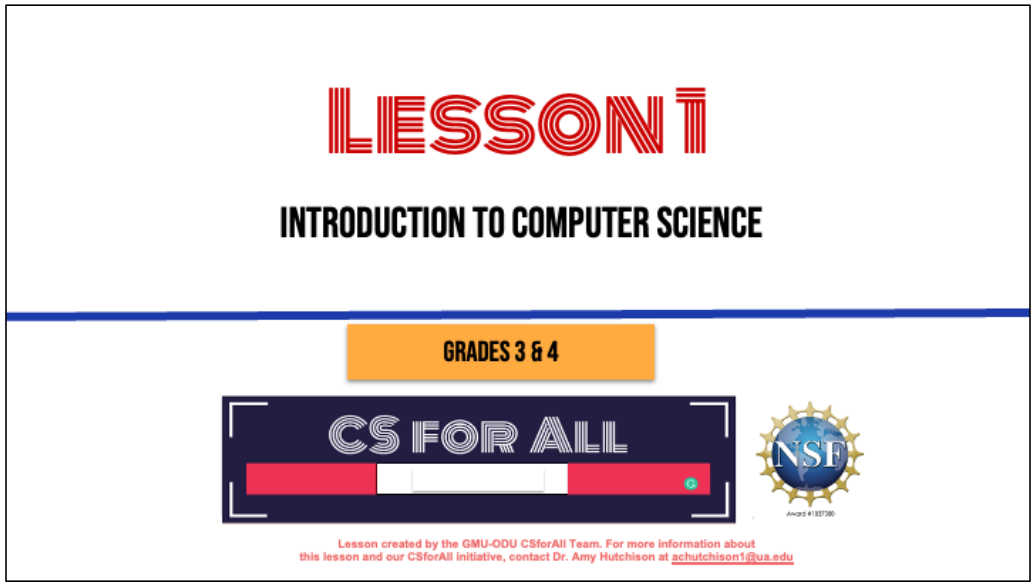
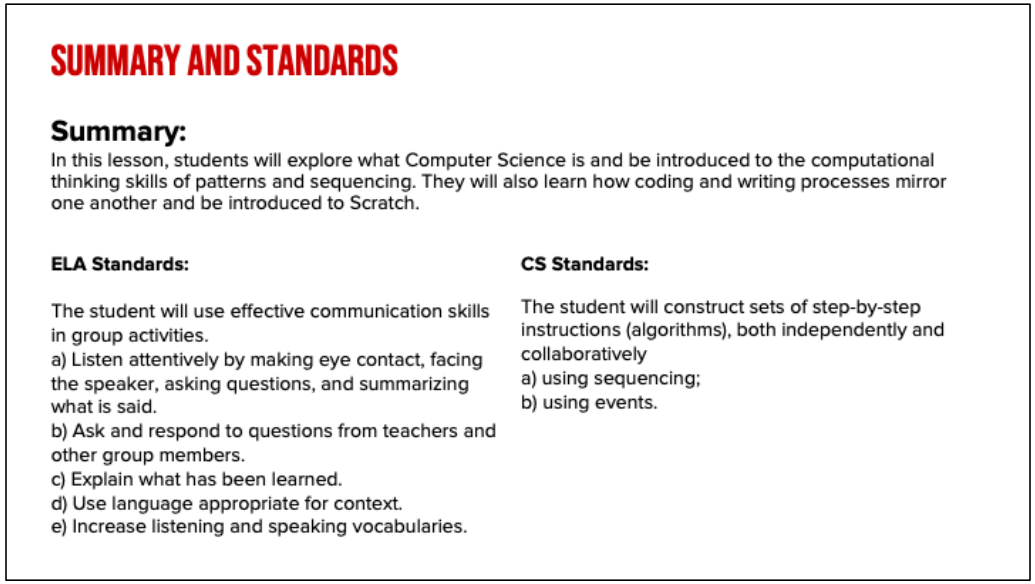


Hi, everyone, and welcome to our first class on computer science.



Optional: Introduce lesson, learning goals, and resources (Slides # 2-4)

Today, we are going to be introduced to what computer science is, and learn some strategies to think like computer scientists! We'll end on exploring how coding and writing are actually quite similar. Let's get started!

MATERIALS AND RESOURCES NEEDED FOR THIS LESSON:

- Chromebook/Laptop
- Internet Access
- Scratch Offline Editor (app)
- Teacher slides
- Hard copies of the printable Scratch blocks

Optional: Introduce lesson, learning goals, and resources (Slides # 2-4)

Does everyone have their chromebook, internet, and Scratch?

LESSON OBJECTIVES: I CAN...

- ❑ Describe characteristics of Computer Science (CS)
- ❑ Define the computational thinking skills of patterns and sequencing
- ❑ Describe a pattern I follow in my own life
- ❑ Change my sprite and backdrop in Scratch
- ❑ Identify and understand the purpose of the start, speak/say, and switch costume blocks in Scratch
- ❑ Believe anyone can be a computer scientist!

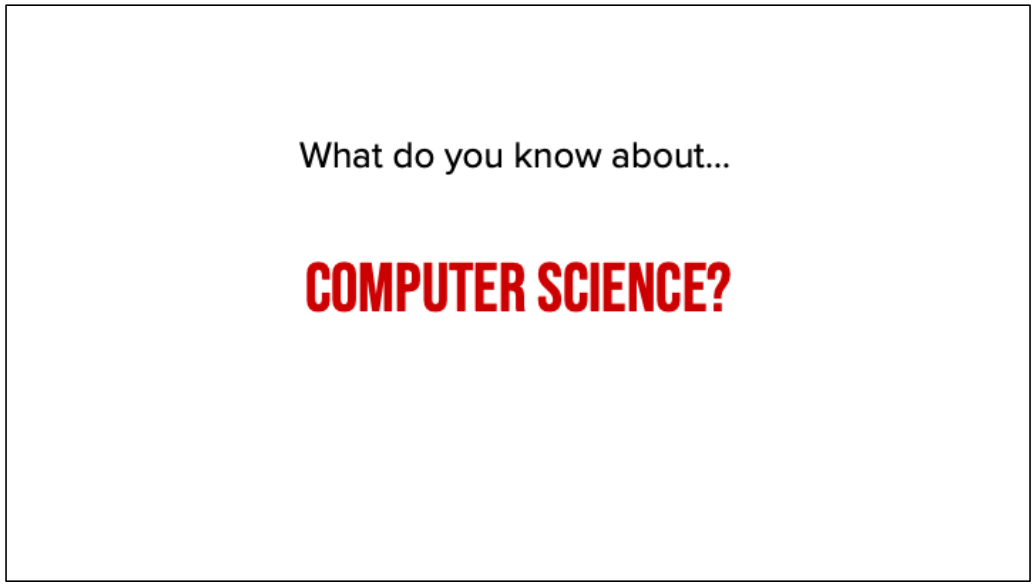
Optional: Introduce lesson, learning goals, and resources (Slides # 2-4)

As we go through the lesson, we will be able to….[read slide]

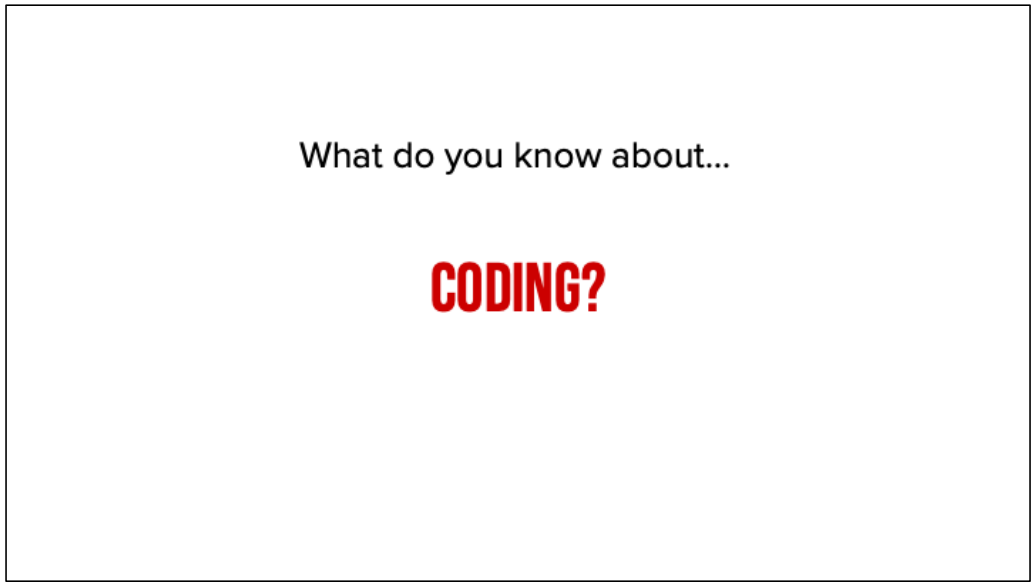
VOCABULARY

- ★ Computer Science
- ★ Coding
- ★ Computer Scientists
- ★ Patterns
- ★ Sequencing

And we're going to learn all these new words! [read vocab words]



Ask students to share what they know about the following words: Computer Science



Ask students to share what they know about the following words: Coding

WE ARE GOING TO LEARN MORE ABOUT COMPUTER SCIENCE!

Next, explain that we are going to be learning more about Computer Science and share the video (Watch until 1:09) (slide #9)

COMPUTER SCIENTISTS

Computer scientist (n): a person who studies computers and how they can be used to solve problems.

Introduce what a computer scientist does (slide 10)

LESSON OBJECTIVES: I CAN...

