

Lesson 5-3B

Action Fractions
Math+CT

Fraction Comic Animation

Math Connections: Children create a number story comparing equivalent fractions.

CS Connections: Children create animations in Scratch, using a detailed plan in the form of a storyboard. They learn to use wait blocks to synchronize the actions on the stage given a limited set of instructions (commands).

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► Before You Begin

Ensure that children have their comic strip storyboard organizers from Lesson 5-3A and a different colored pen or pencil to make revisions.

Computational Thinking

- **SEQUENCE:** Precision and completeness are important when writing instructions in advance.
- **SEQUENCE:** Programs are made by assembling instructions from a limited set.
- **DECOMPOSITION:** Problem decomposition is a useful early step in problem solving.

1 Warm Up 5–10 min

Materials

Singing in a Round

Children sing in a round to think about why it can be important to wait.

“I Can ...” Statements

Children read the explicit math and CS goals.

2 Focus 35–45 min

Changing Scenes

Children discuss different ways to change scenes in Scratch.

Animal Number Story project (for demonstration); Fraction Card Comic (Teacher) project (for demonstration)

Revisiting Storyboards

Children revisit their storyboards to add additional details, especially about waiting.

Storyboard organizers from Lesson 5-3A; Fraction Comic Animation (Teacher) project (for demonstration)

3.NF.3, 3.NF.3a, 3.NF.3b, 3.NF.3d

Animating with Scratch

Children use their storyboards to animate their comic strips in Scratch.

Completed storyboards; Fraction Comic Animation project

“I Can ...” statements

- *I can [meaningfully] order the actions of characters to create an animation.*
- *I can use wait blocks to synchronize the characters’ actions.*
- *I can create a program to animate a comic strip in Scratch.*

Anticipated Barriers

- Students may have difficulty in placing wait blocks in scripts properly.
- Students may have difficulty in deciding the duration of the wait blocks.
- Students may struggle with the collaborative aspects of this project.

Student Options

Consider these options for adapting the lesson to your students’ preferences:

- Students may want to work individually.
- Students may choose to use the Collaborative Discussion Framework.

1 Warm Up 5–10 min

“I Can ...” statements

- I can [meaningfully] order the actions of characters to create an animation.
- I can use wait blocks to synchronize the characters’ actions.
- I can create a program to animate a comic strip in Scratch.

► Singing in a Round

Ask children if anyone has ever sung a song in the round. One popular example is Row, Row, Row Your Boat. Have a volunteer explain how singing in a round works. *Sample answer: One person starts singing, and then another person starts when the first person reaches a certain point in the song.* Ask for at least two volunteers who have sung in a round before to join you in singing Row, Row, Row Your Boat in a round. When finished, ask: *When the song started, was everyone singing at once?* **No** *What were the other singers doing while the first person sang?* **Sample answer: They waited on their turn to start.**

Explain that the idea of waiting until the right time will be important in the work children do in Scratch today. Thank your volunteers for singing with you and ask them to return to their seats.

► I Can ...

Display the “I Can ...” statements and remind children that these statements express the goals for today’s lesson and can give them clues about what to expect. Carefully read each statement and ask them to use their thumbs to show how true they feel each statement is for them right now.

2 Focus 35–45 min

► Changing Scenes

WHOLE CLASS SMALL GROUP PARTNER INDEPENDENT

Open the Animal Number Story project from Lesson 2-3A (<https://scratch.mit.edu/projects/227391112/>) and remind children of when they worked with this project. Run the project, asking children to prompt you about the steps to take to get all the way through it. When done, ask: *How did we advance the story (move from one scene to the next)?* **We had to click on the sprites and press the space key to keep the story going.**

Now open and run the Fraction Card Comic (Teacher) project (<https://scratch.mit.edu/projects/251701629/>). When done, ask:

- *How did we advance this story?* **After we pressed the green flag, it played by itself.**
- *How is this like the round we sang earlier?* **Sample answer: Some sprites are waiting while other sprites are doing actions.**
- *How is this project different from the Animal Number Story project?* **Sample answer: We did not need to do anything to advance the story. Once it started, it played all the way to the end.**

SS: Animal Number Story



SS: Fraction Card Comic (Teacher)



