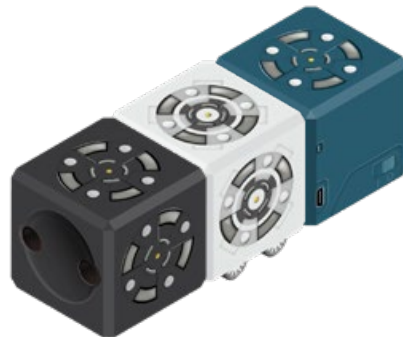
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Connect the magnetic faces so you have a robot construction that looks like this:



Find the switch on the side of the Battery Cubelet and turn it to the ON position.

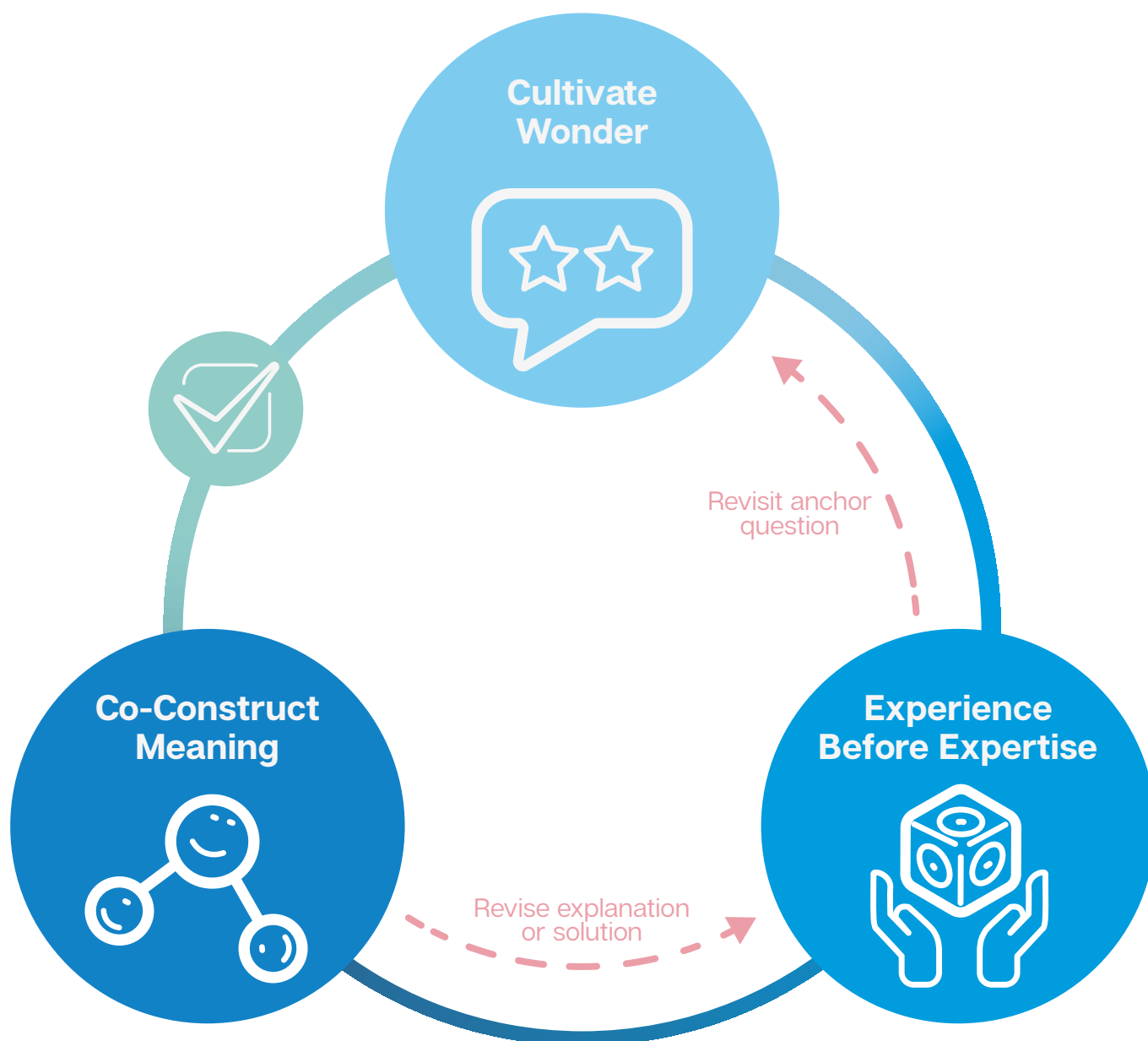


**Congratulations!**  
You've completed  
your first robot  
construction!

What happens when you place your hand in front of the Distance SENSE? Can you figure out what makes the robot construction move faster and slower?