- ✓ Describe characteristics of Computer Science (CS)
- ❑ Define the computational thinking skills of patterns and sequencing
- ❑ Describe a pattern I follow in my own life
- ❑ Change my sprite and backdrop in Scratch
- ❑ Identify and understand the purpose of the start, speak/say, and switch costume blocks in Scratch
- ❑ Believe anyone can be a computer scientist!

Check off learning objectives as the lesson proceeds.

HOW DO COMPUTER SCIENTISTS THINK?

Okay, now that we've learned what a computer scientist DOES, let's learn about how they THINK. Learning about how computer scientists approach problems, helps us see that they are not so different from some of the problem-solving strategies we use every day!

COMPUTER SCIENTISTS USE COMPUTATIONAL THINKING SKILLS

1. Patterns
2. Sequencing
3. Algorithms
4. Decomposition
5. Abstraction

We are going to learn how to do **all of these!**

There are five main skills that computer scientists use to solve problems. They are often called “computational thinking” skills—an easy way to remember this word is that “computational” sounds a lot like “computer.” Okay the core concepts are: recognizing patterns, using sequencing, creating algorithms decomposing, and abstracting. Dont worry, we will learn how to do all of these!

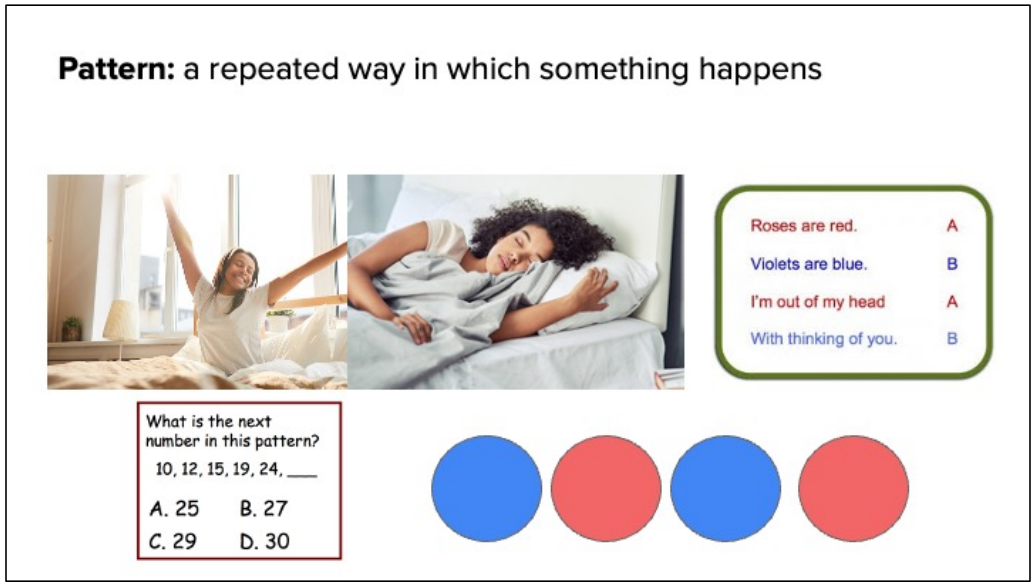
COMPUTER SCIENTISTS USE COMPUTATIONAL THINKING SKILLS

Today our focus is on

1. **Patterns**
2. **Sequencing**
3. Algorithms
4. Decomposition
5. Abstraction

Today's focus is on pattern recognition and sequencing.

PATTERNS & SEQUENCING



Today we are going to learn more about how patterns are used in nearly everything we do. A pattern is a thing that repeats, or a repeated way in which something happens.

Patterns can be found in many places in our lives. For example, there are patterns in weather such as seasons, days of the week, months of the year, moon cycle, and patterns on a leaf. [You can provide familiar everyday patterns that YOUR students may be familiar with!]. We even use patterns in our writing.

INTRODUCTION: EXAMPLES OF PATTERNS --THINGS THAT REPEAT--IN REAL LIFE

Read slide

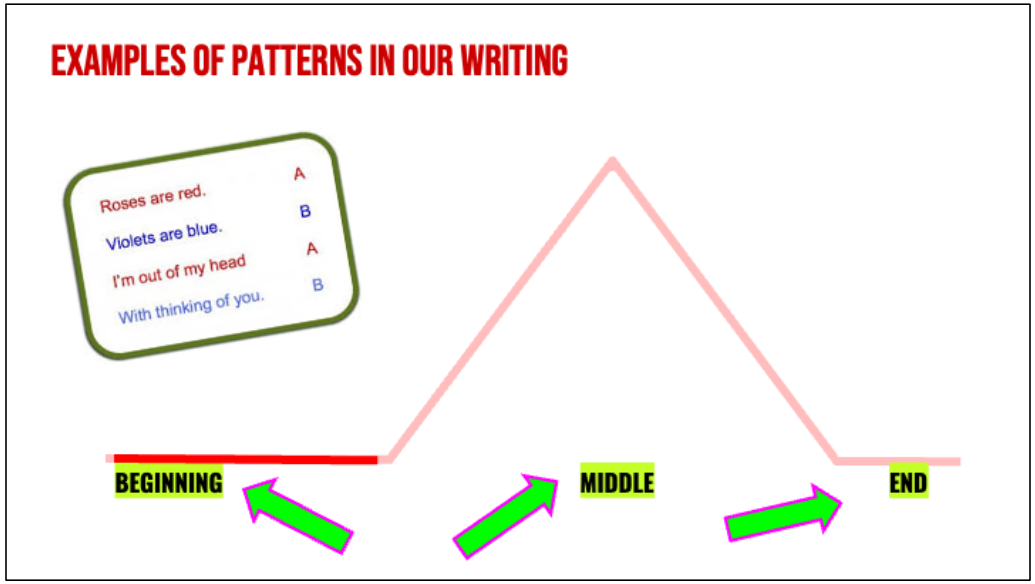
SEQUENCE: AN ORDERED SET OF INSTRUCTIONS

Another new vocabulary word is sequence: it refers to an ordered set of instructions.
In order for a pattern to make sense, it must be in the correct sequence.

SEQUENCE FOR MAKING A BOWL OF CEREAL

For example, here's a sequence for making a bowl of cereal. If we did these steps out of order, we would not be happy!

Patterns exist everywhere, not just in computer science. There are often many patterns found in writing!



Can you think of any patterns you see in books or stories you've read? (if needed, prompt students with patterns such as beginning, middle, and end; characters, setting, and plot; etc.)

GUIDED PRACTICE: EXAMPLE A

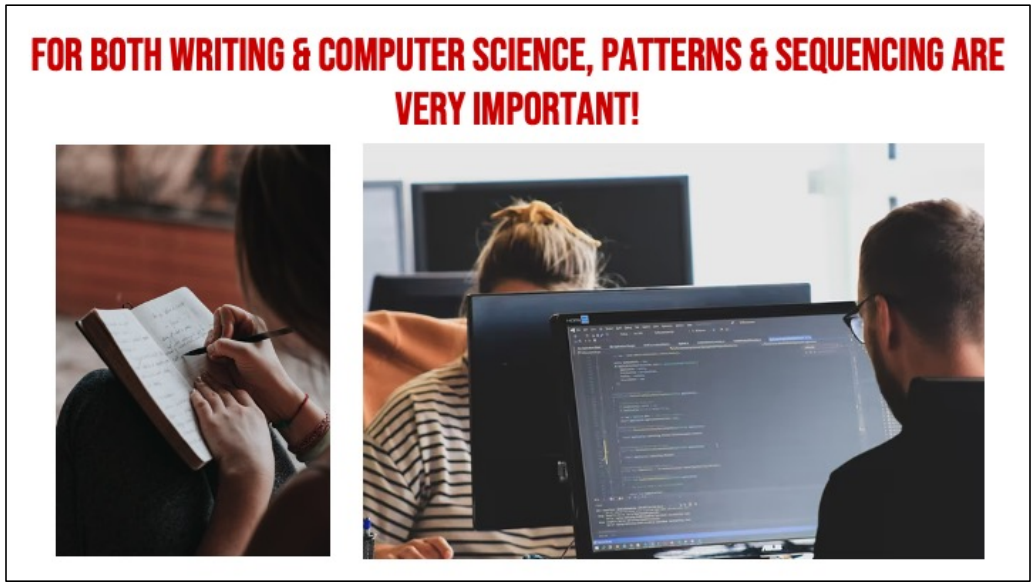
Daquan was watching TV and saw a commercial for pizza and that gave him a great idea! “I’ll just make my own pizza here at the house!,” he thought. He found his mom’s recipe, which said:

“First, roll out the squishy pizza dough with the rolling pin. **Then**, use a spoon to spread on the red pizza sauce on top of the dough. **Next,** add shredded cheese all over the top. **Last**, top it with pepperoni slices, covering the whole pizza. **Finally**, put the pizza in the oven at 425 degrees.”

After about 15 minutes in the oven, his homemade pizza was ready to eat!

DO YOU NOTICE A PATTERN?

Read slide and ask students if they can identify a pattern.



Transition words help us to put our writing in the correct sequence–it's just as important for human readers as it is for computers!

TURN & TALK

What **patterns** do you typically follow when getting ready for school?

What activities do you do in order to get ready? What is their **sequence**?

Read slide

LESSON OBJECTIVES: I CAN...

