

Lesson 3-6B

Action Fractions
Math+CT

Comparing Fractions: Same Numerators

Math Connections: Students compare fractions with the same numerator on a number line.

CS Connections: Students use variables and conditionals to write a program that allows the computer to compare fractions.

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Computational Thinking

- **CONDITIONALS:** Sometimes multiple conditions must be considered.
- **DECOMPOSITION:** Problem decomposition is a useful early step in problem solving.
- **DEBUGGING:** Errors play a valuable role in problem solving.

1 Warm Up 5 min

Materials

"I Can ..." Statements

Students read the explicit math and CS goals.

2 Focus 35-40 min

Math Message

Students compare fractional shares of sandwiches.

4.NF.2

Fraction Comparisons

Students consider the relative size of fractional pieces from two sandwiches.

Comparing Fractions: Same Numerators journal page (p. 1); *Slicing Sandwiches* journal page (optional)

4.NF.2

Programming More Fraction Comparisons

Students build scripts to show fraction comparisons.

Comparing Fractions: Same Numerator project; *Comparing Fractions: Same Numerator* journal pages

"I Can ..." statements

- *I can compare fractions with like numerators.*
- *I can develop rules to determine whether one fraction is greater than, less than, or equal to another fraction with the same numerator.*
- *I can modify an existing program that uses variables and multiple conditionals so that the computer will compare two fractions.*

Anticipated Barriers

- Some students may struggle with inequality symbols.

Student Options

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

- Some students may benefit from visual representations or manipulatives to go along with the Math Message.
- Some students may need more modeling with the journal page other than the example row.

1 Warm Up

5 min

I Can ...

Display the “I Can ...” statements and remind students 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.

“I Can ...” statements

- I can compare fractions with like numerators.
- I can develop rules to determine whether one fraction is greater than, less than, or equal to another fraction with the same numerator.
- I can modify an existing program that uses variables and multiple conditionals so that the computer will compare two fractions.

2 Focus

35–40 min

Math Message

There are two sandwiches that are the same size. One sandwich is cut into 3 equal pieces and another is cut into 6 equal pieces. You can choose 2 pieces from only one of the two sandwiches. From which sandwich would you choose to take the 2 pieces? Why?

Fraction Comparisons

WHOLE CLASS

SMALL GROUP

PARTNER

INDEPENDENT

Math Message Follow-Up Once most students have completed the Math Message, ask for volunteers to share their answers. **Sample answers:** I would take two pieces from the sandwich cut into three pieces because those pieces would be bigger. I would take two pieces from the sandwich cut into six pieces, because then there would be more left over for me to share with friends. Ask:

- What fraction represents two parts of the sandwich that is cut into three equal pieces? $\frac{2}{3}$ Display this fraction, and label it Fraction A.
- What fraction represents two parts of the sandwich that is cut into six equal pieces? $\frac{2}{6}$ Display this fraction, and label it Fraction B.
- Which choice would get you more sandwich? 2 out of 3 pieces, or $\frac{2}{3}$, or Fraction A
- Since we get 2 pieces of the sandwich in both situations, why does $\frac{2}{3}$ of a sandwich give you more sandwich than $\frac{2}{6}$ of a sandwich? **Sample explanation:** Since we are cutting the sandwich into 3 pieces instead of 6, the pieces of the sandwich cut in thirds will be larger.

Remind students that in a previous lesson, they wrote rules for comparing fractions that have the same denominator. Explain that today they will do a similar activity where they write rules for comparing fractions that have the same numerator. If needed, display a student’s completed journal page from Lesson 3-6A to review the form of conditional statements and help students answer the following questions. Ask:

- How many conditionals did you need to write in your same denominators program? 3

Same Denominators: Slicing Sandwiches p. 2

Same Denominators: Slicing Sandwiches (con't)

⑤ Copy the answers from the previous page.

A	?	B
$\frac{3}{8}$	<	$\frac{5}{8}$
$\frac{3}{5}$	>	$\frac{2}{5}$
$\frac{5}{6}$	=	$\frac{5}{6}$
$\frac{4}{12}$	<	$\frac{7}{12}$

⑥ Put it all together by filling in the blanks.

a. numerator A > numerator B A > B

b. numerator A < numerator B A < B

c. numerator A = numerator B A = B

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Lesson 3-6A

SEARCH ID _____ DATE _____ TIME _____

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- What were the conditions you needed to check? Whether numerator A was greater than, less than, or equal to numerator B.
- Now that we are looking at fractions with the same numerators, what conditions do you think you will need to check? Whether denominator A is greater than, less than, or equal to denominator B.

Distribute the Comparing Fractions: Same Numerators journal page. Tell students that they can use the table to decompose the problem so they can think about just one condition at a time. Complete one row of the table in Problem 1 together. Ask:

- In the Math Message, how did the denominator of Fraction A compare to the denominator of Fraction B? Denominator of Fraction A < Denominator of Fraction B. Record this condition in the first row, first column of the table.
- Was Fraction A greater than, less than, or equal to Fraction B? Greater than. Write the greater than symbol in the second column.
- So if the denominator of Fraction A is less than the denominator of Fraction B, which symbol should the computer display? > Record this symbol in the third column.

