Print & Fold
Activity Cards.

Instructions.

01 **Print this file.**

When printing be sure to set the “size” to **“Actual size”** in our printer settings.

02 **Fold.**

Fold each sheet in half along the dotted line.

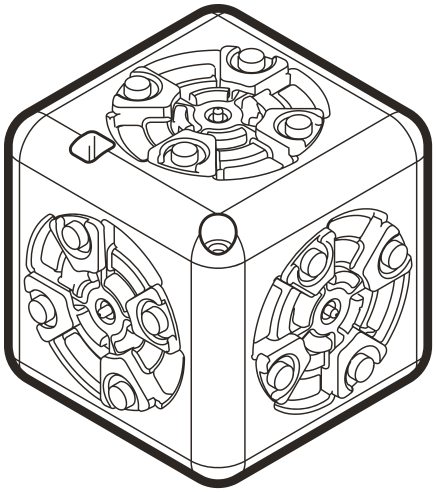
03 **Laminate or tape.**

Laminate or tape the folded card together to create a durable teaching tool for your Cubelets robot blocks!

cubelets
ROBOT BLOCKS

Build. Invent.
Draw. Learn.

Print & Fold Activity Cards.



Modular Robotics

1860 38th St. Boulder, CO USA
www.modrobotics.com

How to use... Activity Cards.

How to use.

01

- Cubelets Activity Cards are designed to support learning stations for a small group of two to three learners. However, you may choose to experiment with these cards in different ways to best match your learning environment.

Important information.

02

- Each activity includes a **difficulty rating** to help you align challenges to your students' Cubelets skills.

●○○○ Novice
●●○○ Apprentice
●●●○ Artisan
●●●● Master

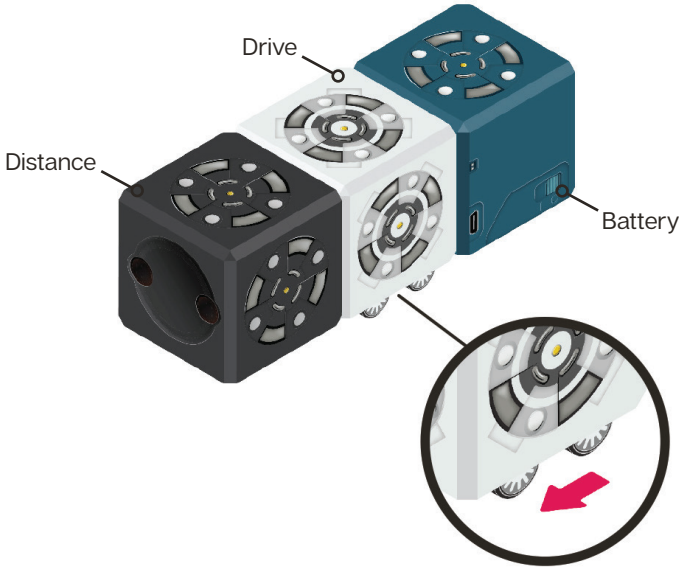
- Select cards are components of two-part activities. Use both cards!

Card **01 of 02**

Card **02 of 02**

- Some challenges require additional materials. These materials are listed on the back of the cards in the "additional supplies" section.

Can you build?
Your first robot.



Your task.

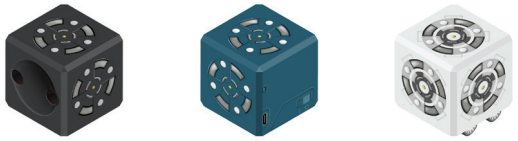
Can you build your first robot with Cubelets robot blocks?

Directions and hints.
Your first robot.

Directions.

01

- 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

- Connect the magnetic faces so you have a robot construction that looks like the robot on the front of the card.
- Find the switch on the side of the Battery Cubelet and turn it to the “ON” position.

- 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?

Hints.

