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Regional Educational Laboratory Northeast & Islands

at Education Development Center

Mathematics Intervention Toolkit: Introductory Module

Participant Workbook

REL 2026-004
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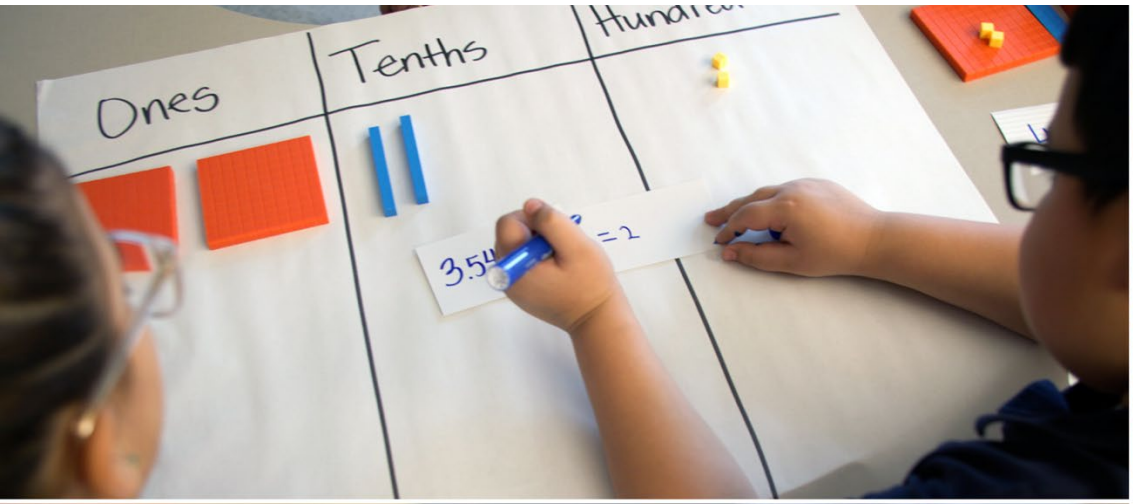

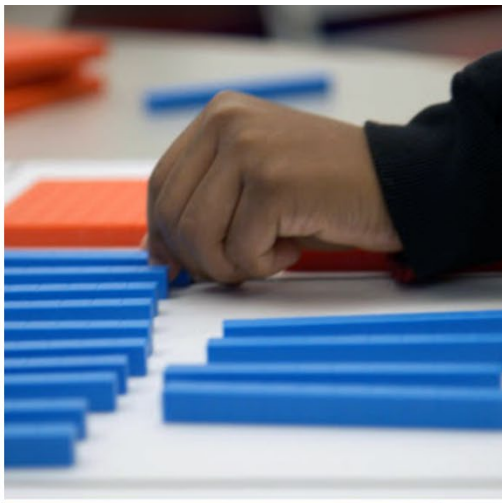

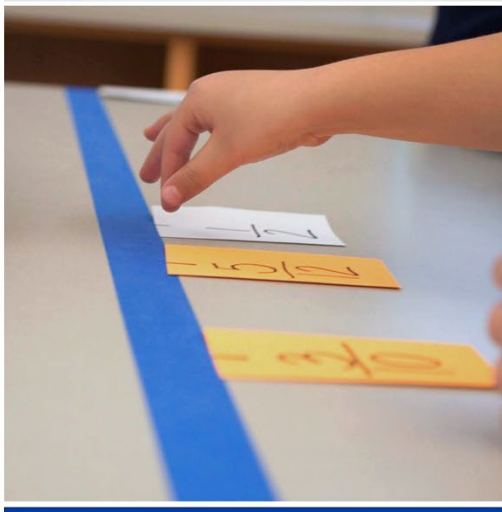

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This product is available on the Institute of Education Sciences website at*: https://ies.ed.gov/use-work/resource-library/resources*.

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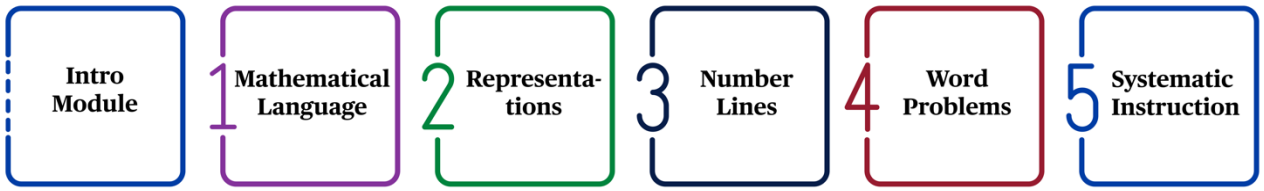
Contents

Introduction to the Course

Welcome! This professional development (PD) course is designed to build participants' knowledge and practices for supporting students struggling with mathematics. It focuses on the evidence-based recommendations of the What Works Clearinghouse (WWC) Practice Guide *Assisting Students Struggling with Mathematics: Intervention in the Elementary Grades*.[1] These recommendations are based on a rigorous review and synthesis of research studies of effective intervention practices. The course is designed to connect this important research to participants' classroom practice.

