

Lesson Plan 1

Introduction to Robotics: What is a Robot?



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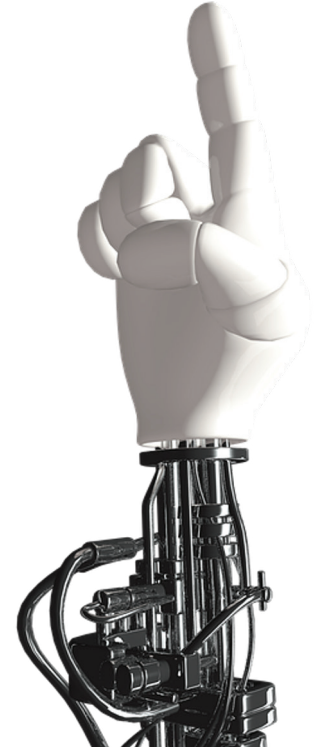
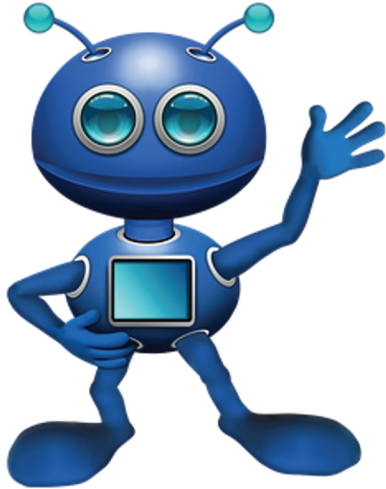


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Introduction to Robots: What is a Robot?: Lesson 1

Meet Colby!

Learning Targets

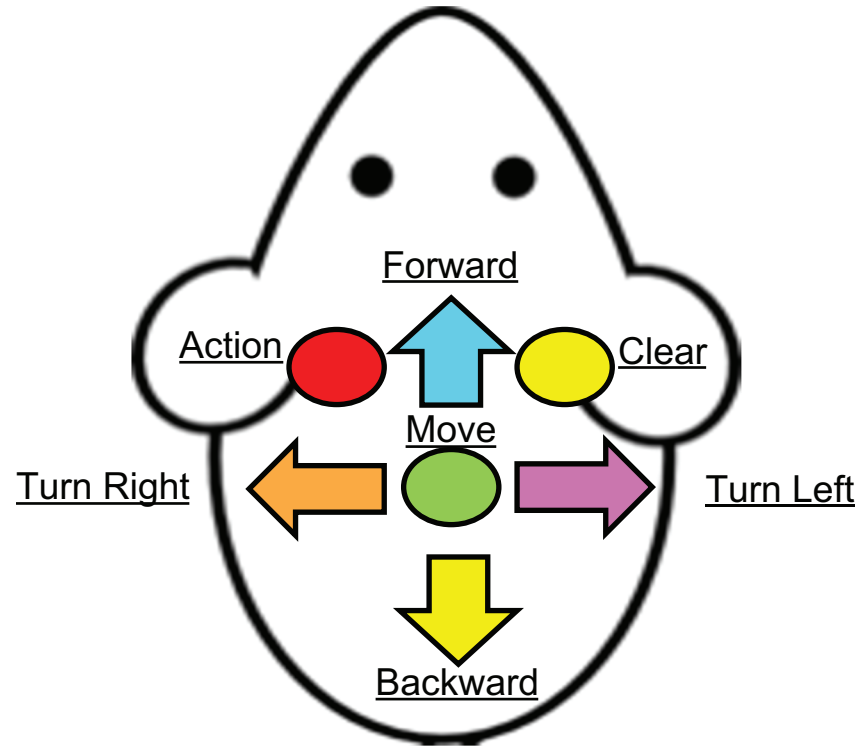
- I can explain Colby's robot functions.
- I can write a command for Colby to follow.



Who's Colby?



Colby's Features



Don't Forget!







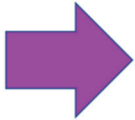
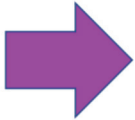
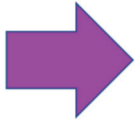
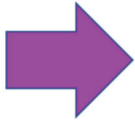
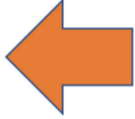
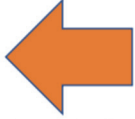

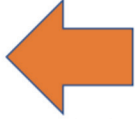
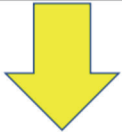
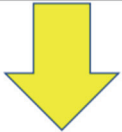
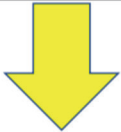
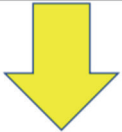




BEEP BEEP
BEEP!!!