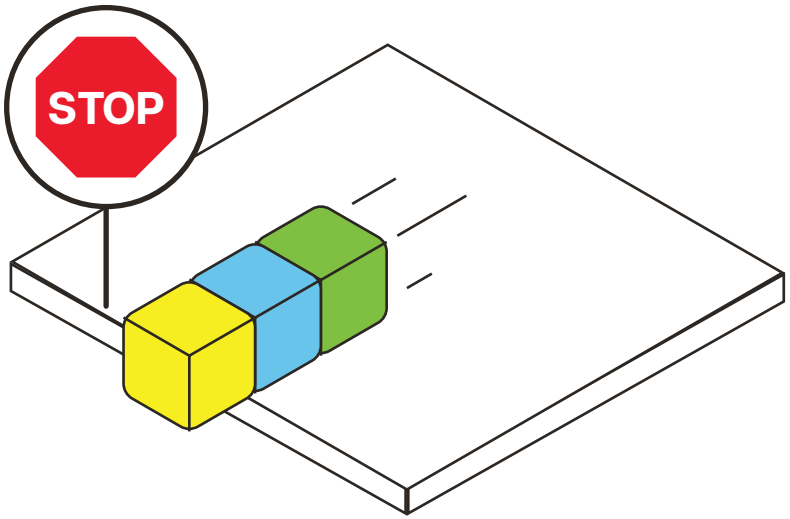
02

- Remember, your robot constructions need a SENSE, THINK, and ACT Cubelet!

Difficulty.

●○○○
Novice

Can you build?
Safety bot.



Your task.

Can you build a robot that **stops** when it gets to the edge of a table?

Directions and hints.
Safety bot.

Additional supplies.

- A light-colored table.
- A pillow or box of soft things to catch falling robots.

Directions.

01

- Design a robot that can move across a table and automatically stop before falling off.
- **Do not** try to catch your robot when it goes near the edge of the table.
- Instead, use a pillow or box full of soft things (crumpled paper, foam, etc.) to catch your robot if it falls.

Hints.

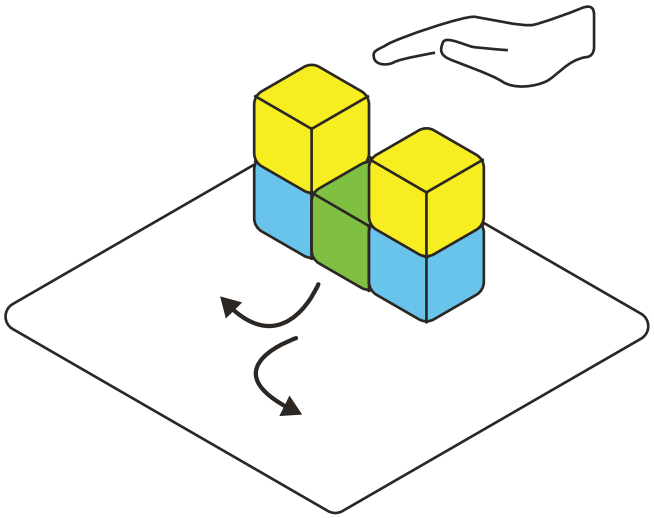
02

- The safety bot works best on a light-colored table.
- By default, Drive Cubelets only move in one direction.
- What direction should your SENSE Cubelet face?
- How can you slow down your robot so it has time to stop?

Difficulty.

●●●○
Artisan

Can you build?
Steering bot.



Your task.

Can you build a robot that can **turn both left and right**?

Directions and hints.
Steering bot.

Additional supplies.

- A clean, smooth surface for your robot to drive on.

Directions.

01

- Construct a robot that can turn left or right without needing to be reassembled in order to make a turn.

Hints.