Have students work with a partner or neighbor to complete the other two rows of the table in Problem 1.

► Programming More Fraction Comparisons

WHOLE CLASS SMALL GROUP PARTNER INDEPENDENT

Have students open, remix, and share the Comparing Fractions: Same Numerators Scratch Project. (<https://scratch.mit.edu/projects/210105678/>)

Comparing Fractions: Same Numerators
remixed by LTEC2

98 scripts, 7 sprites, See inside

Instructions
Click the green flag. Click sandwich A. Click sandwich B. Click the Compare button to show the comparison symbol.

Notes and Credits (added by LTEC2)
Purpose: Use this project to continue working with variables and multiple if-then statements. Change code in the Compare button sprite to show the right comparison symbols. Change code in each of the sandwich sprites to enter fractions from your journal page.

Thanks to sgkrause for: 3a_3.6 Comparing Fractions: Student Same Numerators (Project Remixed)
Thanks to nbanholzer for: Fraction Circles 1a (Original Project)

Shared: 15 Mar 2018 Modified: 11 Dec 2018

Tell students to click See Inside, then find the Compare sprite. Have them use their tables from Problem 1 to help them write a script to compare fractions with the same numerator. If students need more support converting their tables to code, have them complete the top half of the optional second journal page.

Comparing Fractions: Same Numerators

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Comparing Fractions: Same Numerators

Scratch Link: Comparing Fractions: Same Numerators (<https://scratch.mit.edu/projects/210105678/>)

- Plan your project. (Fill in the blanks.)

When ...	Then I know that ...	So I tell the computer to use this symbol:
Denominator A < Denominator B	A > B	>
Denominator A > Denominator B	A < B	<
Denominator A = Denominator B	A = B	=

- Open Comparing Fractions: Same Numerators (<https://scratch.mit.edu/projects/210105678/>).
 - Click See Inside. Then find the Compare button sprite.
 - Create a script for this sprite that will compare two fractions with the same numerator. Use your table from Problem 1 to help you.
- Complete the table below and use your Scratch project to test your rules.

	(Top) Sandwich A Code	Fraction A	Comparison Symbol	Fraction B	(Bottom) Sandwich B Code
a.		$\frac{6}{8}$ six-eighths	>	$\frac{6}{10}$ six-tenths	
b.		$\frac{5}{8}$ five-eighths	<	$\frac{5}{6}$ five-sixths	
c.		$\frac{1}{6}$ one-sixth	=	$\frac{1}{6}$ one-sixth	

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Comparing Fractions: Same Numerators, p. 2

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Comparing Fractions: Same Numerators (optional)

- Plan your code for the Compare sprite.
 - A < B
 - A > B
 - A = B

Explore the code for the Sandwich sprites.

- Change to . Run and watch. Three pieces are shown for each sandwich.
- Change to . Run and watch. Sandwich A is now split into four equal pieces instead of six.
- Circle your answer.
 - This block sets the size of each piece of the top sandwich:
 - The number in this block is the same as the denominator:
 - The number in this block is the same as the numerator:

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When students have completed their scripts for the Compare sprite, have them test their scripts by completing Problem 3 on page 1. They should change the code for the two Sandwich sprites to show the fractions in each row of the table, then click the Compare button to see which comparison symbol is displayed. If it is not the symbol they expect or does not match the comparison shown by the sandwiches and number lines, encourage them to go back to the Compare sprite and check their code.

The code for the Sandwich sprites works the same as in the Same Denominators project from Lesson 3-6A, so students should know how to make changes to show the needed fractions. However, if students need more support, encourage them to complete the bottom half of the optional second journal page before completing Problem 3.

► Wrap Up

WHOLE CLASS	SMALL GROUP	PARTNER	INDEPENDENT
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When students have had sufficient time to work, bring them together for a whole class discussion about decomposing the problem and debugging the scripts.

Suggested Questions:

- *How did you use the table in Problem 1 to help you write your Scratch code?* **Answers vary. Sample answer: The table helped me plan my script.**
- *Was it helpful to think about each conditional separately? Why or why not?* **Answers vary. Sample answer: It was helpful because I could think about one thing at a time and I didn't get confused.**
- *Why is it important to test your scripts?* **Answers vary.**
- *Did anyone notice an error when they tested their code? How did this help you fix the problem in your code?* **Answers vary. Sample answer: I could tell which conditional I needed to change because I knew which fractions were not showing the right comparison symbol.**
- *What were some things that were difficult or confusing?* **Answers vary.**

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

“I Can ...” statements

- *I can compare fractions with like numerators.*
- *I can develop rules to determine whether one fraction is greater than, less than, or equal to another fraction with the same numerator.*
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