Input



Coding Cards

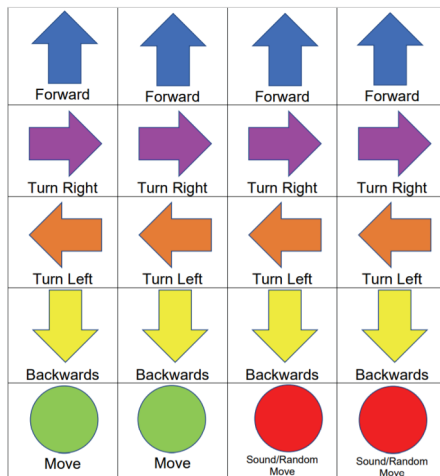
 Forward	 Forward	 Forward	 Forward
 Turn Right	 Turn Right	 Turn Right	 Turn Right
 Turn Left	 Turn Left	 Turn Left	 Turn Left
 Backwards	 Backwards	 Backwards	 Backwards
 Move	 Move	 Sound/Random Move	 Sound/Random Move



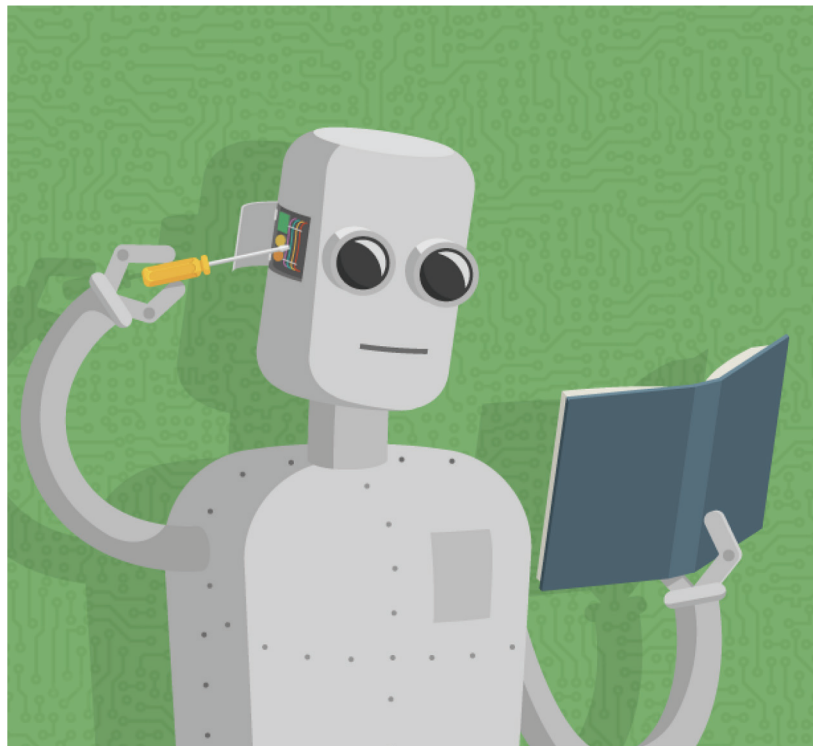
Two Steps Forward/Two Steps Back

Practice Coding

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Action

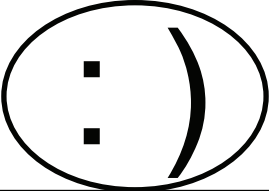


Solution

Practice Coding

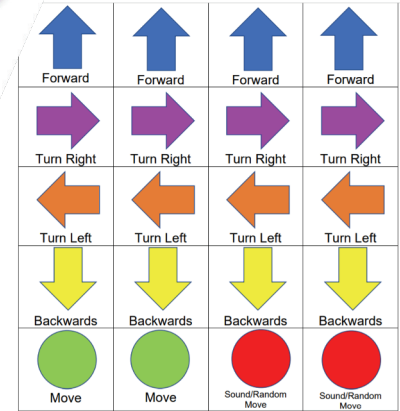
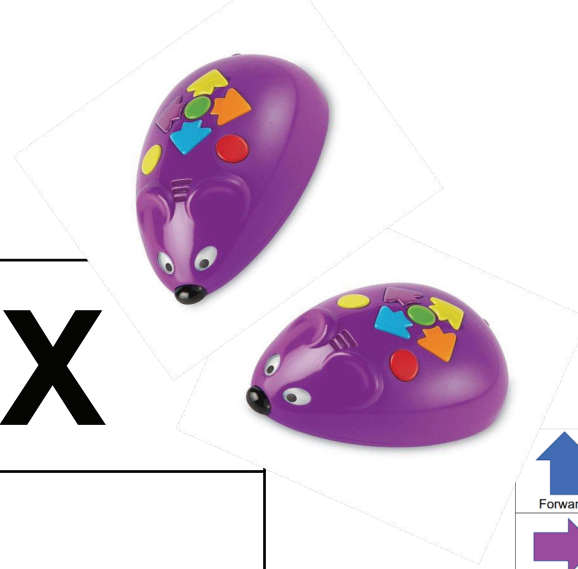
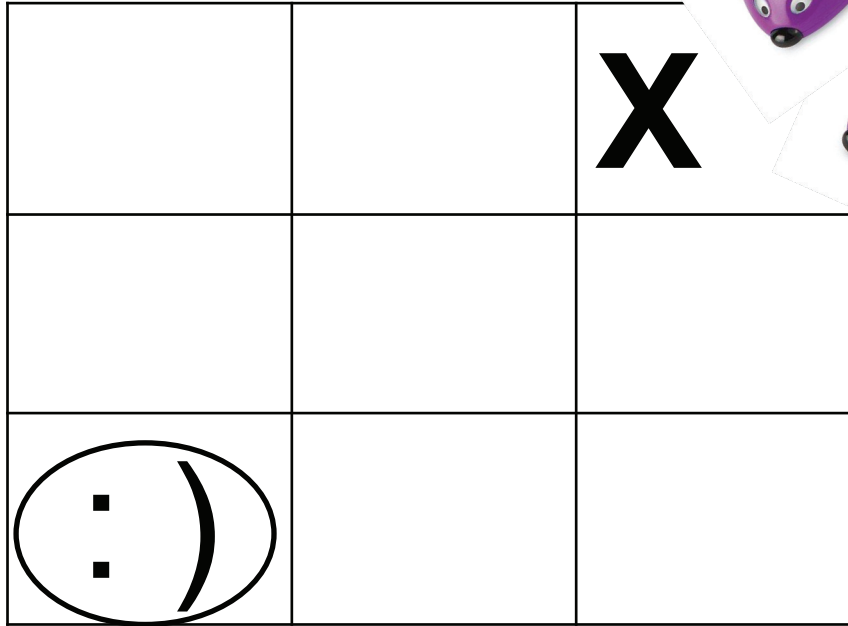