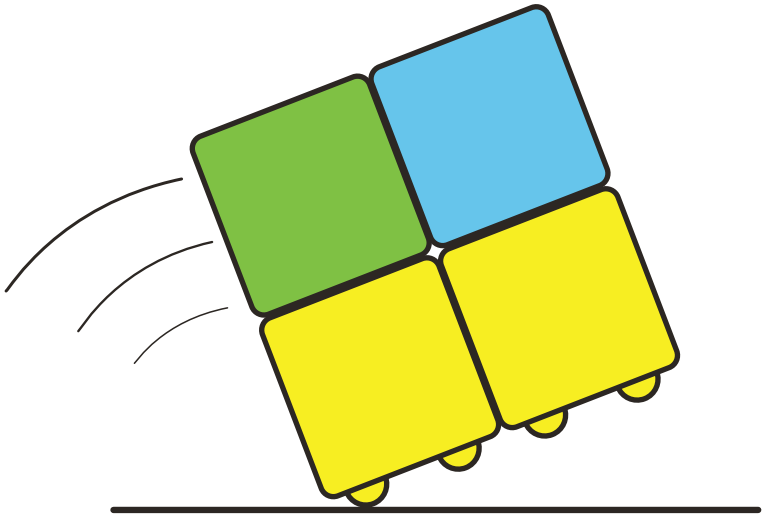
02

- You might need to use two SENSE Cubelets.
- You might need two Drive Cubelets.
- Or you might try using a Rotate.
- Or you might try using a Blocker.
- If you don't have a Blocker Cubelet, use the Cubelets app and Personality Swap to make one with a THINK Cubelet!

Difficulty.

●●●○
Artisan

Can you build?
Bucking bronco.



Your task.

Can you build a robot that **rocks back and forth** like a bucking bronco?

Directions and hints.
Bucking bronco.

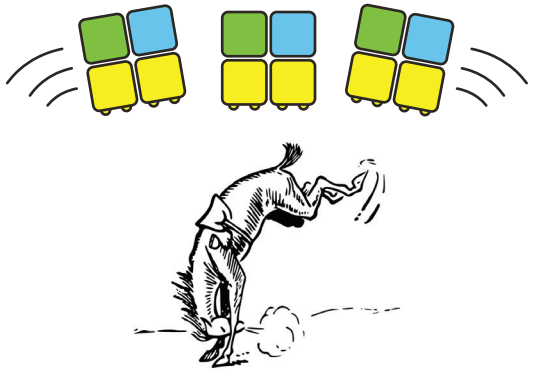
Additional supplies.

- A clean, smooth surface for your robot to rock like a bucking bronco.

Directions.

01

- Build a robot construction that rocks back and forth like a bucking bronco.



Hints.

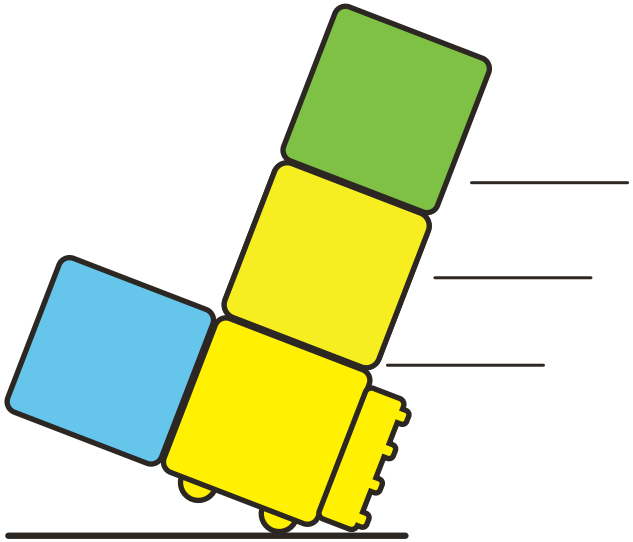
02

- The direction of each Drive Cubelet is important.
- Most solutions need two Drive Cubelets.
- Experiment with different SENSE Cubelets and data values to see what produces the best bucking behavior.

