Mathematics: The Language of STEM
Comparing Fractions with Strategies

CONTENT AND TASK DECISIONS

Grade Level(s): 4th

Description of the Task: Students will use strategies (without models) to compare and order fractions.

Indiana Mathematics Content Standards: 4.NS.5: Compare two fractions with different numerators and different denominators (e.g., by creating common denominators or numerators, or by comparing to a benchmark, such as 0, 1/2, and 1). Recognize comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or < , and justify the conclusions (e.g., by using a visual fraction model).

Indiana Mathematics Process Standards: PS.3: Construct viable arguments and critique the reasoning of others.

Mathematics Content Goals: Students will be able to use strategies and reasoning surrounding benchmark fractions (such as 0, ½, and 1) to compare fractions with different denominators.

Language Objectives: Explain which fraction is greater and which fraction is less using sentence frames.

I know that ___(a fraction)____ is _(greater/less)___ than __(the other fraction)_____ because _____.

Materials: fraction cards (7) for each group

THE LESSON

Before:

- **Activate prior knowledge**
  - Ask students to order unit fractions such as 1/3, 1/8, 1/5, and 1/10.
  - Discuss how they knew which was the least and which was the greatest.
  - Ask them to compare two fractions using a model (like they did in the previous lesson): 3/8 and 4/7.
- **Be sure the problem is understood,**
  - Transition to the new problem: I have a set of seven cards. On the cards are different fractions. Some are greater than one and some are less than one. I want to know what they would look like when arranged from least to greatest. Assume that these are fractions of the same size whole.
  - Pass out fraction cards to each group.
- **Establish clear expectations**
  - As you work, be sure each group member is involved in the conversation. Justify your reasoning for why a fraction should be placed where you decide to place it.

During:

- **Let go,**
  - Give each group space and time to work. They should be arranging their cards in the order they believe they go in.
- **Listen actively,**
  - You should hear conversations explaining why a fraction does or doesn't go in a specific location. Example explanations:
    - "This fraction is close to half so it should go before this fraction which is close to one."
    - "This fraction is close to zero so it should go on the left before the others."
  - Take note of different ways students are justifying their reasoning and determine the order groups will share.
- **Provide appropriate support**
  - Is this fraction closer to 0 or 1? Closer to 0 or ½? Closer to ½ or 1?
  - How large are the parts? Which one has larger parts of the whole?
  - Are the parts the same? How do you know? Which has more of the same number of parts? Are their parts larger or smaller? How do you know?
  - If students are still struggling, ask them to first draw a model and then use the model to help come up with a reason that doesn't rely on using the model.
- **Provide worthwhile extensions**.
  - Have the students name a fraction that is close to one and explain how they know it is close to one. Then as them to name a second fraction that is even closer to one without going over one.
  - Have students name a fraction that is close to 0 and explain how they know it is close to zero. Then ask them to name a second fraction that is even closer to zero.

After:

- **Promote a mathematical community of learners**
  - Ask groups to present in the order you determined by listening into their conversations. Groups will come up and show the order they placed the fractions in and will justify why each fraction is where it is.
- **Listen actively without evaluation**
  - After a group shares ask if another group used a different reason to justify where a fraction should go in the order.
  - If a group disagrees with the order, ask them to explain why.
- **Make connections**
  - How was ordering the fractions today similar to what we did before with the visual models?
  - How was it different?
  - What did you notice about how others were explaining why they placed fractions where they did? (Hopefully, students should notice that they were looking at the number of pieces or the sizes of pieces or the fractions size compared to 0, ½, and 1).
- **Summarize main ideas**
  - What you should us today was that we can compare fraction in another way besides just using visual models. We can also think about the size of the parts or the number of parts to help us compare. In addition, we can think about where a fraction is compared to 0, ½, or 1.

ASSESSMENT

Observe: I will give an exit ticket with four sets of fractions on it. Students will be asked to compare one set of fractions of their choosing without using a visual model. They need to explain why one is greater than the other. If they are able to correctly tell which is greater and explain how they know by using reasoning or a strategy other than a visual model, it will show they are understanding.

Ask: Which is greater? How do you know?

Fraction Cards for the Task

$\frac{4}{5}$	$\frac{5}{7}$
$\frac{4}{9}$	$\frac{7}{9}$
$\frac{5}{4}$	$\frac{2}{9}$
$\frac{3}{5}$	

Exit Ticket: Comparing Fractions

Chose one pair of fractions and tell which one is greater. Then explain how you know.

$\frac{3}{5}$ and $\frac{3}{7}$	$\frac{5}{8}$ and $\frac{6}{10}$	$\frac{9}{8}$ and $\frac{3}{4}$	$\frac{2}{9}$ and $\frac{3}{7}$

_____ is greater than _____ because _____

_____

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Exit Ticket: Comparing Fractions

Chose one pair of fractions and tell which one is greater. Then explain how you know.

$\frac{3}{5}$ and $\frac{3}{7}$	$\frac{5}{8}$ and $\frac{6}{10}$	$\frac{9}{8}$ and $\frac{3}{4}$	$\frac{2}{9}$ and $\frac{3}{7}$

_____ is greater than _____ because _____

_____

_____

_____

_____

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