Let's Move

		X
		



Planning



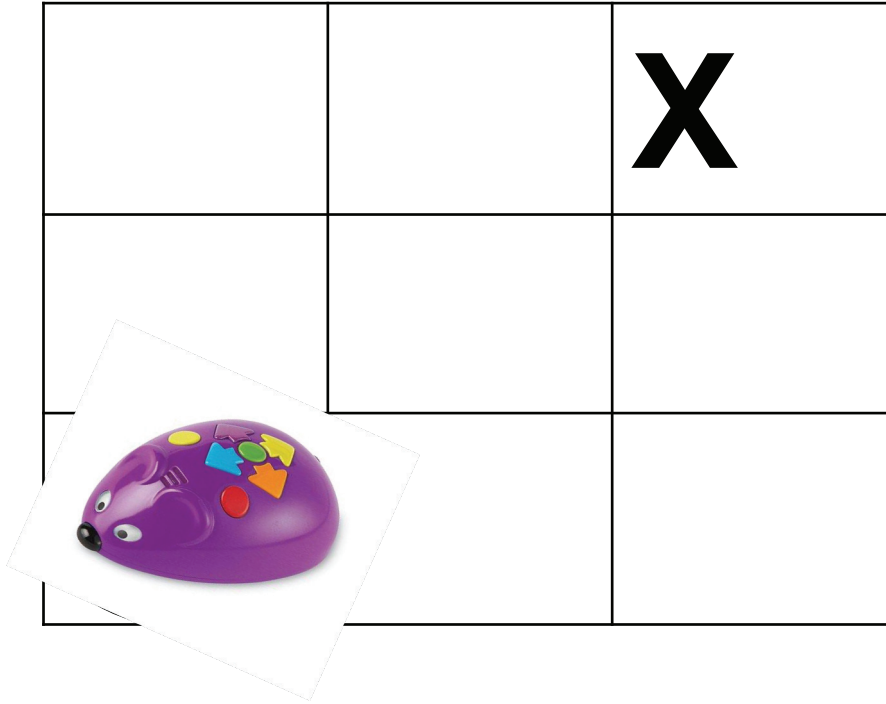
Input and Go!

Remember

- Don't skip any steps
- If you make a mistake press the Red button

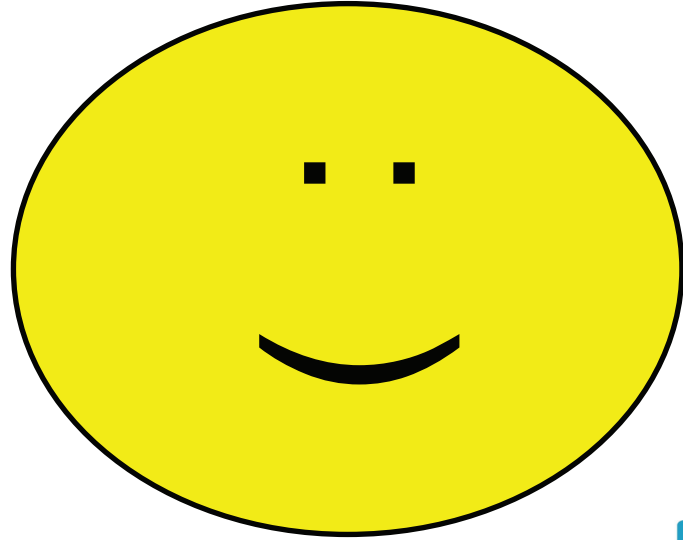


How did you do?