► Revisiting Storyboards

WHOLE CLASS SMALL GROUP PARTNER INDEPENDENT

Tell children that today they will create an animation—a comic based on their comic strip. They will remix a starter Scratch project that contains incomplete scripts. Ask:

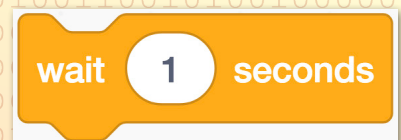
- *In the comic strip, how do we know when actions are happening at the same time?* **Sample answer:** In the comic strip, the actions in any picture or scene all happen at the same time.
- *In Scratch, how does the computer know when to do each action?* **Sample answer:** Computers go through the program one block at a time in a script. The computer uses the blocks in the order they appear in the script.
- *In Scratch, how could we get two (or more) actions to happen at the same time?* **Sample answer:** We could use the same event block to start more than one script. The scripts could be for multiple sprites.
- *What blocks do you think might be used for the actions in each scene of your comic strip?* **Sample answers:** say, think, hide, show, switch costume, switch backdrop

Display the partially completed Example Storyboard Organizer from Lesson 5-3A. Point out connections between elements of the organizer and the Scratch blocks children just named. For example, in Scene 1, Abby's action is to say something. Children can tell the computer to have Abby do that action using a say block.

	Scene 1	Scene 2	Scene 3	Scene 4
	Duration: 5 seconds	Duration: 5 seconds	Duration: 5 seconds	Duration: 5 seconds
Abby	Costume: 2/3 fraction Action: say wait think show switch costume Hey Devin, come look at my Fraction Card!	Costume: 2/3 fraction Action: say wait think show switch costume --	Costume: 2/3 fraction Action: say wait think show switch costume Hmm ...	Costume: 2/3 circle Action: say wait think show switch costume These fractions are equivalent!
Devin	Costume: -- Action: say wait think show switch costume	Costume: 4/6 circle Action: say wait think show switch costume	Costume: 4/6 circle Action: say wait think show switch costume	Costume: 4/6 circle Action: say wait think show switch costume
Stage	Backdrop: chalkboard Action: wait switch	Backdrop: chalkboard Action: wait switch	Backdrop: chalkboard Action: wait switch	Backdrop: Jinx! balloons Action: wait switch

Ask: *What action is shown for Devin in Scene 1?* nothing Is there a word we can use to talk about doing nothing? wait Have children think back to singing in a round. Point out that Devin is waiting in Scene 1, just like some of the singers did and that there is a wait block in Scratch (see margin).

Tell children that before they begin their own projects, you will finish filling in the details on this example storyboard organizer with the class, using the completed example Teacher project as needed. In particular, they will need to think about how they can use wait blocks to make sure that things happen when they want.



Example Script from Abby sprite

```

when green flag clicked
  Setup
  say Hey Devin, come look at my Fraction Card! for 5 seconds
  wait 5 seconds
  think Hmm... for 5 seconds
  switch costume to TwoThirdsCircle
  say These fractions are equivalent!
  
```

Example Script from Stage

```

when green flag clicked
  switch backdrop to chalkboard
  wait 5 seconds
  wait 5 seconds
  wait 5 seconds
  switch backdrop to JINXballoons
  
```

Look at the scripts for each sprite in the Fraction Card Comic (Teacher) project and compare them to the example organizer (see margin). Ask children to volunteer suggestions for where you should add wait blocks on your organizer to correspond with the example project. Be sure to add the duration each time you add a wait, say, or think action. Adjust suggestions as needed to match the completed storyboard below. Use a different color when making revisions to the storyboard so children can clearly see what was added today.