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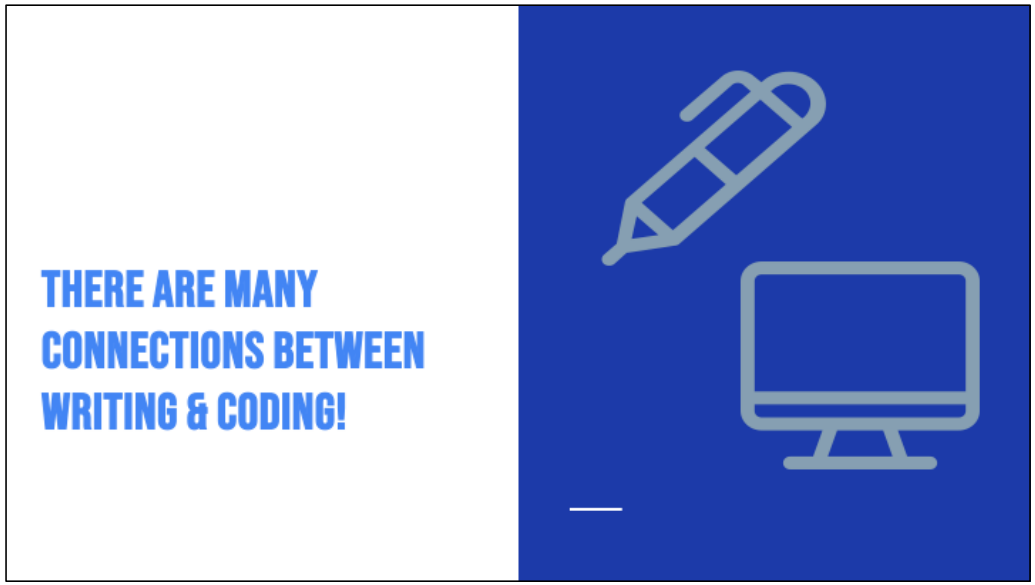
- ❑ Change my sprite and backdrop in Scratch
- ❑ Identify and understand the purpose of the start, speak/say, and switch costume blocks in Scratch
- ❑ Believe anyone can be a computer scientist!

Check off learning objectives as the lesson proceeds.



See, there are many connections between writing and coding. The fact that we use patterns and sequences in both is just the beginning.

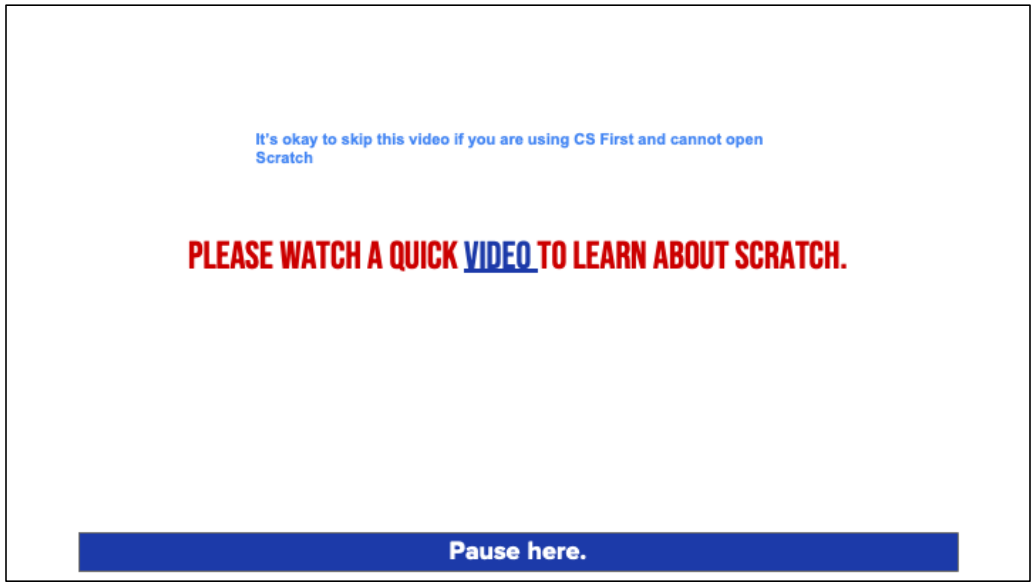
SHARING YOUR .SB3 FILE FROM CS FIRST TO COCO

1. Create the file in CS First
2. In the Scratch editor, find the word "File" in the top-left corner.
3. Click on "File" menu and you'll see some choices pop down.
1. Choose "Save to your computer." This will download your Scratch project.
1. Look in your "Downloads" folder. That's where your saved project might be.
1. Go to the CoCo website and log in to your account. https://wego.gmu.edu/scratchgo/login.php
1. Click proceed on the correct story in CoCo.

1. Navigate to the section of CoCo where you can upload your project. (only sb3 type and 10Mb max).

1. Click "Save".

Model how students can share Scratch creations to their teacher's studio



First, let's learn a little more about Scratch

Scratch - Imagine, Program, Share

Coding in Scratch

Before we can start coding in Scratch, we need to review a few things.

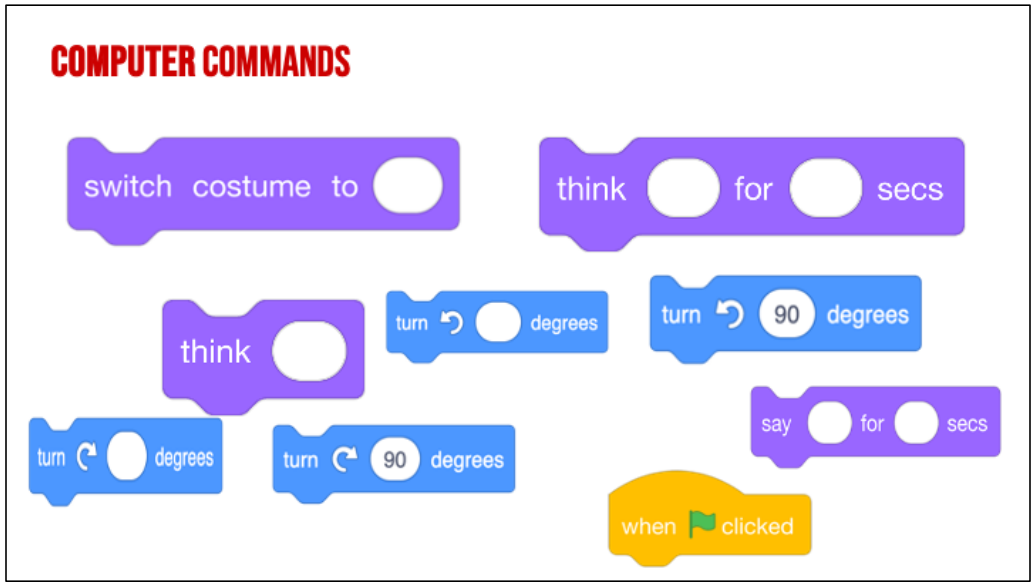
TERMS USED IN SCRATCH

Block(s): commands in Scratch

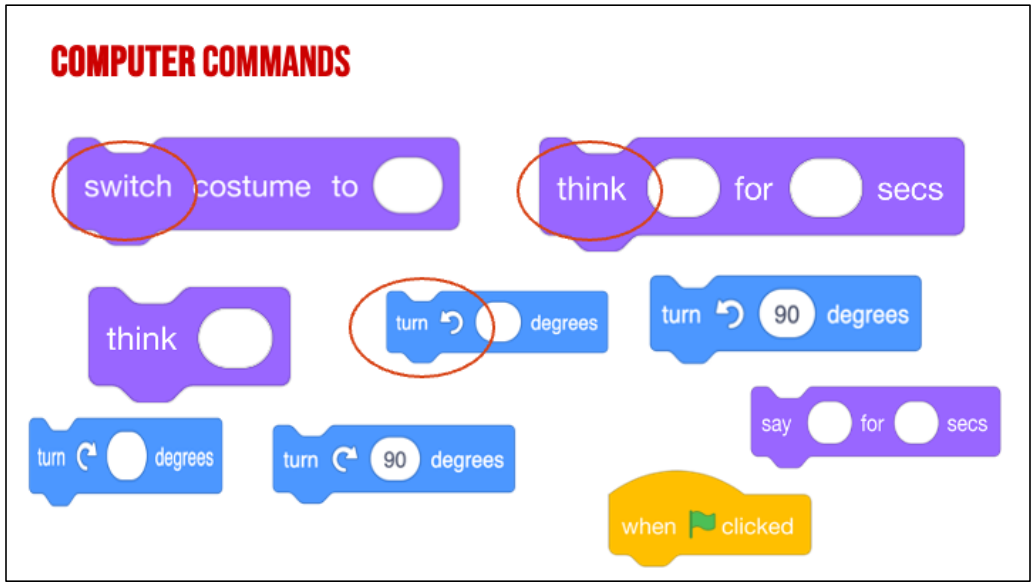
Sprite: characters in Scratch

Backdrop: background

These three terms are very important in Scratch. They are: [read slide]



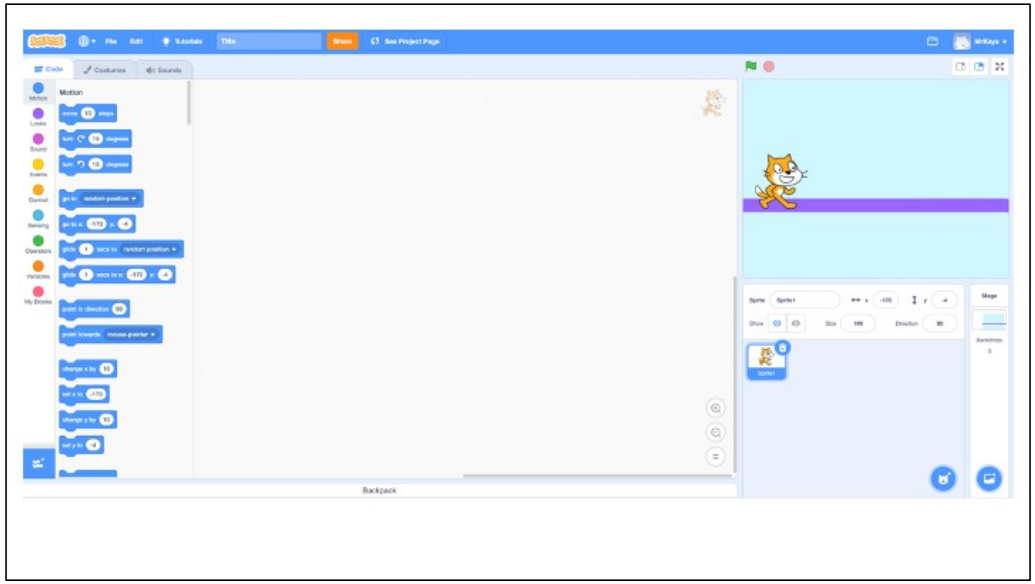
"*Has anyone seen these types of pieces anywhere before? (from warm up) These pieces are actually computer "commands." **Command**s tell a person or a computer what to do.*