Looking Back

X



Learning Targets

- I can explain Colby's robot functions.
- I can write a command for Colby to follow.





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Introduction to Robots: What is a Robot?

Lesson 1 Meet Colby!

LESSON SUMMARY

In this lesson students are introduced to the Code and Go Mouse Robot named Colby. Students will learn how Colby functions and how he can be used in their learning.

LEARNING TARGETS

- I can explain Colby's robot functions.
- I can write a command for Colby to follow.

STANDARDS SUPPORT

CCSS

- ☐ **K-2-PS3-2** Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem.
- ☐ **K-2-ETS1-1** Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

ISTE

Empowered Learner Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.

Computational Thinker Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

CSTA

Algorithms and Programming

- ☐ **1A-AP-09** Model the way programs store and manipulate data by using numbers or other symbols to represent information.

- ❑ **1A-AP-10** Develop programs with sequences and simple loops, to express ideas or address a problem.
- ❑ **1A-AP-11** Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
- ❑ **1A-AP-12** Develop plans that describe a program's sequence of events, goals, and expected outcomes.
- ❑ **1A-AP-14** Debug (identify and fix) errors in an algorithm or program that included sequences and simple loops.

21st Century Skills

- ❑ **21stCS_1** Critical thinking, problem solving, reasoning, analysis, interpretation, synthesizing information.
- ❑ **21stCS_11** Scientific literacy and reasoning, the scientific method.

INSTRUCTIONAL MODEL

1. Engage: Pique Interest and Prior Knowledge (5 min.)
2. Explore: Who is Colby? (10 min.)
3. Explain: Input Means Go! (15 min.)
4. Elaborate: Let's Move (25 min.)
5. Evaluate: Learning Review (5 min.)

MATERIALS

- Laptop/tablet (for PPT display)
- Code and Go Mouse "Colby"
- 3 AAA batteries per robot
- Student Worksheet for Lesson 1
- 5 x 5 inch cardstock squares-enough for 9 per group
- Copy of Coding Cards for each student/group
- Lesson 1 Presentation
- Pencils, Crayons, or Colored Pencils

LESSON PLAN

TEACHER NOTE: Students may complete the "Student Worksheet" throughout the lesson or to wrap up the lesson depending on the class.

Engage Pique Interest and Prior Knowledge (5 min.)

- **Slide 2: Begin lesson showing pictures of robots**
 - **ASK:** Where have you seen robots like this? [Movies, cartoons, etc.]
 - **Explain:** Just like people robots come in all shapes and sizes.
 - **ASK:** I want you to think of something (not a person) that helps you accomplish a task? Maybe get to school? Do laundry or even unlock your car.

- **Explain:** Cars, appliances, keys, and many other things are types of robots. Robots are pieces of technology that are designed to get specific jobs done.
- Today you are going to meet a special robot named “Colby”.
- **Slide 3: Welcome to “Meet Colby!”**
 - Teachers: here you can hold up Colby or pass him around, tell student’s he is fragile because he is so small. Etc.
- **Slide 4: Learning Targets**
 - Display and review learning targets.
 - I can explain Colby’s robot functions.
 - I can write a command for Colby to follow.

Explore Who is Colby? (10 min.)

TEACHERS Make sure to pass out student worksheets before beginning the lesson.

- **Slide 4: “Who” is Colby?**
 - **ASK:** I know we all just met Colby a moment ago, however, does he remind you of anything? If so, what? [mouse]
 - Colby is a programmable robot mouse. He is ready to follow commands and teach hands-on coding concepts! Colby lights up, makes sounds, and features 2 speeds for easy programming and sequencing.
- **Slide 5: Colby’s Features**
 - Display the slide showing the key to Colby’s features.
 - **ASK:** What do you notice about Colby’s buttons? Can you guess what they might be used for?
 - **Explain:** Each button gives a command. A command is a step in a program. A program for a robot is a set of instructions that robots follow to accomplish a goal.
 - **ASK:** Look at Colby’s buttons. Why do you think they are all different colors?
- **Slide 6: Colby’s Key**
 - Encourage students to fill their matching key on their daily worksheet.
 - Look at the picture of Colby on Slide 6. It isn’t just any picture; it is a “key”, not a key to a door, but a key that will remind you how Colby’s buttons work.
 - (Teachers explain Colby’s buttons using the key on Slide 6. Assist students in filing out their own keys on their worksheets as needed.)
 - **Explain:** Since each button gives a command it is important to understand what each button means. A command is the information given to a robot to create a program.
 - For example:
 - Yellow arrow-one move backward
 - Blue arrow-one move forward
 - Orange arrow-one turn or rotation to the left
 - Purple arrow-one turn or rotation to the right (tell students that turn/rotation arrows do not make Colby move forward or backwards ONLY turn/rotate)
 - Red circle-action/sound button-this tell Colby to do a random action and sound
 - Green circle-This tells Colby to Go!
 - Yellow button-Tells Colby to remove or clear the last step.