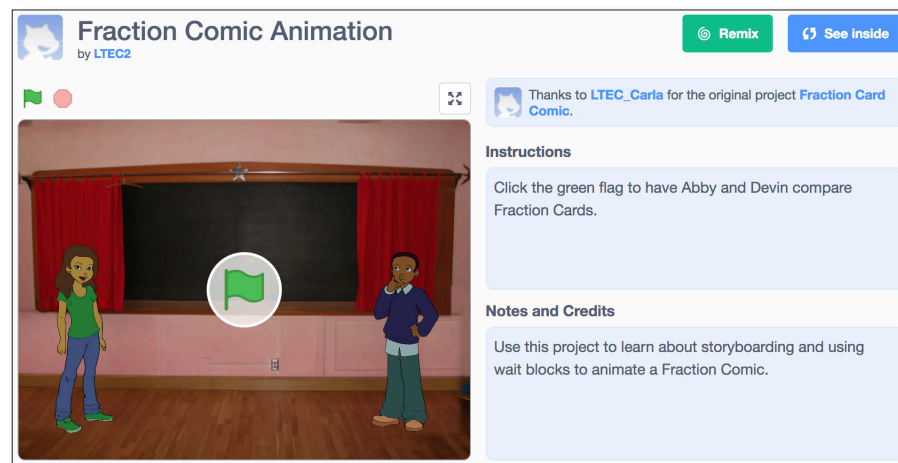
	Scene 1	Scene 2	Scene 3	Scene 4
	Duration: 5 seconds	Duration: 5 seconds	Duration: 5 seconds	Duration: 5 seconds
Abby	Costume: 2/3 fraction Action: say wait think show switch costume Hey Devin, come look at my Fraction Card!	Costume: 2/3 fraction Action: say wait think show switch costume --	Costume: 2/3 fraction Action: say wait think show switch costume Hmm ...	Costume: 2/3 circle Action: say wait think show switch costume These fractions are equivalent!
Devin	Costume: -- Action: say wait think show switch costume --	Costume: 4/6 circle Action: say wait think show switch costume Hello, Abby!, This is my Fraction Card!	Costume: 4/6 circle Action: say wait think show switch costume Hmm ...	Costume: 4/6 circle Action: say wait think show switch costume These fractions are equivalent!
Stage	Backdrop: chalkboard Action: wait switch	Backdrop: chalkboard Action: wait switch	Backdrop: chalkboard Action: wait switch	Backdrop: Jinx! balloons Action: wait switch

▶ Animating with Scratch

WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT

Have children work independently or in pairs to open, remix, and modify the starter project to create an animation of the fraction comic from the comic strip storyboard organizers they created in Lesson 5-3A.

Fraction Comic Animation (<https://scratch.mit.edu/projects/262796710/>)



NOTE The starter project contains costumes for all the fraction cards (from Lesson 5-2) children might use for this fraction story.

Remind children that the starter project contains incomplete scripts and the sprites shown in the comic strip cards they used. They will need to search for options to match their own comics and add the right blocks to make their animations work the way they have planned on their storyboards.

As they work, remind children to think about how using wait blocks can help them get actions to happen in the desired order. Encourage them to use the storyboard as a planning tool for each section at a time, making as many revisions as they need in order to finish the animation. Have children make these revisions in a different color, so they can clearly see what they added today. Also encourage children to attend carefully to what changes between scenes. As needed, guide them to realize that when a sprite has the same costume in two consecutive scenes, they don't need a new action block in their code, but if the costume (or stage backdrop) changes, they need to include a switch costume (or backdrop) block.

If time allows, have children pair up, have a partner run their completed project, then compare it to their storyboard. Allow children time to discuss and make revisions to their projects based on their partner's input.

► Wrap Up

WHOLE CLASS	SMALL GROUP	PARTNER	INDEPENDENT
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If time allows, choose one or two volunteer groups to share their fraction comics with the class. Ask:

- *Why is it important to provide many details when you are creating a project in Scratch? Sample answer: You have to give the computer all the details for the animation to work.*
- *How does using the Storyboard to break the story into smaller parts make it easier to build in Scratch? Sample answer: The Storyboard helps me think about just one part of the story at a time.*
- *How did using wait blocks help you get the timing right in your animation? Answers vary.*
- *What things did you forget to add to your Storyboard that you noticed when you were building your Scratch project? Answers vary.*

Now “I Can ...” Review today's “I Can ...” statements and ask children to use their thumbs to show their opinion of each statement.

“I Can ...” statements

- *I can [meaningfully] order the actions of characters to create an animation.*
- *I can use wait blocks to synchronize the characters' actions.*
- *I can create a program to animate a comic strip in Scratch.*