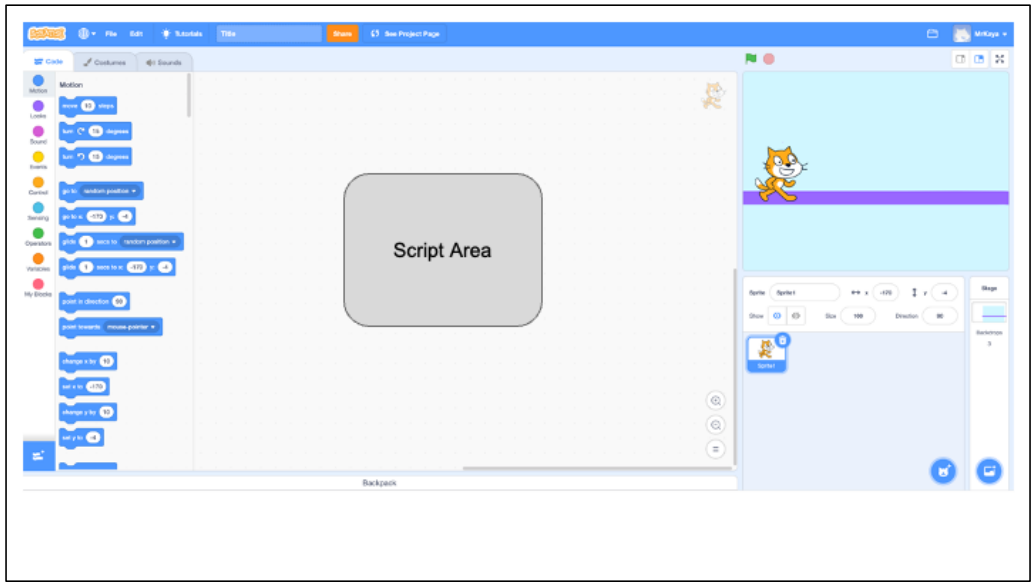
Lets look closely at these blocks again and what they say-
Click "switch,
Click “think,
Click “turn
“these are commands" written in Scratch code, which is the kind we will be working with.
We put these commands together in Scratch by snapping the together the blocks so they hook onto each other like puzzle pieces. This allows us to code multiple commands in a single set of instructions.

COMPUTER COMMANDS

For example, these Scratch commands have been put in the correct order from top to bottom you have created a sequence of instructions. This would tell the computer to say Hi for 2 seconds then turn right 90 degrees.

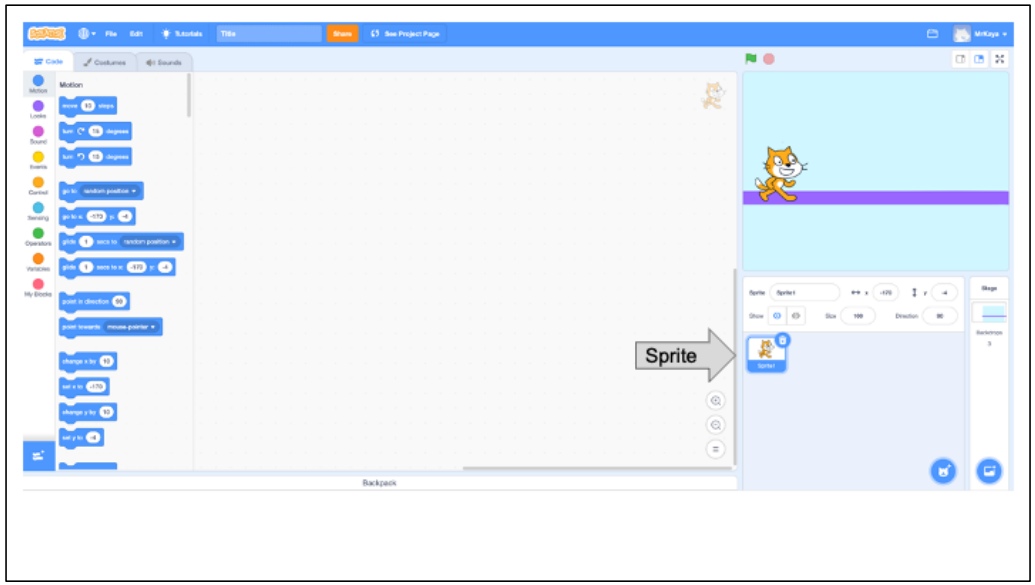


Guide Students through the main areas of the Scratch page
“When you open Scratch, your screen should look like this.”



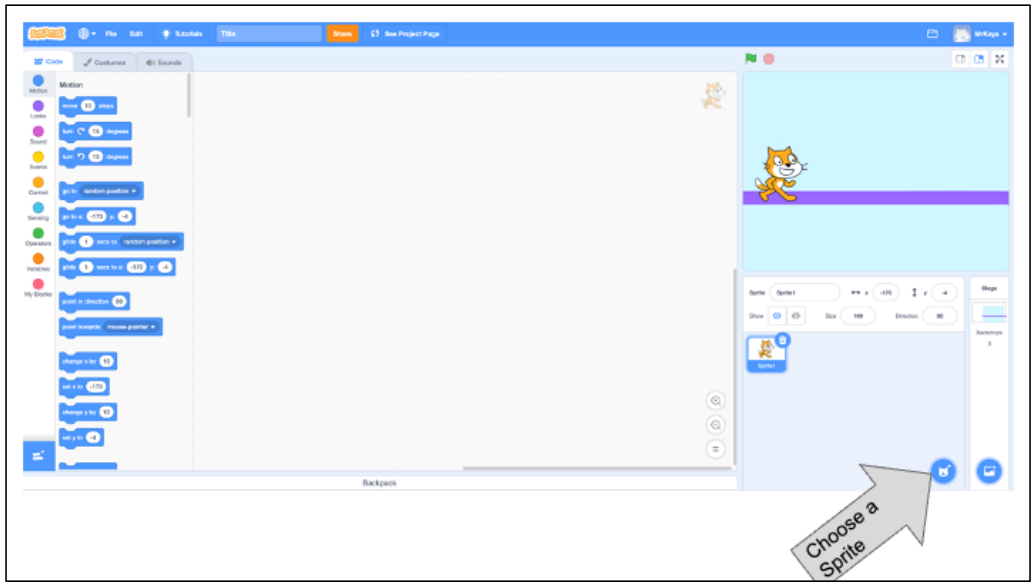
Guide Students through the main areas of the Scratch page

“This main area in the center of your screen is the script area. This is where you drag you command block and join them to build your algorithm. You will find your command blocks on the left side of the screen and drag them to the center. If you decide that you do not want a certain block, drag it back to the left. We will learn more about this in a moment.”



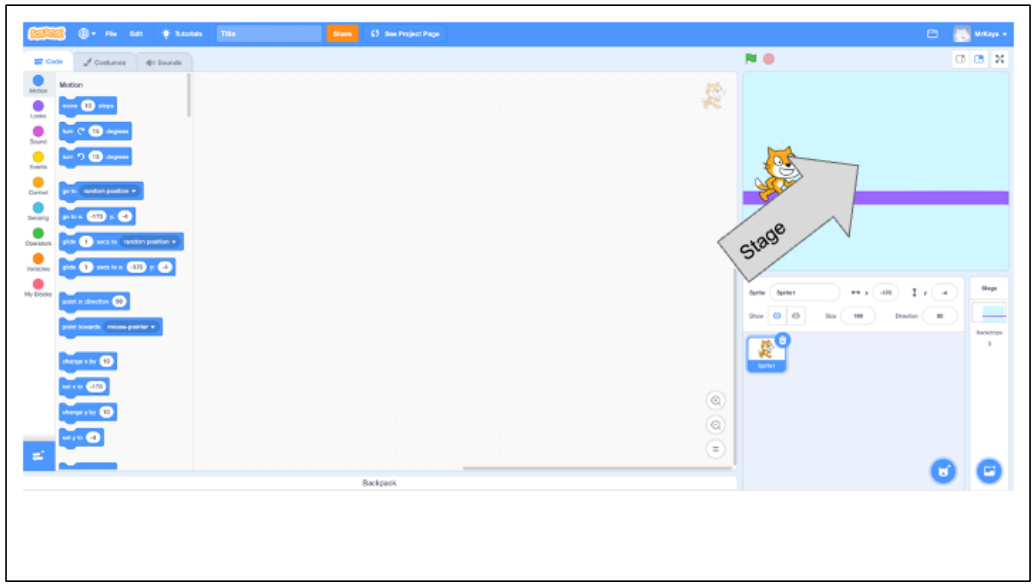
Introduce and explain to create/add Sprites and Backdrops

“In SCRATCH, an object, author, or character in a story is called a **Sprite.** The sprite you can see right now is Scratch the cat. The box here is blue because this is the sprite that is currently being coded. If this box is not blue, you will not be able to add any command blocks for your sprite.”