Difficulty.

●●●○
Artisan

Can you build?
Wheelie bot.



Your task.

Can you build a robot that does a **wheelie**?

Directions and hints.
Wheelie bot.

Additional supplies.

- A clean, smooth surface for your robot to drive on.

Directions.

01

- Build a robot that can move while doing a wheelie.

Hints.

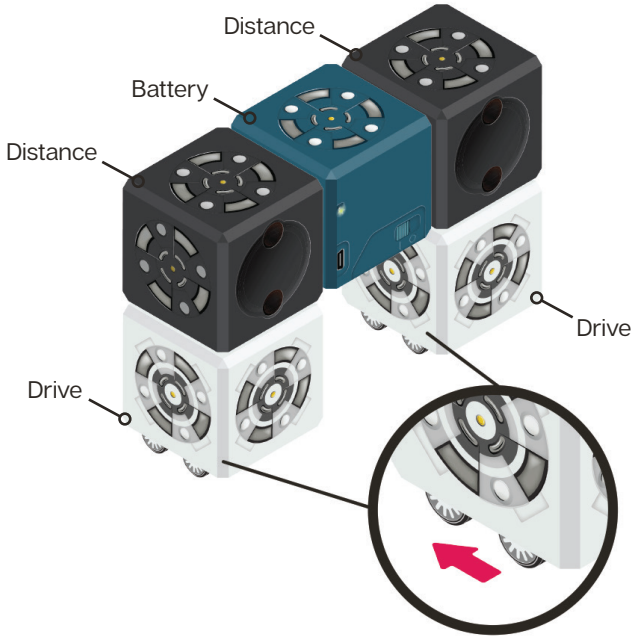
02

- You may need more than three Cubelets.
- Think about how you might balance the robot.
- You might want to use a Brick Adapter to help your robot balance.

Difficulty.

●●●○
Artisan

Can you predict...
What it will do?



WAIT! DO NOT BUILD THIS ROBOT!
Turn this card over for more instructions.

Directions and hints.
What will it do?

Directions.

01

Look. Think. Build.

1. Observe the robot image on the front of the card.
2. Predict how you think the robot will behave.
3. Build and test the robot construction.
4. How does the robot compare with your prediction?

Hints.

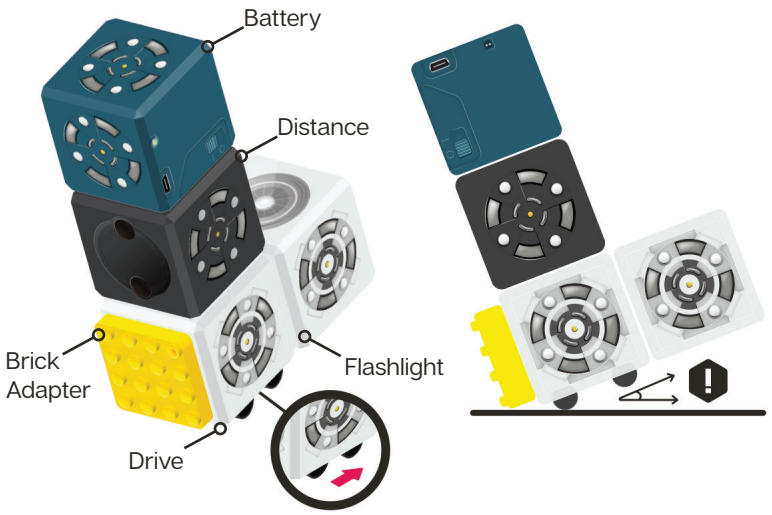
02

- Think about what the SENSE Cubelets detect.
- Think about how the ACT Cubelets will react.

Difficulty.

●●●●
Master

Can you predict...
What it will do?



STOP

WAIT! DO NOT BUILD THIS ROBOT!

