UNIT 3, LESSON 1

ALGORITHMS AND DEBUGGING

5TH & 6TH GRADE

Award #1837380

Lesson created by the GMU-ODU CSforAll Team. For more information about
this lesson and our CSforAll initiative, contact Dr. Amy Hutchison at ahutchison1@ua.edu

SUMMARY AND STANDARDS

Summary:

In this lesson, students will identify and use algorithms to create loops in Scratch and write a new explanatory writing piece.

ELA Standards

The student will write in a variety of forms to include narrative, descriptive, opinion, and expository.

a) Engage in writing as a process.
b) Identify audience and purpose.
c) Use a variety of prewriting strategies.
d) Use organizational strategies to structure writing according to type.
g) Use transition words to vary sentence structure.

CS Standards:

The student will analyze, correct, and improve (debug) an algorithm that includes sequencing, events, and loops.

Today, we are moving on to Unit 3 where we will learn about something called algorithms and debugging, a key process you will use in both computer science and writing.

MATERIALS AND RESOURCES NEEDED FOR THIS LESSON:

- Chromebook/Laptop
- Internet Access
- Teacher Slides
- Explanatory text graphic organizer
- CoCo Link
- Blank paper for brainstorming

Reminder:
In this lesson, every student should be **assigned a story in CoCo** using **Level 3.**

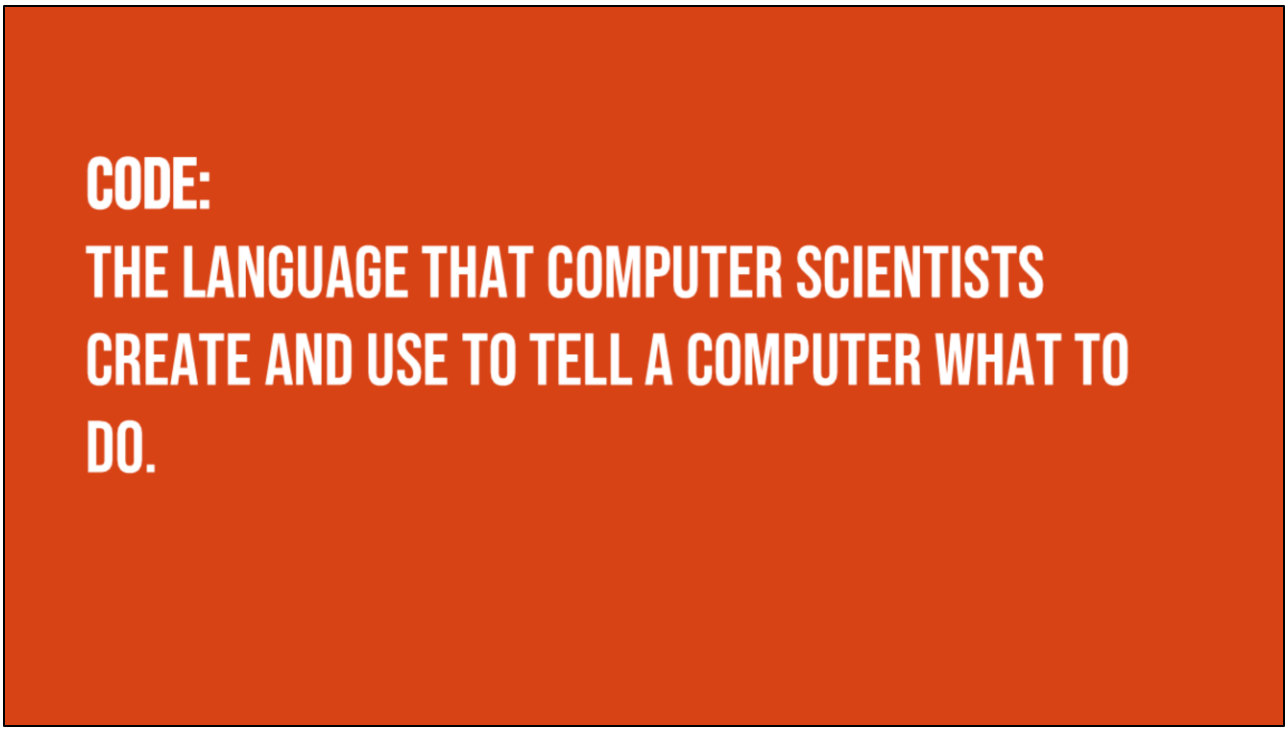
The story should be titled "**Unit 3 Story.**"