- The only way for Colby to clear or remove an entire program is to turn him on and off on the bottom.
- **ASK:** Can you think of a command you could give to Colby?
- **Slide 7: Don't Forget!**
 - **ASK:** Colby runs on battery power. What is the responsible thing to do when you are finished using something that runs on batteries? Why?
 - It is very important to make sure to turn Colby off when you finished with him each time. If you do not you may hear a constant beeping sound.
 - **ASK:** What might the beeping sound mean? [His batteries are going bad, time for new ones!]
 - **CFU:** Ask for a thumbs up or down if they understand or have questions about anything that was shared. Give everyone time to answer and encourage them to share their screen to verify success before moving on.
 - Students should have their Colby Keys filled out before moving on to use as a resource for the remainder of the lesson and in the future if necessary.

Explain Input Means Go! (15 min.)

- **Slide 8: Input**
 - So far today, you've learned two new words that relate to robots they are:
 - **Program** - which means to give a robot a task.
 - **Command** - is the information given to a robot to create a program.
 - **EXPLAIN:** The next word you'll learn today is "input". **Input** is how robots take information into their systems.
 - **ASK:** Based on what you've learned so far today, how do you think Colby takes input? Why? [Input is programmed using Colby's buttons]
- **Slide 9: Practicing Code**
 - **ASK:** What do you think of when you hear "code" or "coding"? Why?
 - Code or coding isn't always something secret, especially when it comes to robots! For robots, **code** is another word for their program. Today you are going to practice writing a code for Colby.
- **Slide 10: Coding Cards**
 - Show/Share/Pass out "Coding Cards" to students
 - **EXPLAIN:** These are coding cards. They match Colby's input steps for coding. Good programmers plan out their lines of code, instead of guessing as they go.
 - **ASK:** Which card would match Colby's "green" button? Why? [Students may hold up the matching coding card]
 - Using the card is similar to writing down words when we speak. It helps us not forget.
- **Slide 11: Two Step Forward/Two Steps Back**
 - Ask students to take out their worksheets.
 - Look at your worksheet. There are 4 boxes. We are going to practice writing a program for Colby. Your goal is to program Colby to take two steps forward, and two steps backwards.
 - **ASK:** What cards will represent those steps? Why did you choose those cards?

- Teachers make sure to encourage students to copy their code into the boxes so they won't "forget" later. This means drawing the arrows in the correct direction and colors.
- **Slide 12: Action**
 - Now that you've written out your code, it is time to input your program into Colby.
 - **ASK:** What button will you press after you've added in all your commands? How will you know your code was correct? [Colby two moves forward, two moves backwards]
- **Slide 13: Solution**
 - Optional to display the solution to the Practice Coding from Slide 11





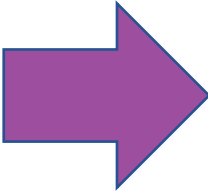
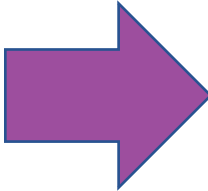
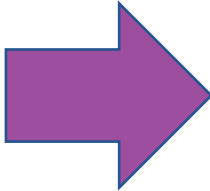
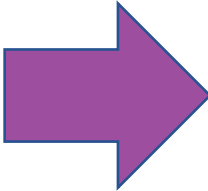
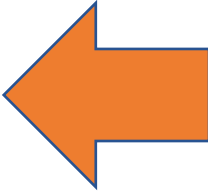
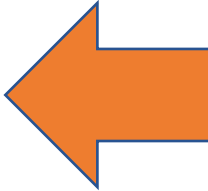
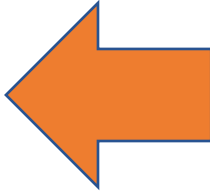
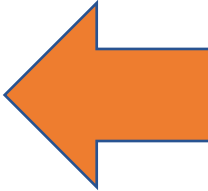
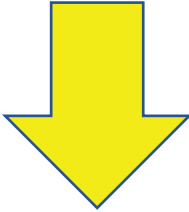
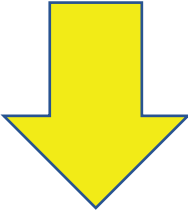
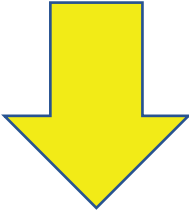
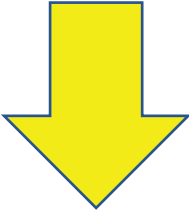
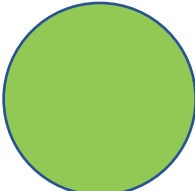
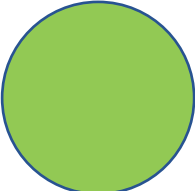
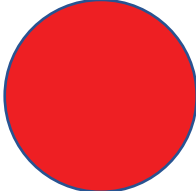
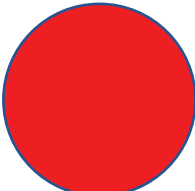
Elaborate Let's Move (25 min.)