Turn this card over for more instructions.

cubelets
ROBOT BLOCKS

Find more education resources on modrobotics.com/thehub

Directions and hints.
What will it do?

Directions.

01

Look. Think. Build.

1. Observe the robot image on the front of the card.
2. Predict how you think the robot will behave.
3. Build and test the robot construction.
4. How does the robot compare with your prediction?

Hints.

02

- Think about what the SENSE Cubelets detect.
- Think about how the ACT Cubelets will react.

Difficulty.

●●●●
Master

Invent it!
Dancing robots.

Your task.

Can you invent a few dancing robots?

Directions and hints.
Dancing robots.

Additional supplies.

- **(Optional)** Add more personality to your robots with Brick Adapters and brick-based building toys.

Directions.

01

- Create as many dancing robots as you can.

Hints.

02

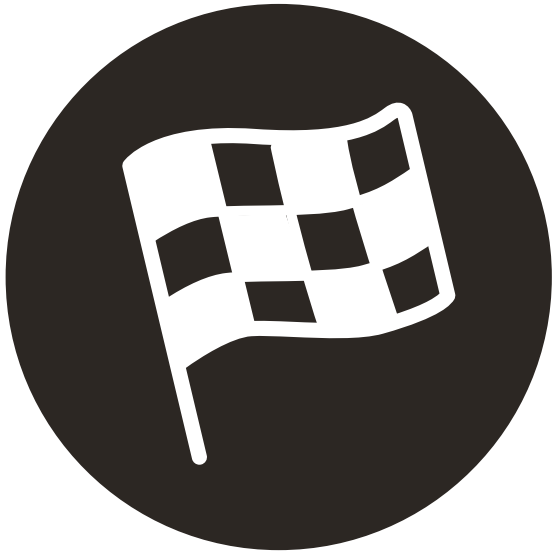
- Not everyone dances the same way! Think of the different ways your robot could shake, twist, bounce, and roll.

Difficulty.

●○○○
Novice

Invent it!

Fast and slow bots.



Your task.

Can you invent two different robots – one that moves very slowly and one that moves very fast?

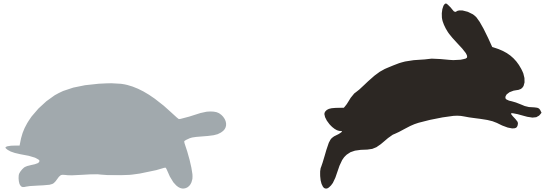
Directions and hints.

Fast and slow bots.

Directions.

01

- You may use as many Cubelets as you like to build your robot constructions.
- Create the **slowest** robot you can.
- Create the **fastest** robot you can.



Hints.

02

- Which Cubelets make the biggest difference in how fast your robot construction moves?
- Adding more Drive or Battery Cubelets may not be the best answer!

Difficulty.

●●○○
Apprentice

Invent it!
Storybook bot.

Your task.

Invent a robot construction that behaves like a character in a book you've read.

Find more education resources on modrobotics.com/thehub

Directions and hints.
Storybook bot.

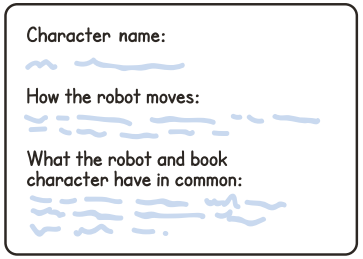
Additional supplies.

- Paper and markers for making "museum cards."
- Brick Adapters and brick-based building toys to add extra characteristics.

Directions.

01

- Think of a character you want to model, and then design a robot that mimics their behavior.
- After you've built your robot, make a "museum card" that includes:



Hints.

02

- What might your character run away from?
- What might they chase or pursue?
- Is there anything that makes your character "light up" or "shut down"? You may use as many Cubelets as you like for this challenge.

Difficulty.

●●○○
Apprentice

Invent it!
Robot animal.

Your task.

Invent a robot construction that behaves like an animal. Your animal can be real or imaginary.