Each student should save their work using this naming strategy: "**Student Name + Unit # + Descriptor",** for example, "**Johnny Unit 3 Story."**

COCO
COMPOSE & CODE

DEPICT-CS

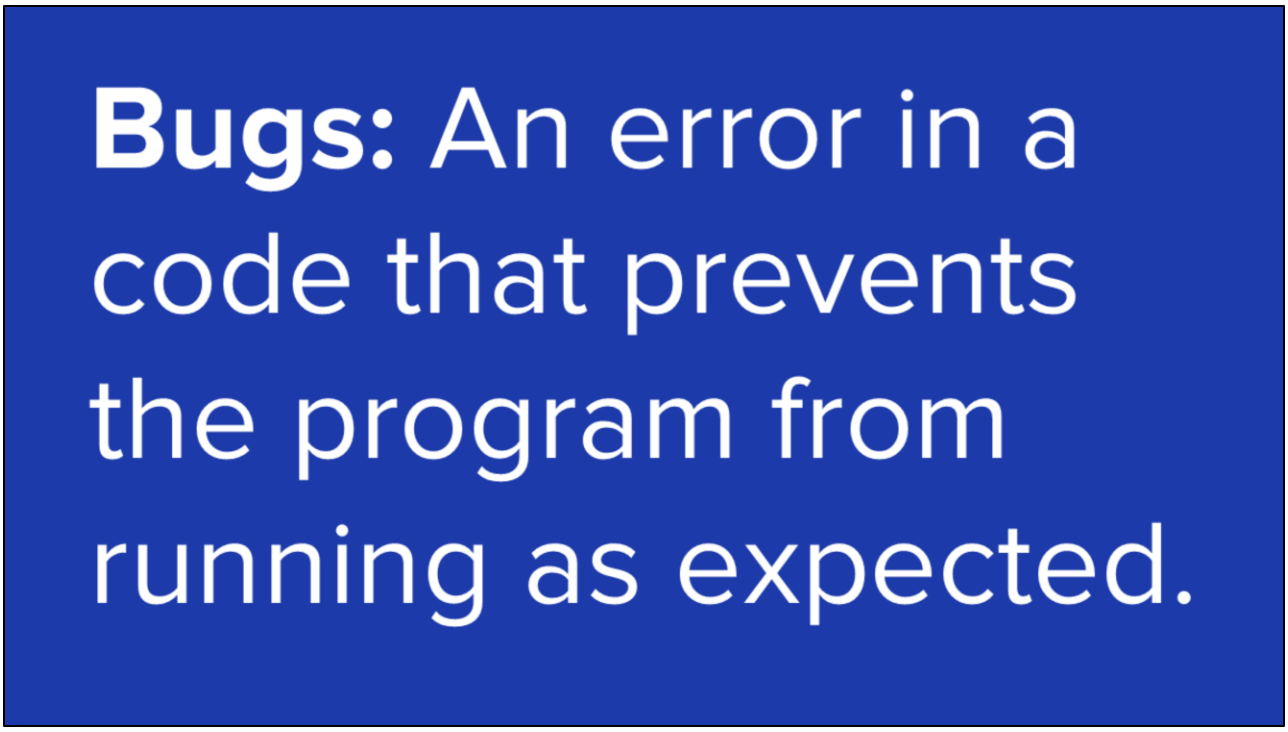
You will need….[read slide]