- **Slide 14: Let's Move**
 - In small groups or as individuals' students will plan out a simple program for Colby.
 - Teachers-Help students if needed set up their 3 x 3 grids using the previously cut squares, marking one box with an "x" and a second with a "happy face". The grid should make the picture on Slide 14.
 - **EXPLAIN:** Now that you have learned how to input commands for Colby it is time for you to create a simple program. First, set up a grid that matches the one you see displayed on the screen. Make sure you draw an "x" on the top corner square and a "happy face" on the bottom square.
- **Slide 15: Planning**
 - Using your coding and grid to help you, plan a program for Colby to get from the "x" to the "happy face". Don't forget about turns!
 - **ASK:** Will every student's program look the same? Why or why not?
 - Make sure to copy your code into the boxes on your worksheet.
- **Slide 16: Input and Go!**
 - Now that you have planned your code, you may input it into Colby. Don't skip any steps.
 - **ASK:** What is the best step if you mess up? [press red button and start again]
 - **ASK:** After your code is in what do you do? [place Colby on the "x" and press the green button]
 - **EXPLAIN:** Don't skip any steps when coding. If you accidentally make a mistake, no big deal, you can press Colby's Red button and make a correction.
- **Slide 17: How did you do?**
 - **ASK:** Did Colby make it to the Happy Face? If not, what could you change?
 - If you need to make a change in your code, it is called debugging. When programmers debug their code, they are correcting a problem.
 - **ASK:** What's a problem could programmers possibly have? How could they fix it?
- **Slide 18: Looking Back**
 - **EXPLAIN:** If you were able to get Colby to the "happy face" on the first try, then you may switch the happy face square with another and create a new program for Colby to follow. Don't forget to use your coding cards and to record your code.
 - If you are debugging a program, move Colby back to the "x" and go step by step.
 - **ASK:** Where did Colby get off track? Did he turn right when he should have turned left? How can that be fixed?

Evaluate Learning Review (5 min.)

- **Slide 19: Review Learning Targets**

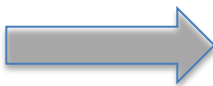




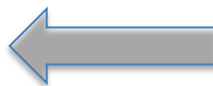

- **ASK:** Are robots useful without being programmed?
- Display and read each Learning Target and invite students to reflect on their learning by showing a thumbs up, thumbs down, or thumbs to the side for each one to indicate their progress.

 Forward	 Forward	 Forward	 Forward
 Turn Right	 Turn Right	 Turn Right	 Turn Right
 Turn Left	 Turn Left	 Turn Left	 Turn Left
 Backwards	 Backwards	 Backwards	 Backwards
 Move	 Move	 Sound/Random Move	 Sound/Random Move

Name: _____

What Can I Do?

- I can explain Colby's robot functions.
- I can write a command for Colby to follow.

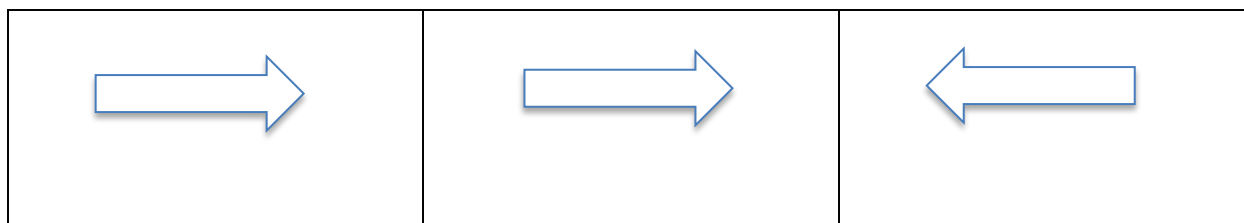
Practice Coding			
If Colby's code goes Forward, Forward, Backward, Backward. What is missing?			
			
Let's Move			
Look at the arrows. How many steps did it take Colby to move from the "X" to the "Happy Face"?			
			X
			
 :)			