# Cubelets Inquiry Framework.

As you dig into the Cubelets Lesson Plans, you will notice they all use a common format. This format represents our version of an Inquiry Framework. In each lesson, after you find the Overview 🍏 and Classroom Prep ⚙️ sections, you'll notice the following sections:



# Programming parallel systems.



## Lesson overview.

### Cubelets work as a parallel (distributed) system of computers.

Today, students will be introduced to Cubelets Blockly and the nuances of programming a parallel system, as opposed to other, single-computer robots. While prior programming experience is not required, it will be helpful if students have already been exposed to Blockly programming. Code.org has many free resources to get you started!

**Objectives** Students will program a parallel system using Cubelets Blockly.

**Assessment** Students will successfully program a Cubelets robot construction using Cubelets Blockly.



If you have a strict school filter, you may need to have your IT department allow access to the Cubelets compiler server. We do not collect any user data. We'll point you in the right direction at



## Supplies needed.

### Cubelets (6 groups of)

- One of every Cubelet you have available, to create matching groups
- Plus Bar Graph Cubelet OR Bluetooth Cubelet OR Bluetooth Hat

### Assorted

- Device with Cubelets Blockly
- Create with Cubelets Blockly tutorial (Ep. 08-09.5)
- (Optional) T7 - Blockly Overview



## Vocabulary.

- Parallel system
- Distributed system
- Blockly
- Variable
- Actuator
- Conditional



## Pacing.

- 5 minutes: Introduction.
- 35 minutes: Students work through Blockly tutorials.
- 10 minutes: Reset to Default and reflect.

## 12 Programming parallel systems.



Cultivate wonder.

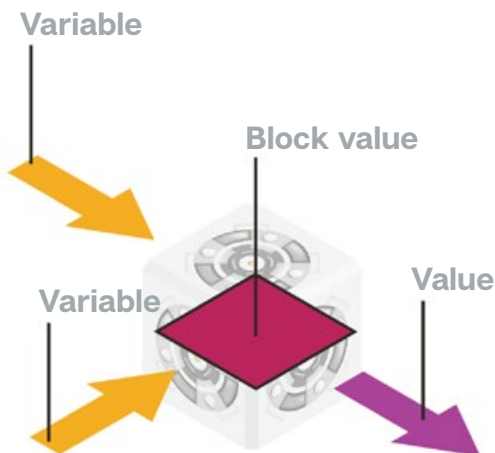
### Introduction.

“Remember when we made Data Flow Diagrams to show how data moves within Cubelets constructions? What exactly are Cubelets sending when we say **data**?”

- Numbers.

“Cubelets send numbers back and forth to each other. The number a Cubelet remembers is called the **block value**.

“When a Cubelet sends out a block **value**, we call that number a value (block value!). When a Cubelet receives a number from another Cubelet (or the environment), we call it a **variable** because the Cubelet cannot control what number it is receiving. As we build more complex robot constructions, some Cubelets could receive more than one variable from its neighbors. When that happens, the Cubelet collects the **weighted average** of those numbers.”



“Because Cubelets are 8-bit computers, they can only count from 0-255. If they receive a number greater than 255, they start counting again at 0 (ie. 260 = 5).”

We've included helpful resources about binary and 8-bit computers at

## 12 Programming parallel systems.



### Experience before expertise.

#### Explore Blockly Tutorials.

*“Today, we’re going to practice using Cubelets Blockly to write custom programs for our Cubelets. Remember, the code you’ll be writing will be applied to only one Cubelet at a time.”*

- Show students how to access the Blockly tutorials at [modrobotics.com/cwc](http://modrobotics.com/cwc) and how to use the student resource sheets.



### Co-construct meaning.

#### Reset to Default.

*“Please take a minute to save your programs, then reset all your Cubelets back to default.”*

- Student reset the Cubelets back to default using Cubelets Blockly or the Cubelets app.



### Check for understanding.

#### Reflect.

*“What was surprising today while you were programming with Cubelets Blockly?”*

- Students share out.

*“What would you like to try to program using Cubelets Blockly?”*

- Students share out.



If students are having trouble getting started in Blockly, they can start at Ep. 05! [modrobotics.com/cwc](http://modrobotics.com/cwc)



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## 12 Programming parallel systems.



**Differentiation** – Intervention & extension.

### **Intervention**

If students need extra support, have them start their Blockly tutorials at Ep. 05 of Create with Cubelets. This introduces the user interface and introduces them to the blocks in a more scaffolded way than jumping in at Episode 08. Make sure every student has access to a printed student resource sheet.

### **Extension**

Once students have finished the Blockly tutorials, give them time to create their own programs. They have a list of ideas from their experiments with Personality Swaps.

## **END OF LESSON #12**

**How did this lesson work for you? Let us know!**

Check out our newest resources at [\[REDACTED\]](#)