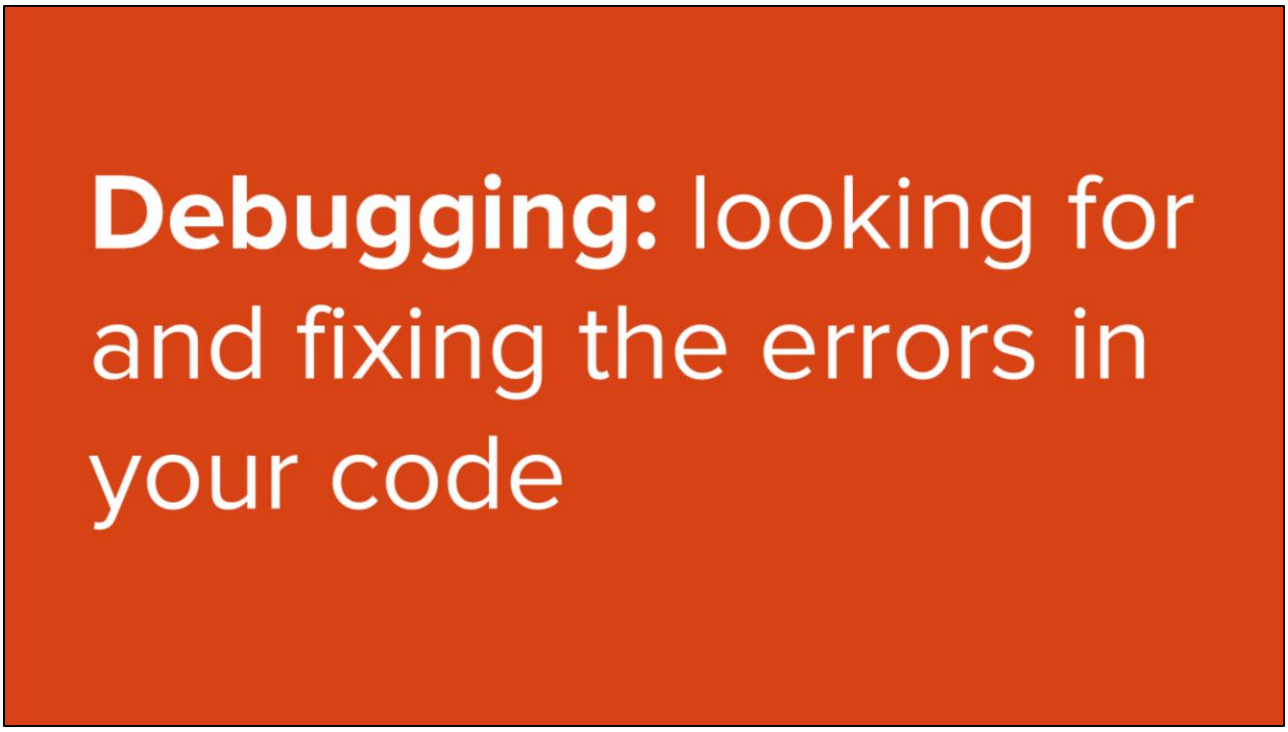
Code is the language that computer scientists create and use to tell a computer what to do. Code is how we can give instructions to a computer.

BUT WHAT IF....

Ok, but what happens if we miss a step or make a mistake in writing our algorithm? Well, the computer or the human who is reading the instructions will not be able to accomplish the task! These mistakes are called….



"Bugs...but not the creepy, crawly critter that you might think of at first when you hear the word "bug." "Bugs" in computer science are errors in a code...." A bug is an error or mistake in your code that prevents the program from running as expected. It is like when you write something incorrect in your instructions and someone else can't follow them because they are confused. When this happens in your writing you have to fix your mistake.



When you need to fix your error in your code we call that debugging. This means you are looking for your mistake and then fixing it. Everyone makes mistakes, even professionals!

WHAT IS EXPLANATORY WRITING?

Now that we have reviewed the CS vocabulary let's think about another type of algorithm we have used: explanatory writing. Can anyone share an example of explanatory writing?