Find more education resources on modrobotics.com/thehub

Directions and hints.
Robot animal.

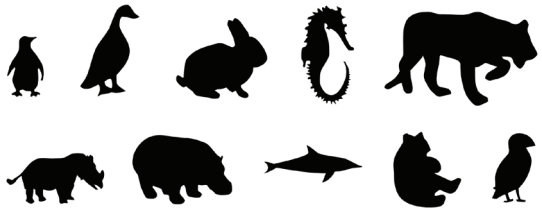
Additional supplies.

- **(Optional)** Add more personality to your robot animals with Brick Adapters and brick-based building toys.
- **(Optional)** Design your robot's environment with crafting materials.

Directions.

01

- Create a way to show how your robot animal behaves like the real animal.



Hints.

02

- What kinds of things does your animal eat?
- What might your animal chase?
- What might make your animal run away or hide?
- You may use as many Cubelets as you like to build your robot animal.

Difficulty.

●●○○
Apprentice

Invent it!

Escape artist.

Your task.

Invent a robot construction that can help you escape a dark room.

Directions and hints.

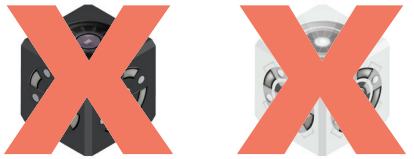
Escape artist.

Directions.

01

- Think about the ways a robot could help you in the dark.
- Design a robot that can help you find your way out of a dark room!

BONUS CHALLENGE: What if you couldn't use the Brightness or Flashlight Cubelet?



Hints.

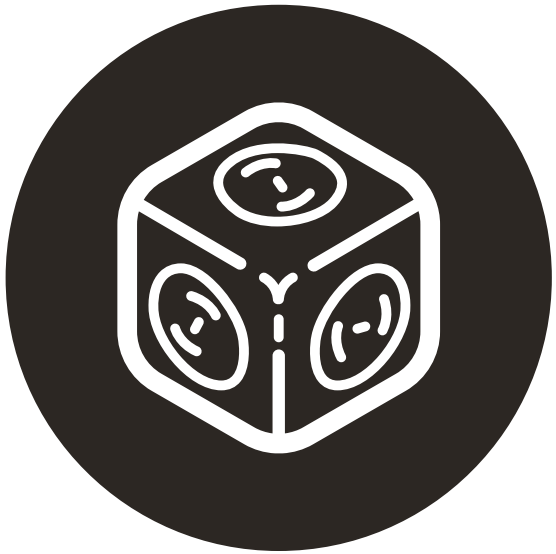
02

- Think about what **you** would do to escape a dark room.
- Which tools would you use?
- Which of your body's senses would you use?
- How are SENSE Cubelets different from your senses?
- What would you try to avoid in a dark room?
- If you couldn't see, how could a robot help you?

Difficulty.

●●●○
Artisan

Invent it!
Cubelets kit.



Your task.

Can you invent the best set of Cubelets to sell in a store?

Directions and hints.
Cubelets kit.

Additional supplies.

- Pen and paper.
- Markers or other creative supplies.

Directions.

01

- Choose your own combination of Cubelets to sell in one box as a new set.
- Design a box for your new set.
- How will the Cubelets fit inside the box?
- What are some of the robots you can build with the Cubelets in your set?

Hints.