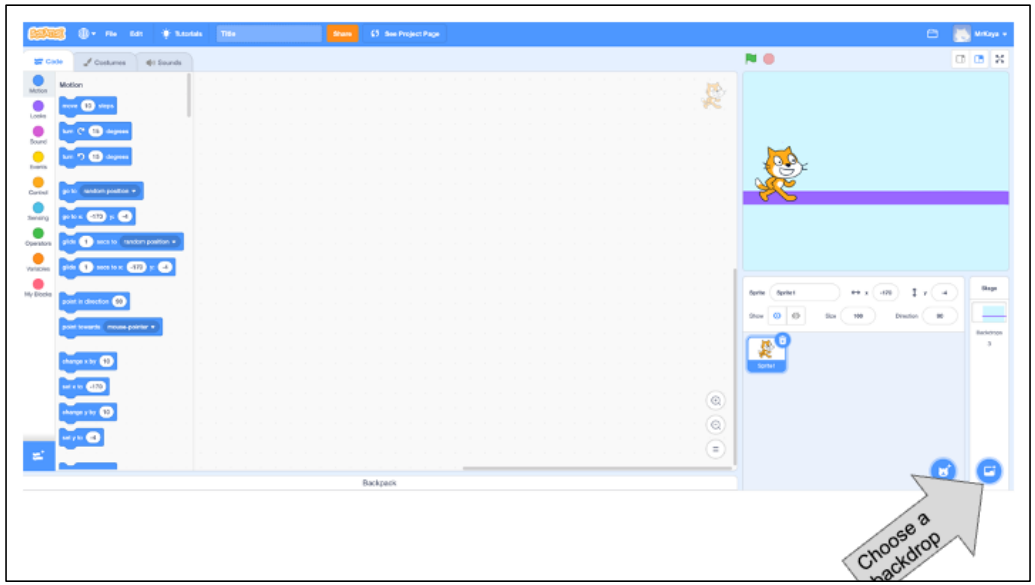
Introduce and explain to create/add Sprites and Backdrops

“If you want to add another sprite or change sprites, you can click here, the small circle with the cat image and plus sign. The new sprites you add will appear in this box. But you can only add code for the sprite that is selected and is in the blue box.”



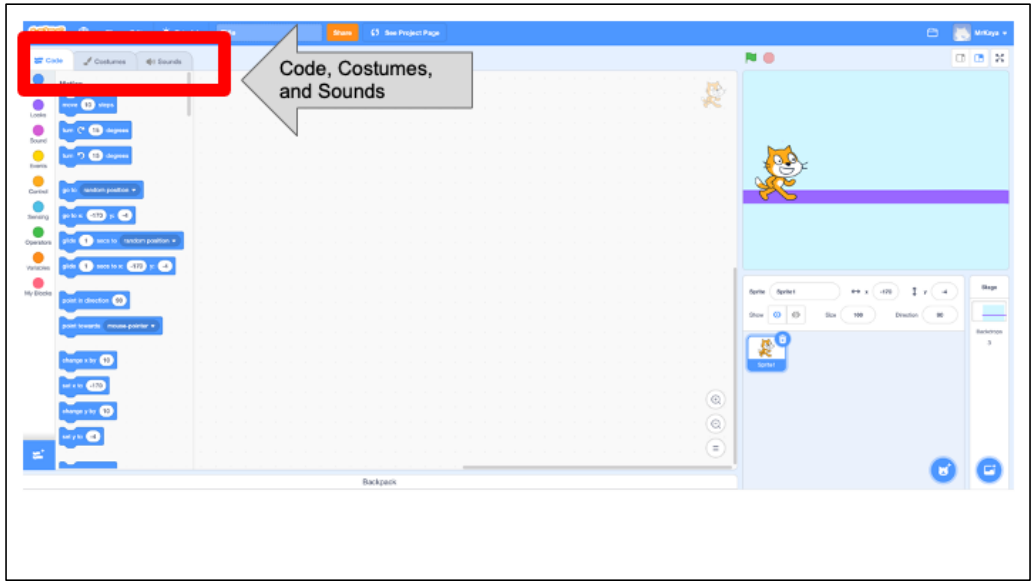
Introduce and explain to create/add Sprites and Backdrops

“You can see scratch the cat here on the stage. When you run your code, this is where you can see the action.”

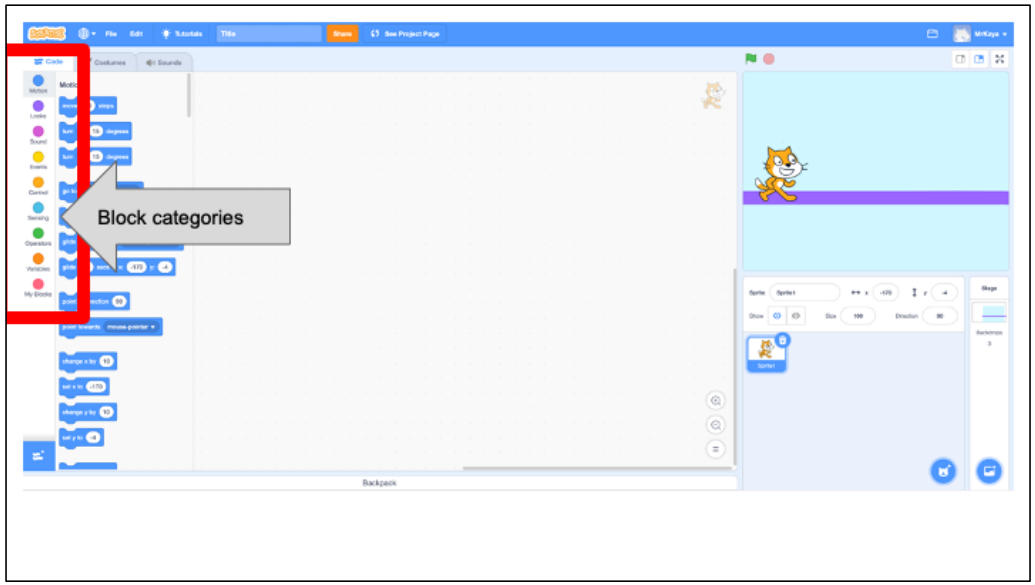


Introduce and explain to create/add Sprites and Backdrops

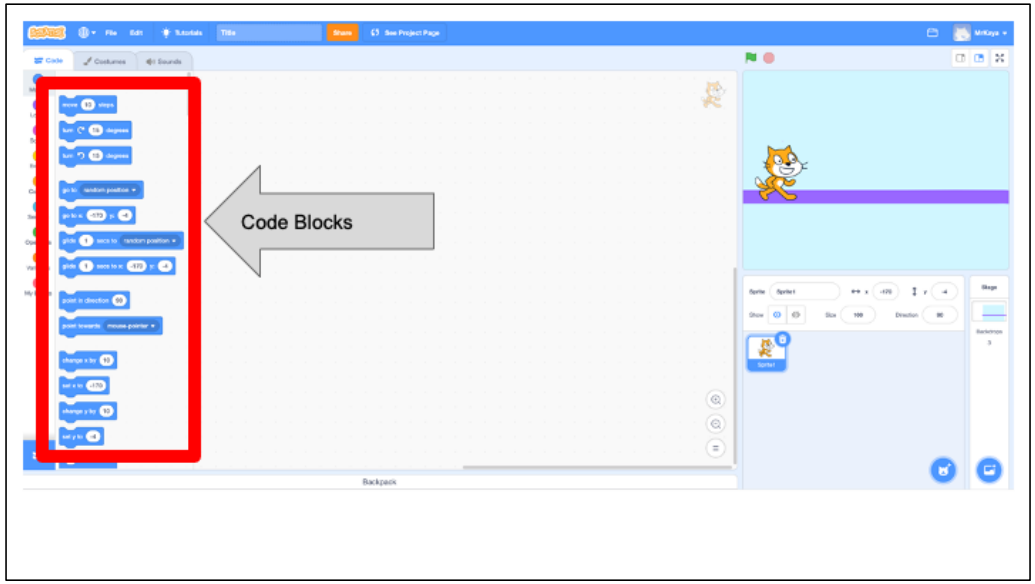
“If you want to change your background or your backdrop, as it is called in scratch, you can click here. It looks like a small picture with a plus sign.”



Guide Students through the main areas of the Scratch page
“In the upper left, you can see three different tabs. Code, Costumes, Sounds. Choose the code tab to build code from command blocks. Choose the costumes tab to change how your sprite looks. Or you can add new sounds to sprites here.”