EXPLANATORY WRITING

explanatory writing. This is a type of writing to explain or inform someone else. Think of some examples of explanatory writing that we have done so far….

That's right–we've written instructions for how to do lots of things! Most of these have been recipes, a set of written instructions for how to make a food or drink. For example, we've read and written recipes for:
–how to make hot chocolate
–how to make a yummy treat
–how to make a chocolate, vanilla, or chocolate milkshake!
–how to make koolaid
–how to make lemonade

WHAT IS EXPLANATORY WRITING?

Explanatory writing:

- **Explains** something to someone or helps them understand how to do something. So it is important to provide many details!
- Is written in a specific order or **sequence**
  - A sequence is a set of things that follow each other in a particular order, where order matters!
- Often uses sequencing words such as **first, then, next,** and **last** to communicate the correct order of steps, also known as their sequence

So, explanatory writing is when we write to inform or explain! Remember {Read slide}

CAN YOU THINK OF OTHER EXAMPLES OF EXPLANATORY WRITING?

We may wish to write about how to....

- Get somewhere (directions)
  - To the cafeteria
  - The park in your neighborhood
- Do something (instructions)
  - Build a fort in your living room
  - Do a dance
  - Shoot a basketball or kick a soccer ball
  - Create a craft
- Explain something
  - How your family celebrates the holidays
  - About someone important to you or someone famous
  - How something happens, such as photosynthesis or the water cycle

There are lots of times when you may wish to explain something to someone! [read slide]

LESSON OBJECTIVES: I CAN...

- ❑ Review algorithms and explanatory writing
- ❑ Identify the characteristics of an explanatory text
- ❑ Write a sequence of instructions for a new explanatory text
- ❑ Plan out my animation on paper

Let's go over today's lesson's objectives: [read slide]

GUIDED PRACTICE

Now, let’s think about other types of explanatory writing together.

An Algorithm is a list of steps or commands to finish a task.

ALGORITHMS AND EXPLANATORY WRITING

- Use the correct sequence
- Be clear and precise

Just like an algorithm, explanatory writing **explains** the steps or instructions for doing something.

Explanatory writing is also written in a specific order or sequence, just like an algorithm.

Algorithms must be written in the correct sequence so that others, humans or a computer, can follow the orders to complete a task. This task can be anything, so long as you can give clear instructions for it. Think about an algorithm for getting your shoes on in the morning, you must put on your socks before you put on your shoes!

Just

HOW TO WRITE AN EXPLANATORY TEXT

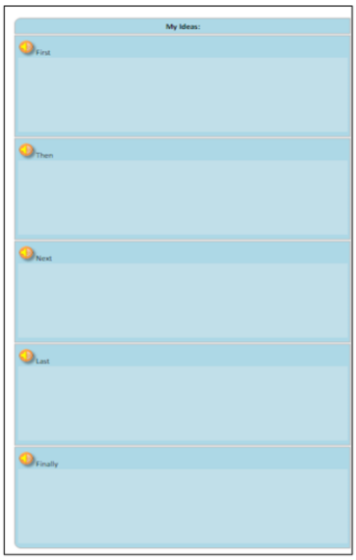
COCO
COMPOSE & CODE
DEPICT-CS

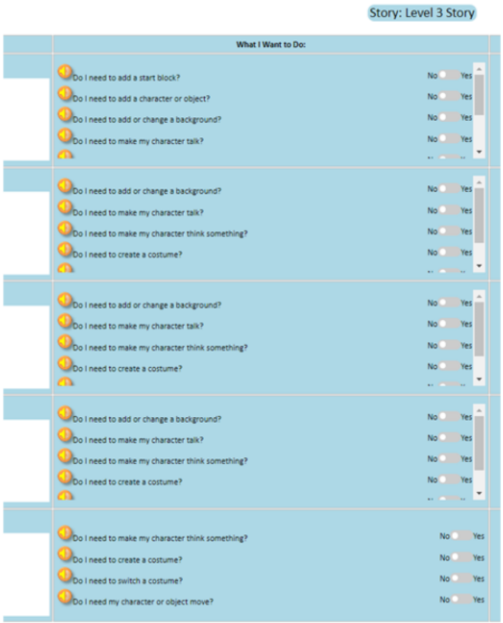
1. **Brainstorm:** What do you want to share?
2. **Plan:** What does your reader need to know? How should you organize your information?
   a. Graphic Organizers can help (Coco)
3. **Write!**
   a. Be clear and specific
   b. Use transition words