<h2>Write a Code</h2>

What is a Robot? Lesson One

Name: _____

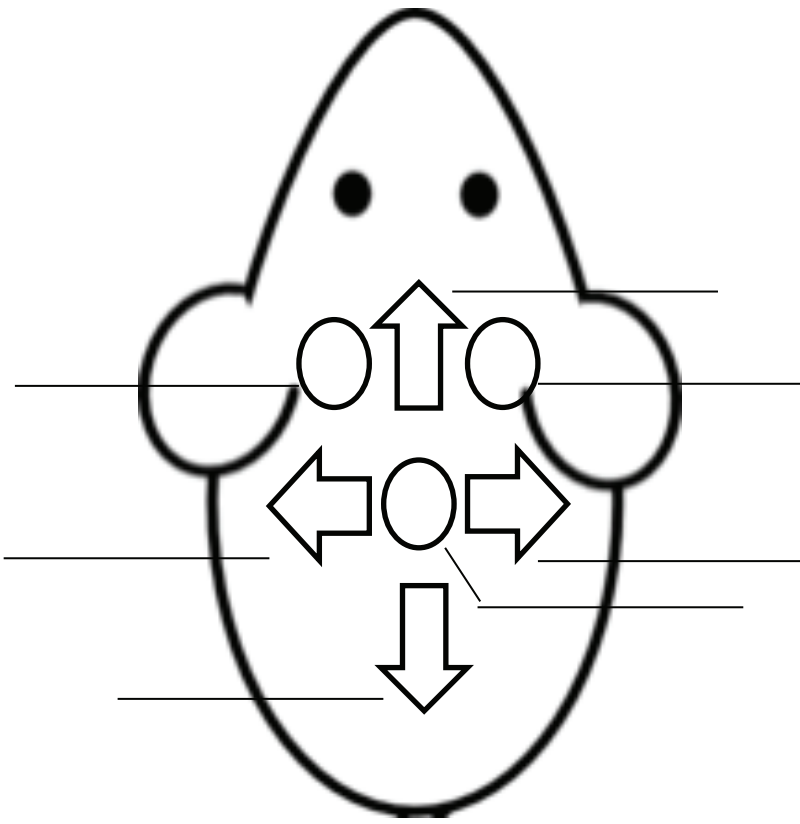
Color in the missing arrows for the code- Forward-
Forward-Backward.
Don't forget to color!



Name: _____

What Can I Do?

- I can explain Colby's robot functions.
- I can write a command for Colby to follow.

Colby's Key	
Write the number that matches Colby's input button on the line, then color to match.	
	<ol style="list-style-type: none"> 1. Move 2. Forward 3. Turn Right 4. Backwards 5. Turn Left 6. Sound/Random Move 7. Erase

Name: _____

Practice Coding			
Let's Move			
		X	
:)			

Write a Code
Write a code in the boxes that would make Colby to Forward-Forward-Backward. Don't forget to color!

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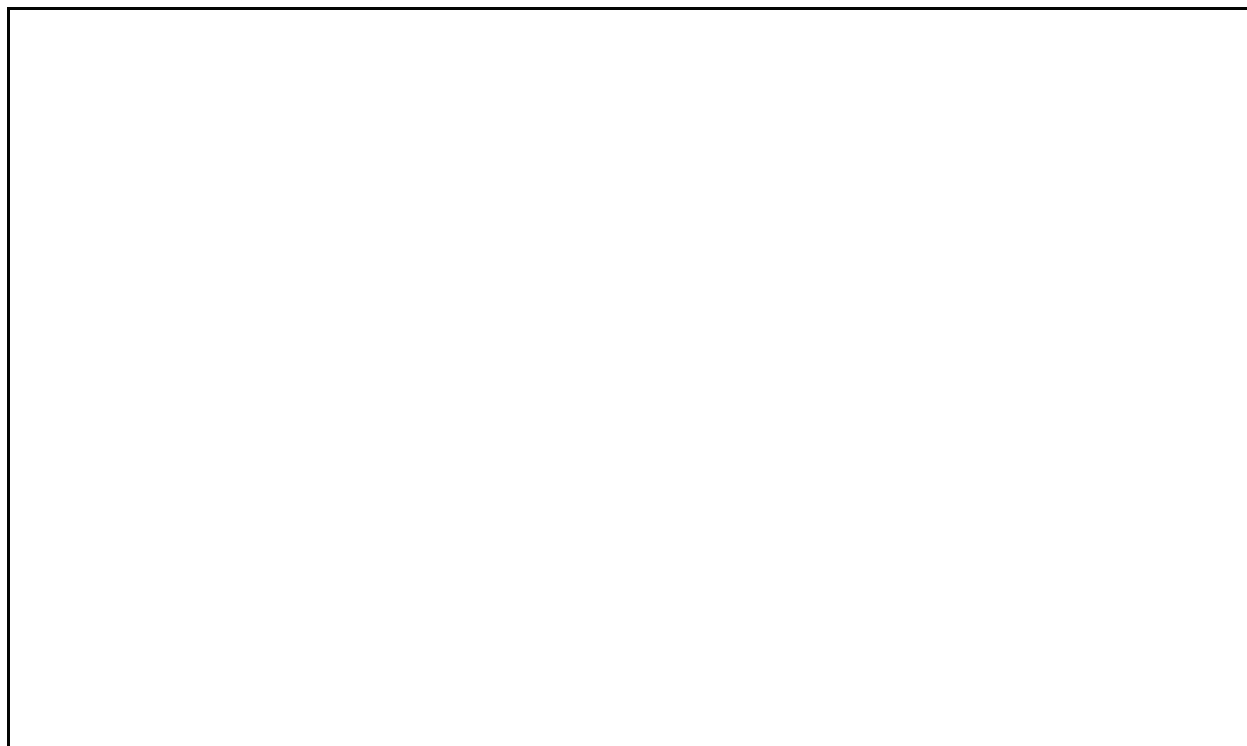
Matching Match the word to the definition.
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What is a Robot? Lesson One