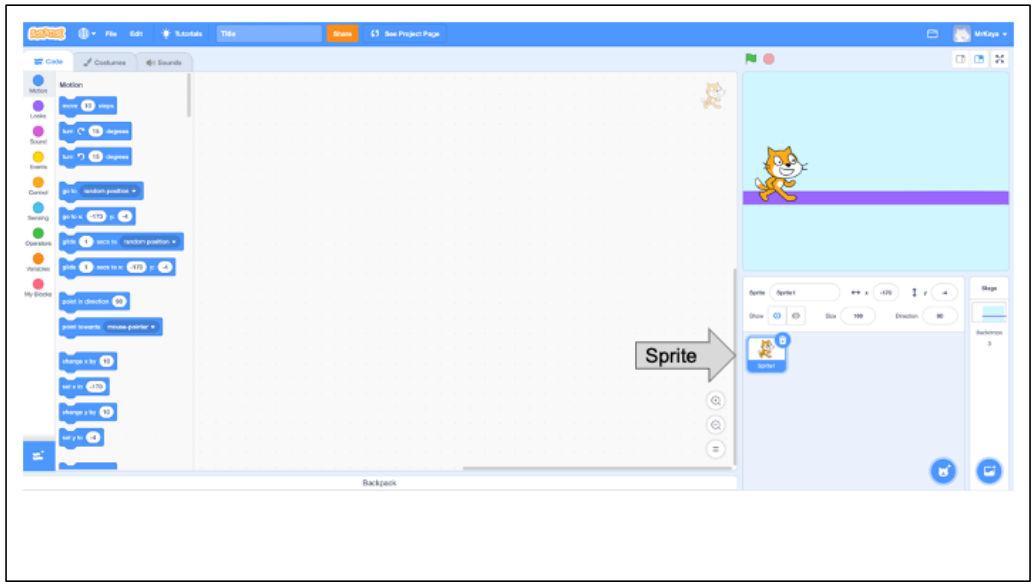
Guide Students through the main areas of the Scratch page
“Let’s look closer at the code blocks. On the far left you can see several colored dots (some also call it categories palette). These are the different types of code you might want. You can choose motion, looks, sound, events..they are all different colors to help you. You can choose just one block category.”



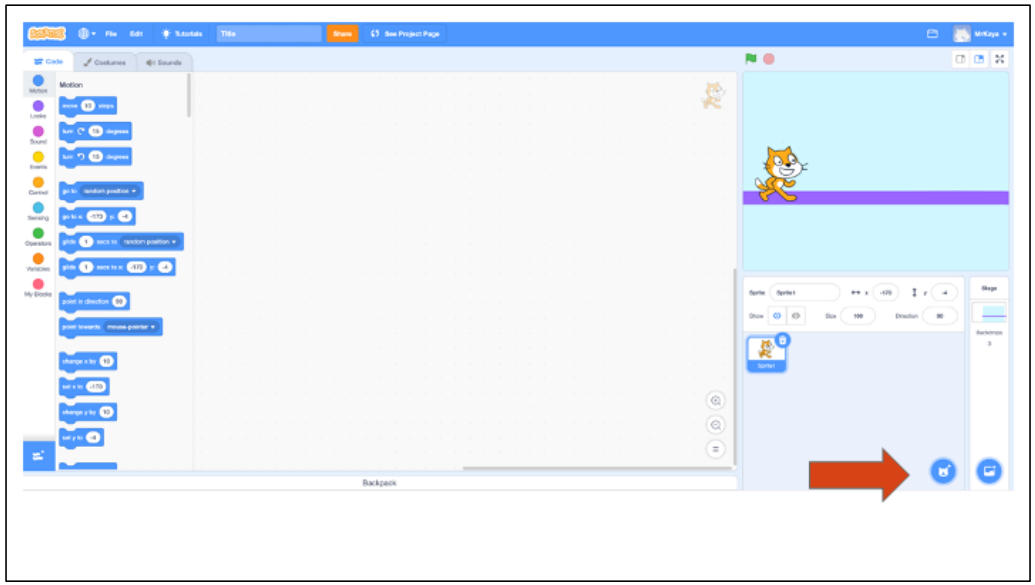
Guide Students through the main areas of the Scratch page
“Once you choose your category, the code blocks will appear here and you can find the specific command that you would like to give your sprite. Once you drag your code to the stage and click them together, you are ready to try it out.”

CHANGING SPRITES & BACKDROPS

Scratch comes with a preset sprite and backdrop. Let's look at how you'd change those to one of your choosing

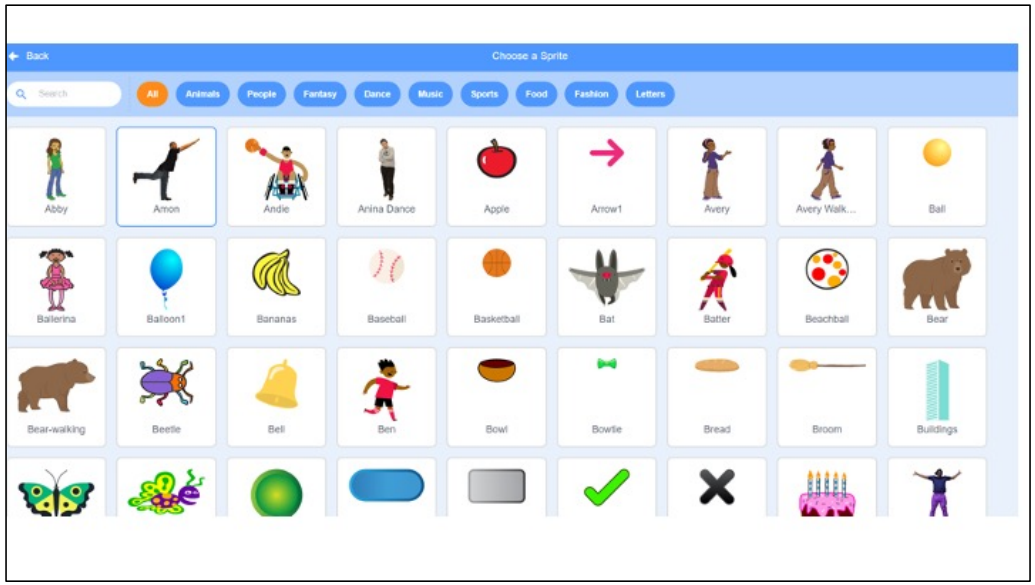


Okay, remember that in SCRATCH, an object, author, or character in a story is called a **Sprite.** The sprite you can see right now is Scratch the cat. What if we wanted to change our sprite to another animal?

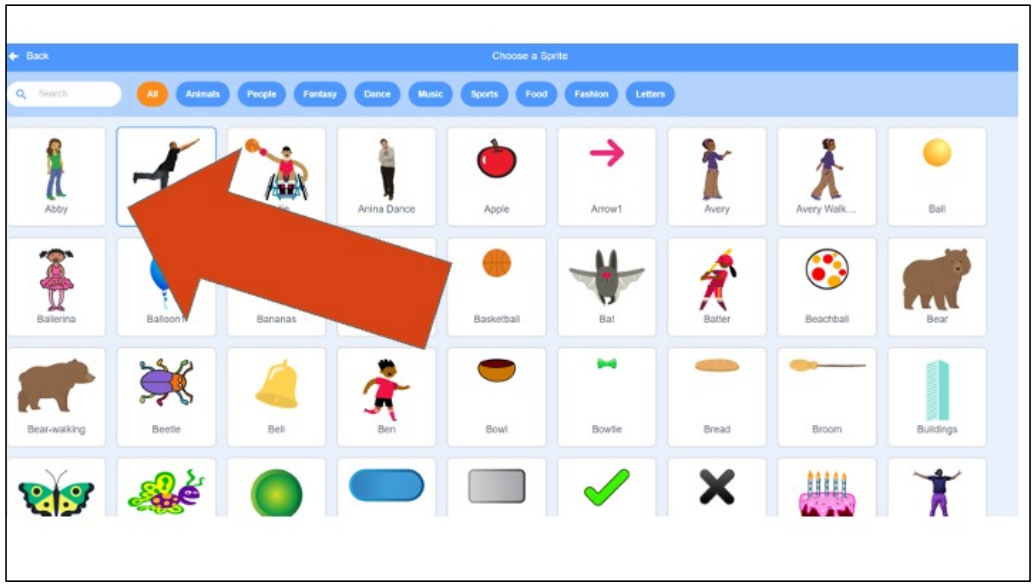


Okay, remember that in SCRATCH, an object, author, or character in a story is called a **Sprite.** The sprite you can see right now is Scratch the cat. What if we wanted to change our sprite to another animal?

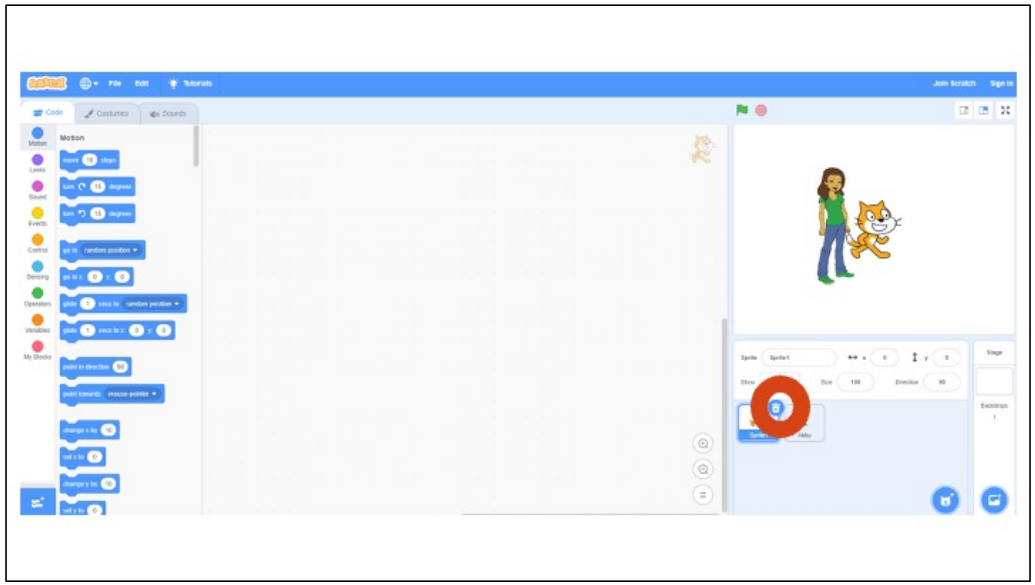
First, we would click on the sprite icon.