4. **Debug and Edit**
   a. Look for mistakes or things that don't make sense.
   b. Fix your mistakes

COCO IS A GRAPHIC ORGANIZER

CoCo helps us organize our writing and plan out our animation in Scratch.





One great graphic organizer you have already learned about is Coco. Coco is also helpful because it not only helps us plan our writing but also how we are going to share our writing virtually in a Scratch animation!

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The next two steps are to write and then debug and edit our writing. When we write we need to be clear and specific and use our transition words. When we debug, we are looking for and fixing mistakes.

Ok, now it is time to get started!

Pause here and make sure you have your idea ready to go. Take a few moments to pause here and to think about what you want to write about. I might want to explain how to get to the park from my house, or how knit a sweater, or maybe the steps to feeding my goldfish.

Teacher may also provide a prompt of their choice.

Take a moment to share your thoughts with your next door neighbor. Take turns sharing your ideas. Pause the video here to turn and talk about your ideas for your explanatory writing.

INDEPENDENT PRACTICE

LEVEL 3 IN COCO

Do I need to add a start block?

Do I need to add a character or object?

Do I need to add or change a background?

Do I need to make my character talk?

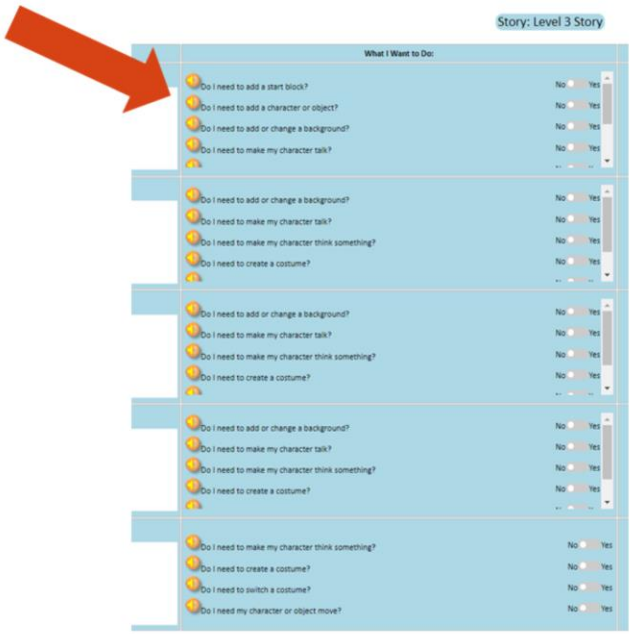
Do I need to make my character think something?

Do I need to create a costume?

Do I need to switch a costume?

Do I need my character or object move?