Name: _____

Program	a task given to a robot
Input	information given to a robot
Command	to put information into a robot

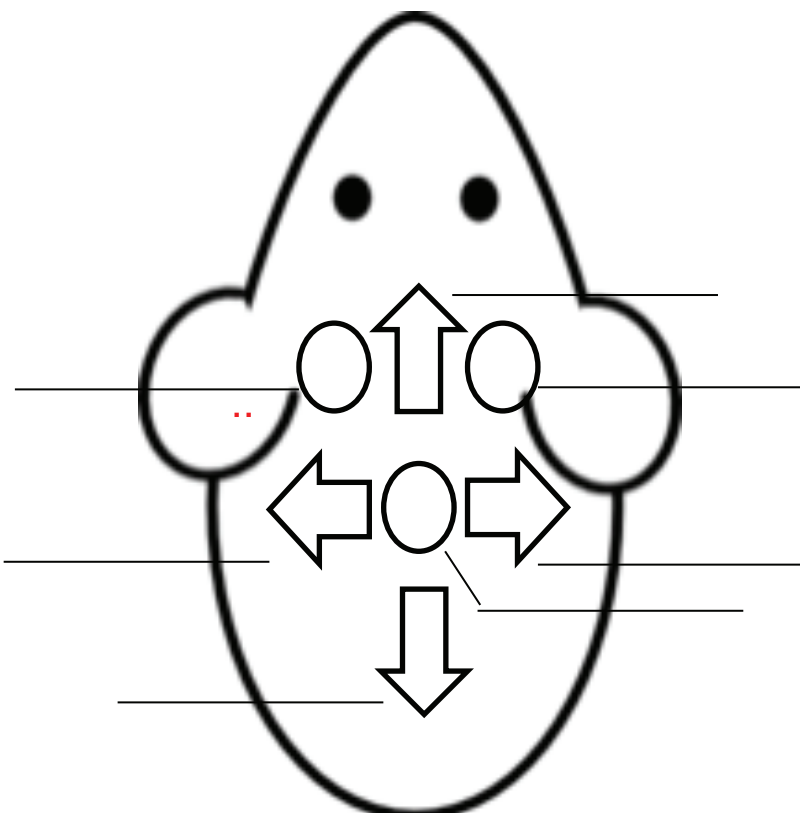
Could a robot like Colby help people? Draw a picture to show a way Colby could help solve a problem. (K-2-ETS1-1)




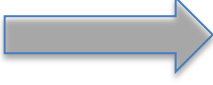

Name: _____

What Can I Do?

- I can explain Colby's robot functions.
- I can write a command for Colby to follow.

Colby's Key	
Write the number that matches Colby's input button on the line, then color to match.	
 <p>The number colors match the correct colors of the buttons.</p>	<ol style="list-style-type: none"> 1. Move 2. Forward 3. Turn Right 4. Backwards 5. Turn Left 6. Sound/Random Move 7. Erase

Name: _____

Practice Coding		
		
Let's Move		
		X
:)		

Students' answers will vary. Evaluate their ability to support their claims with sound reasoning and/or evidence.

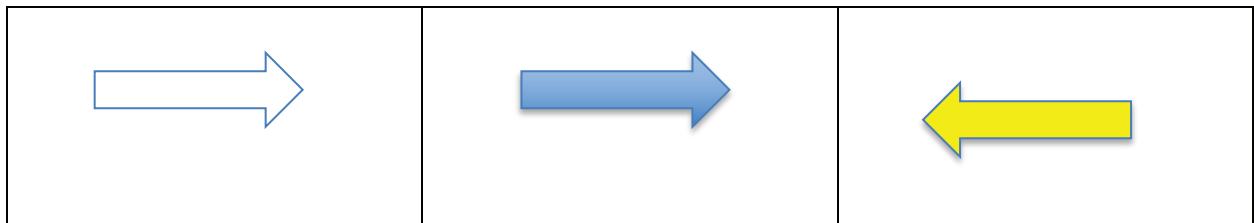
Matching
Match the word to the definition.

Name: _____

Program	information given to a robot
Command	a task given to a robot
Input	to put information into a robot

Write a Code

Write a code in the boxes that would make Colby to Forward-Forward-Backward.
Don't forget to color!



Could a robot like Colby help people? Using words and/or pictures show a way Colby could help solve a problem. (K-2-ETS1-1)

Students' answers will vary. Evaluate their ability to support their claims with sound reasoning and/or evidence and describe how they would break it down into more manageable problems that they solve with engineering.



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