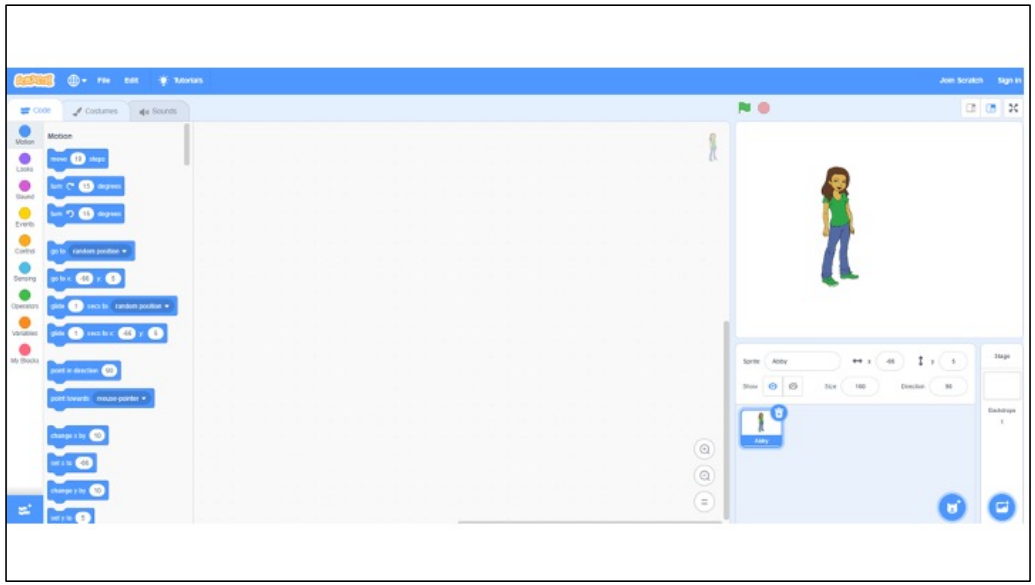
Then, we would have ALL these sprites to choose from.



We change our sprite by clicking the one we want.



But don’t forget to delete the other sprite! So you have only the one you want.



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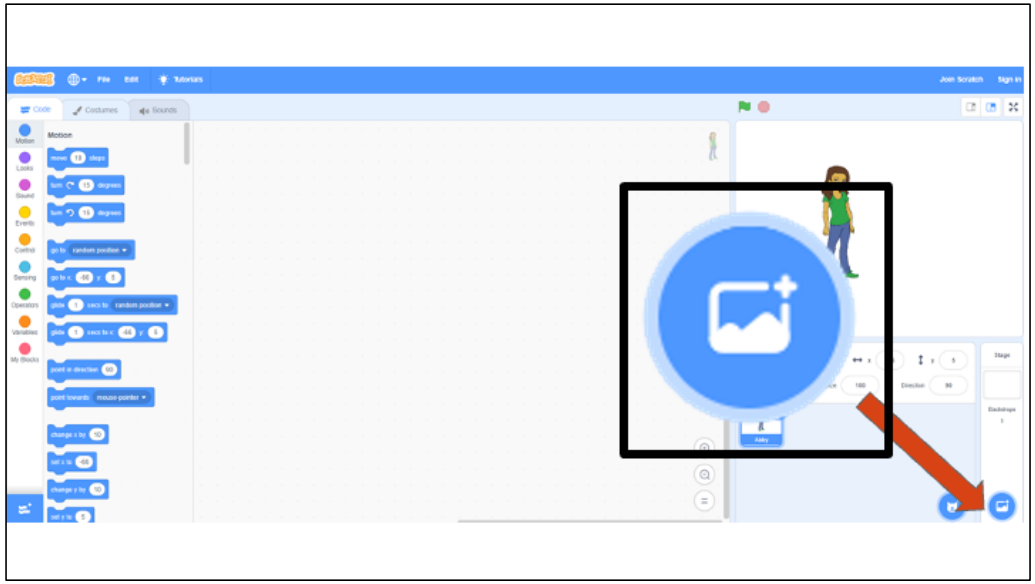
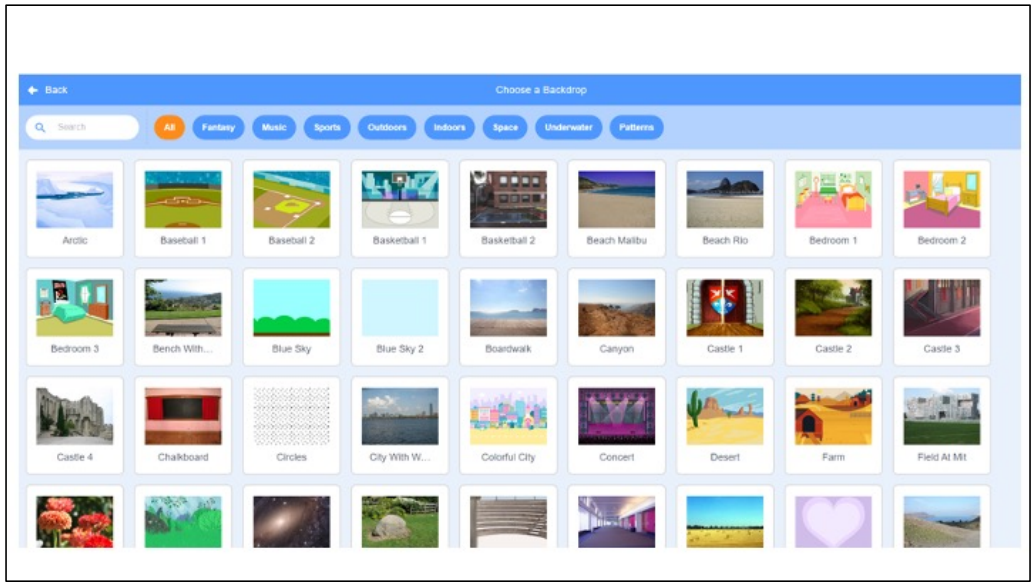


To add your own backdrop, follow the same steps but click this icon instead.
You'll see lots of options to choose from appear.



To add your own backdrop, follow the same steps but click this icon instead. You'll see lots of options to choose from appear.

TRY IT OUT!

- ❑ Open Scratch
- ❑ Change your sprite
- ❑ Change your backdrop

Questions?

PAUSE AND WORK (5 MINUTES)

This is just to get familiar with scratch, so don't worry about making mistakes. Just try a few things and see what happens! If you get stuck, take a deep breath and try again. You can do it!

LESSON OBJECTIVES: I CAN...

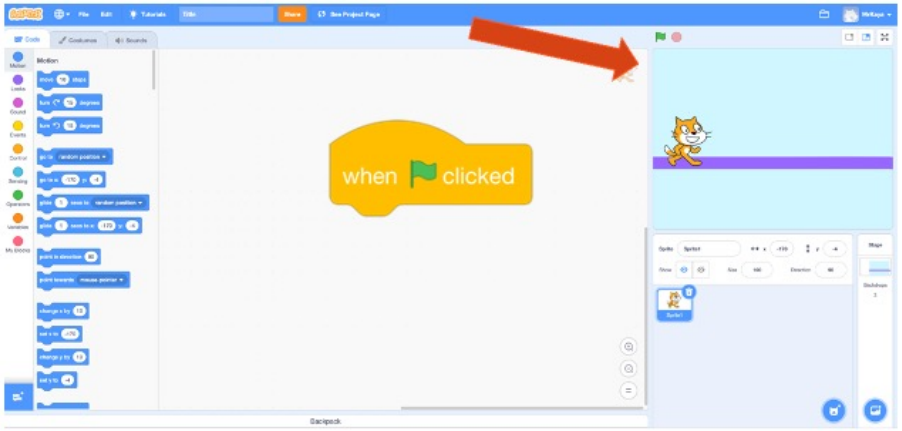
- ✓ Describe characteristics of Computer Science (CS)
- ✓ Define the computational thinking skills of patterns and sequencing
- ✓ Describe a pattern I follow in my own life
- ✓ Change my sprite and backdrop in Scratch
- ❑ Identify and understand the purpose of the start, speak/say, and switch costume blocks in Scratch
- ❑ Believe anyone can be a computer scientist!

Check off learning objectives as the lesson proceeds.

Again, Scratch allows us to write code using these block-based commands. These command blocks should be familiar by now. What do you think these blocks might do? Pause here and share with your teacher.

Let's find out more!

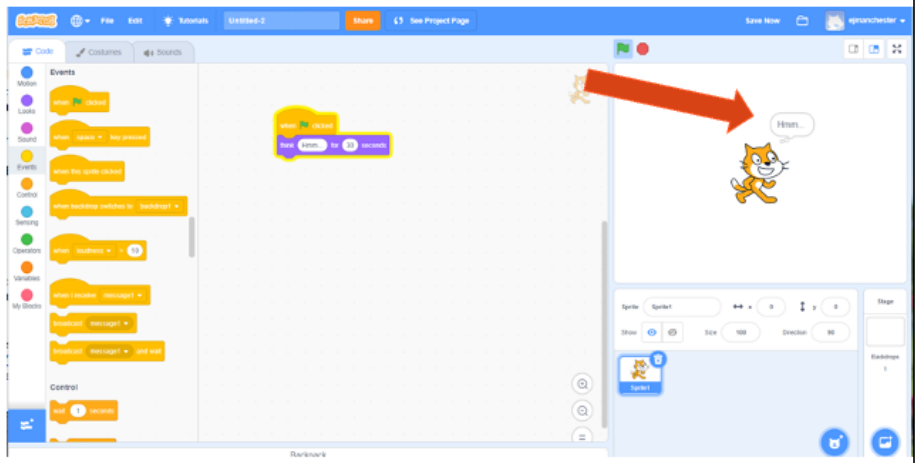
START BLOCK (EXPLAINER VIDEO)



Tells your code to run when you click the green flag in Scratch.