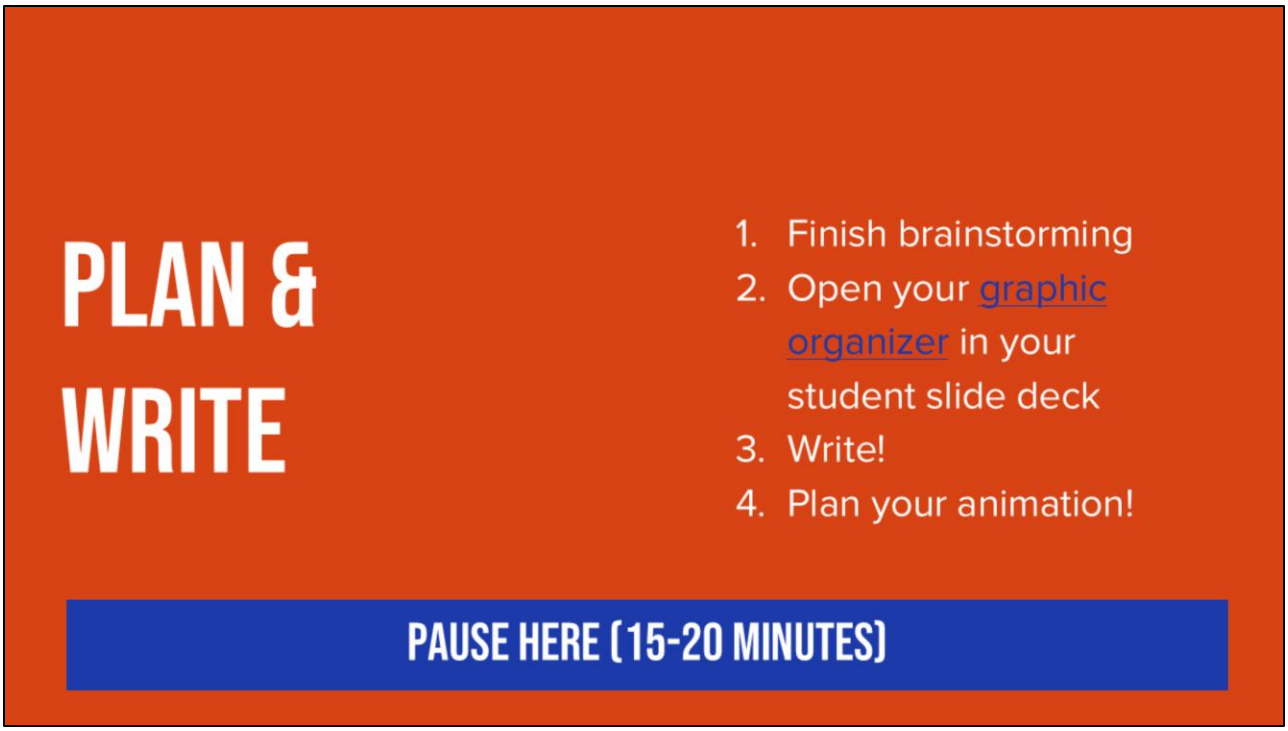
Do I need my character or object to turn and then move?



Before we get started, let's take a quick look at the level 3 features in CoCo.

In level 3 of Coco, you will be introduced to some new ways to use Scratch to animate your explanatory writing. In this level, you have more options for how you will animate your writing in Scratch. Let's look at these new questions together. These questions are from our very first row in Coco. (Read questions) In level 2, you did not need to decide what happened in the first row but in level 3 you will. Remember, you will always need to add a start block or your code will not work!

https://www.dropbox.com/s/ytt59g8y184pzd4/Hover%20over%20blocks%20in%20Coco.webm?st=3p93jeti&dl=0



Now it is time to plan out our writing. You need to think about: What does your reader need to know? How should you organize your information?

Graphic organizers, like we have used before, can be a huge help with this step. We need to think about the important details our readers will need. Today will be using a graphic organizer for our writing and for planning our animation.

Pause the here and working on planning and writing your new explanatory writing into your graphic organizer. When you are done with your writing, use the boxes on the right to plan how you will animate each step in Scratch.
https://docs.google.com/document/d/19YsF-3x_3_ypWv_3jMsgqn12pPxDYiOy/edit?usp=drive_link&ouid=104701427422211502426&rtpof=true&sd=true

WRAP UP

Great job!

ALGORITHMS AND EXPLANATORY WRITING

- Use the correct sequence
- Be clear and precise

Just like an algorithm, explanatory writing **explains** the steps or instructions for doing something.

Explanatory writing is also written in a specific order or sequence, just like an algorithm.

Remember: Algorithms and explanatory writing are very similar. They both explain a sequence of steps or events. And they both need to be clear so that others, people or computers, can follow those steps.

Great job today, make sure you save your planning graphic organizer for next time, when we will be working in CoCo