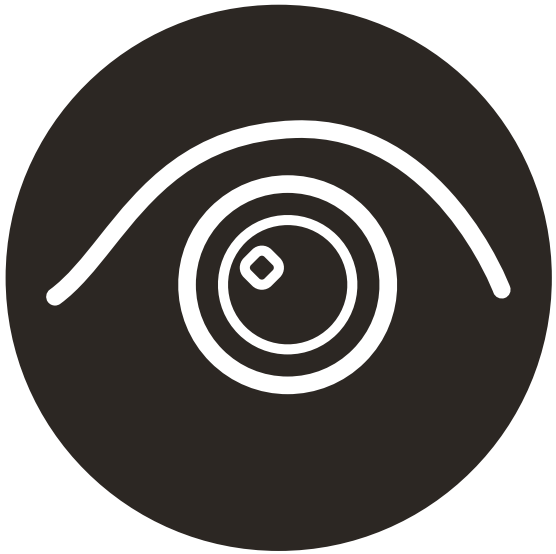
02

- Need ideas? See what we made at modrobotics.com/discovery or modrobotics.com/curiosity

Difficulty.

●●●○
Artisan

Invent it!
Sense robots.



Your task.

Can you **design two separate robots** where one senses the other?

Directions and hints.
Sense robots.

Directions.

01

- Build a robot construction that can **sense and respond** to a second robot construction.
- You may use as many Cubelets as you like to build your sensing robots. However, we recommend starting small.

Hints.

02

- Think about how robots might be able to sense whether another robot is nearby.
- Think about games that involve chasing, following, or running away from other players. Could robots play these games?

Difficulty.

●●●○
Artisan

Invent it!

Maze solver.

Your task.

Invent a robot that can go through a simple maze.

Directions and hints.

Maze solver.

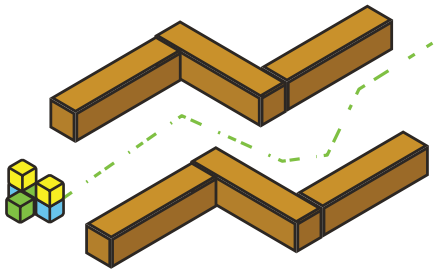
Additional supplies.

- Some maze-making materials (cardboard boxes, books, etc.).

Directions.

01

- Assemble a simple maze like the one below.



- Design a robot that can move through this maze. You can steer or lead your robot. Or try to build a robot that will move through the maze automatically.

Hints.

02

- You may need to widen your maze to help your robot complete the maze.
- It is possible to navigate this maze with robot built of seven or less Cubelets.
- Think about how a Steering bot can turn.

Difficulty.

●●●●
Master

Invent it!
Problem solver.

Your task.

Invent a robot that solves a real-world problem.

Directions and hints.
Problem solver.

Additional supplies.

- Brick Adapters and brick-based building toys.
- Other crafting supplies like paper plates, markers, etc.

Directions.

01

- Think about small tasks a robot might be able to do or big problems that a robot might be able to solve.
- Design a **prototype robot** to show how it could solve the problem. A **prototype** is an early model that demonstrates how something might work.

Hints.

02

Here are a few items to help you give you ideas:

- A lawn mower.
- A trash collector.
- A floor cleaner.
- A car that automatically stops when it is going to run into something.

Difficulty.

●●●●
Master

Invent it!

Light seeker.

Your task.

Invent a robot that can find a light in a dark room.

Directions and hints.

Light seeker.

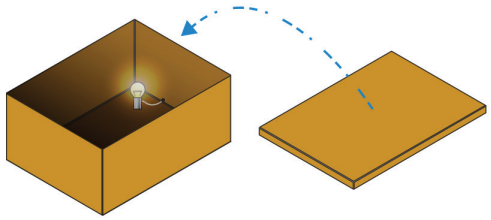
Additional supplies.

- A very dark room.
- OR a big box with a lid to simulate a dark room.
- A bright light source that can fit inside the box.

Directions.

01

- Set up your dark room/box with a light inside.
- Design a robot that will move toward the light when it is in a dark room or box.
- Test your robot in the box and then peek in to see if it can find the light!



Hints.

02

- No coding required.
- You may use as many Cubelets as you like, but you can solve this challenge with as few as three Cubelets.

Difficulty.

●●●●

Master

Invent it!
Line follower.

Your task.

Invent a robot that can follow a dark line on a white surface.