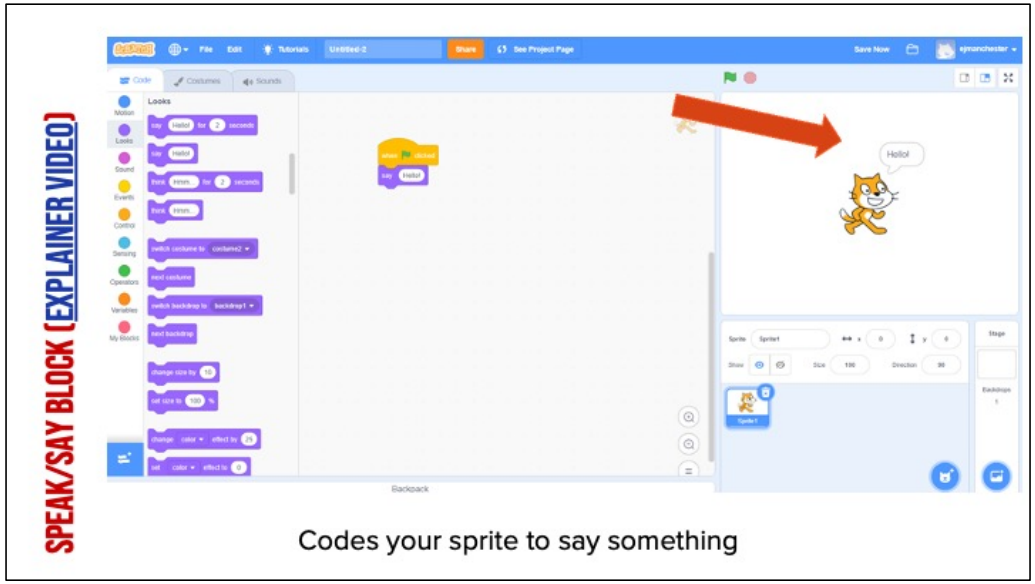
[read slide and play video if desired]

THINK BLOCK (EXPLAINER VIDEO)

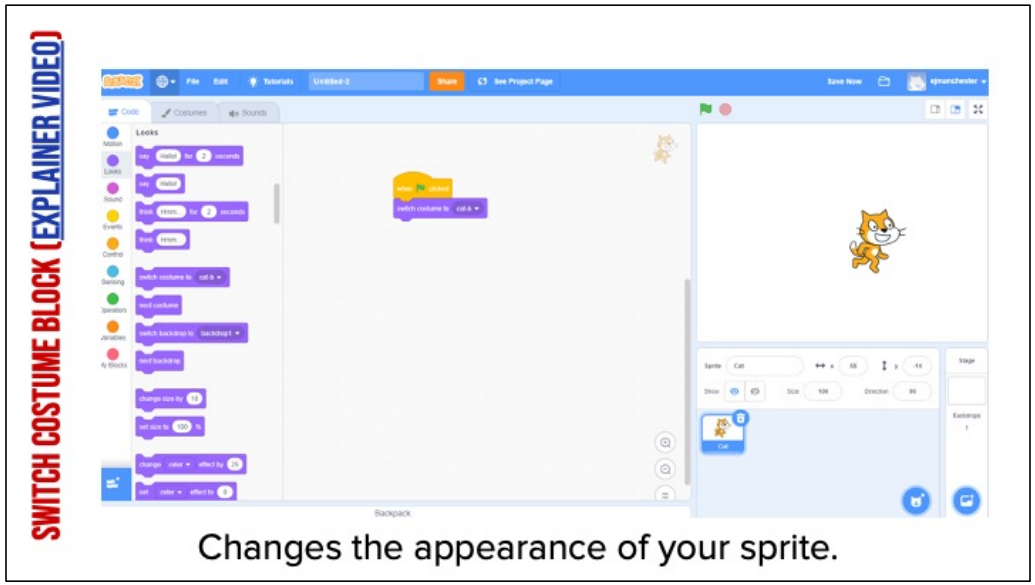


Makes your sprite “think” something

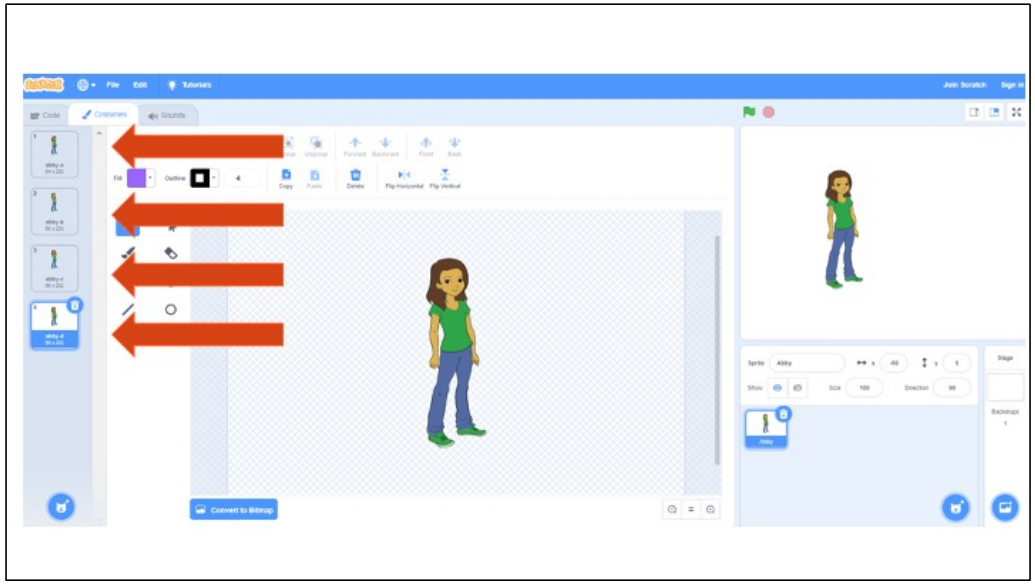
[read slide and play video if desired]



[read slide and play video if desired]



Play Video, and explain: It may not be obvious but this cat looks different from the one automatically in scratch. This one looks like it's running. The "change costume" block in Scratch changes the appearance of your sprite. You can use it to change the appearance of your sprite. This block makes things simpler because we want have to use as many sprites in our project.
Video link:
https://www.dropbox.com/s/jdt70o0l0neyk8c/SwitchCostumeCoCo_Nov16.mp4?dl=0



Lots of sprites in Scratch come pre-loaded with multiple costumes. So changing the costume is as easy and choosing one of these four looks.

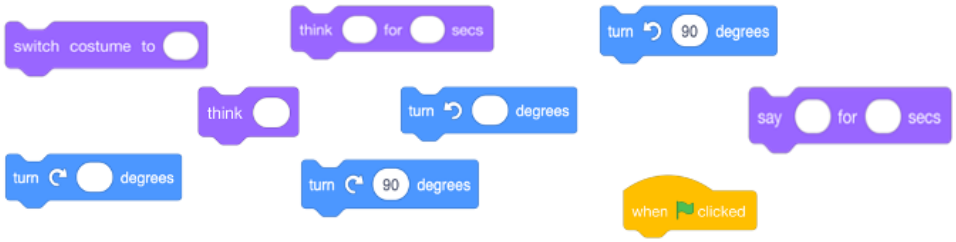
INDEPENDENT PRACTICE

TRY IT OUT!

We are going to create a **pattern** with the blocks we just learned.

Remember, a **pattern** is something that repeats, like a design or sequence.

Consider designing your pattern around: the color of the blocks, the shape and size of the blocks, or the words in the blocks.



For the teacher: print and cut hard copies of the Scratch block handout

TRY IT OUT!

- ❑ Open Scratch
- ❑ Add the **“when green flag clicked”** block
- ❑ Code a pattern using the **think, say, turn** and **switch costume** Scratch blocks
- ❑ Run your code!

PAUSE AND WORK (10-15 MINUTES)

Ok, let’s get started. Pause here and leave this screen up so that you can check on your goals. Please navigate to Scartch.mit.edu in your web browser.
This is just to get familiar with scratch, so don’t worry about making mistakes. Just try a few things and see what happens! If you get stuck, take a deep breath and try again. You can do it!

Note to teacher: as students are working, Review how Scratch blocks can be used to create a pattern and sequence.

LESSON OBJECTIVES: I CAN...

- ✓ Describe characteristics of Computer Science (CS)
- ✓ Define the computational thinking skills of patterns and sequencing
- ✓ Describe a pattern I follow in my own life
- ✓ Change my sprite and backdrop in Scratch
- ✓ Identify and understand the purpose of the start, speak/say, and switch costume blocks in Scratch
- ❑ Believe anyone can be a computer scientist!

Check off learning objectives as the lesson proceeds.

WRAP UP

Computational thinking means **“thinking like a computer scientist.”**

We’ve learned about these computational thinking skills:

- Pattern recognition
- Sequencing

Pick one of these skills and share with a small group for a few minutes about how this skill **helps you think like a computer scientist.**

[read slide]

LESSON OBJECTIVES: I CAN...

- ✓ Describe characteristics of Computer Science (CS)
- ✓ Define the computational thinking skills of patterns and sequencing
- ✓ Describe a pattern I follow in my own life
- ✓ Change my sprite and backdrop in Scratch
- ✓ Identify and understand the purpose of the start, speak/say, and switch costume blocks in Scratch
- ✓ Believe anyone can be a computer scientist!

Check off learning objectives as the lesson proceeds.