Directions and hints.
Line follower.

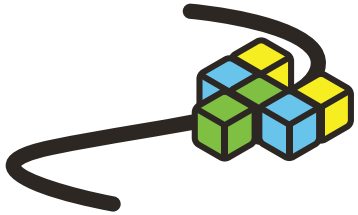
Additional supplies.

- **SETUP:** Make a simple line with gentle direction changes on a white surface using black tape. (We recommend black masking tape; black marker doesn't work as well.)

Directions.

01

- Start with an experiment to see which SENSE Cubelet can detect the line. The answer might surprise you!
- Use the SENSE Cubelet that can detect the line to create a robot that can automatically move while following the line.



Hints.

02

- The SENSE Cubelet that can see the line is **closer** than you might imagine!
- Think about how the Steering bot or Maze solver can turn.

Difficulty.

●●●●
Master

Blind directions.
Draw-n-trade.

Your task.

Find a partner and give them directions to build a robot. See the back for more instructions.

Directions and hints.
Draw-n-trade.

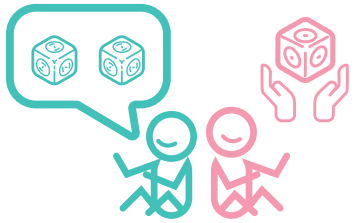
Additional supplies.

- Some paper and drawing supplies.
- A partner.

Directions.

01

- Design a robot.
- Draw a model of your robot so you remember it.
- Sit back-to-back with your partner.



- Give your partner directions on how to build the robot **WITHOUT** looking at what they are doing.
- Your partner can ask you questions.
- Test the robot to see if it behaves the same as the one you designed!

Hints.

02

- Remember, your robot needs a SENSE, THINK, and ACT Cubelet!

Difficulty.

●●○○
Apprentice

Draw it.
Robot model.

Your task.

Test your Cubelets knowledge with this drawing challenge!

Directions and hints.
Robot model.

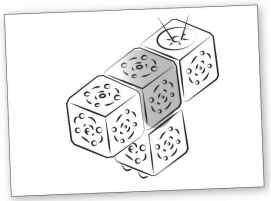
Additional supplies.

- Paper and drawing supplies.

Directions.

01

- Build a Cubelets robot construction of your choice. Or use another card for inspiration.
- Set your robot on the table in front of you. Draw what your construction looks like from the **opposite** side (the side you can't see).



Hints.

02

- Remember, your robot needs a SENSE, THINK, and ACT Cubelet!

Difficulty.

●●●○
Artisan

Think about it!

Confused robot 01.

Card
01 of 02

Your task.

Build a malfunctioning robot for a partner to “debug,” or fix.

Directions and hints.

Confused robot 01.

Additional supplies.

- Paper and writing materials.

Directions.

01

- Think about some easy/common mistakes people might make when building with Cubelets.
- Design a “confused” robot that **includes one of these mistakes**.
- Write an explanation of what the robot would do if built correctly.
- Leave the robot and explanation for a partner to solve.

Hints.

02

- Remember, your robot needs a SENSE, THINK, and ACT Cubelet!

Difficulty.

●●●○
Artisan

Think about it!

Confused robot 02.

Card
02 of 02

Your task.

"Debug," or fix, the robot so it behaves like the explanation says it should.

Directions and hints.

Confused robot 02.

Additional supplies.

- Robot from Confused robot 01.
- Robot explanation.

Directions.

01

- **Diagram or draw a model of the robot before you begin.**
- Read the explanation from Confused robot 01 to find out what the robot should do.
- Build the robot if it isn't already built.
- Identify the "bug," or error, in the robot.
- Test possible fixes for the robot until it behaves like the explanation says it should.
- Write a short note back to the designer explaining the mistake and how you fixed it.

Hints.

02

- Refer to your diagram or drawing if you need to "reset" your robot to the way it originally was.

Difficulty.

●●●○
Artisan