The course has a series of **modules** to support in-depth professional learning. It starts with an Introductory Module and continues with five modules, each focusing on one recommendation (figure 1) and how to implement it effectively with students.

Figure 1. Course Sequence



The course is specifically designed for **teachers of mathematics intervention in grades 3–6**. This includes teachers in different roles, such as interventionists, Title I teachers, math specialists, general educators, and special educators. Participants will be able to apply the strategies in a variety of intervention settings, including separate intervention classes; intervention/enrichment blocks; and designated times for intervention during core mathematics classes. Similarly, the course will support participants who use a variety of intervention programs or who do not have a program.

The full course is intended to provide about **28 hours** of professional learning during one or two school years. It uses a **hybrid format** that combines online learning, Professional Learning Community (PLC) sessions, and opportunities for classroom implementation. The course focuses on key **number and operations** topics, such as **fractions**, that are a high priority for mathematics intervention.

[1] Fuchs, L. S., Newman-Gonchar, R., Schumacher, R., Dougherty, B., Bucka, N., Karp, K. S., Woodward, J., Clarke, B., Jordan, N. C., Gersten, R., Jayanthi, M., Keating, B., and Morgan, S. (2021). *Assisting students struggling with mathematics: Intervention in the elementary grades* (WWC 2021006). U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance. Retrieved from http://whatworks.ed.gov/.

Module Overview

This Introductory Module provides an overview of the PD course and introduces the recommendations of the WWC Guide *Assisting Students Struggling with Mathematics: Intervention in the Elementary Grades.* The module has one Kick-Off Session to launch the course and jumpstart learning about the recommendations. Participants will try an instructional routine that incorporates evidence-based strategies and watch a classroom video of the routine in action. They will also get an orientation to the course goals, components, and resources to support their professional learning.

Module Resources

The Introductory Module includes the following resources for participants:

- **Online Component**: Provides information and resources for the module (see next section).
- **Participant Workbook** (current document): This provides all the handouts that participants will use at the Kick-Off Session. Handouts are labeled with the letter H and a number, such as H1. Appendix A has resources for a card sorting routine for comparing fractions with benchmark numbers.
- **Classroom Video Example**: The video, *Instructional Routine: Sort, Explain, and Generalize*, shows an intervention teacher and students using a routine that has recommended strategies.
- **Glossary**: Provides definitions for mathematical terms and other words that are relevant to the course modules.

Online Component

This component provides information, activities, and resources and is organized by tabs (figure 2).

Figure 2. Online Component Tab Menu

Description of tabs:

- **Tab 1. Intro**: Introduces the module's goals, key questions, and sequence.
- **Tab 2. Course Info**: Provides information and answers to frequently asked questions (FAQs).
- **Tab 3. Kick-Off Session**: Provides resources to use during and after the facilitated session.
- **Tab 4. Wrap-Up**: Provides a reflection activity for participants to do independently.
- **Resources Tab**: Provides a hyperlinked list of resources for the module.

The **Mathematics Intervention Toolkit**, which includes all the PD Course resources, is available for free at https://ies.ed.gov/ncee/rel/math-support-grades-3-6.

H1. Course Goals

Goals

Participants will:

- Build knowledge of the What Works Clearinghouse (WWC) Practice Guide's recommendations for supporting students struggling with mathematics.
- Build knowledge of evidence-based strategies and how to use them effectively.
- Plan and implement strategies with students.
- Collaborate and support each other in using strategies, sharing successes and challenges, and strengthening implementation.

1. Write specific goals for your professional learning.

Complete these sentence starters.

a. I want to build knowledge about…

b. I want to build strategies to support students with…

c. At the end of the course, I want to leave with…

2. During the course, revisit and reflect on your goals.

List ways that you are making progress towards your goals.

H2. Overview of Recommendations

In the course, we will explore five recommendations[2] from the What Works Clearinghouse Practice Guide *Assisting Students Struggling with Mathematics: Intervention in the Elementary Grades* (WWC Guide). The Introductory Module provides an overview of the recommendations. Modules 1–5 each focus in depth on one recommendation, providing implementation steps, evidence-based strategies, robust examples, and practical resources for teaching mathematics intervention.

Recommendations from the WWC Guide

The course focuses on these recommendations:

- **Mathematical Language: "**Teach clear and concise mathematical language and support students' use of the language to help students effectively communicate their understanding of mathematical concepts."
- **Representations: "**Use a well-chosen set of concrete and semi-concrete representations to support students' learning of mathematical concepts and procedures."
- **Number Lines: "**Use the number line to facilitate the learning of mathematical concepts and procedures, build understanding of grade-level material, and prepare students for advanced mathematics."
- **Word Problems: "**Provide deliberate instruction on word problems to deepen students' mathematical understanding and support their capacity to apply mathematical ideas."
- **Systematic Instruction**: "Provide systematic instruction during intervention to develop student understanding of mathematical ideas."

Key Questions

Participants will explore these questions for each recommendation:

1. **What** is the WWC Guide's recommendation?
2. **Why** is the recommendation important for student learning?
3. What are **strategies** for **how to** implement the recommendation?
4. What are **ways to apply** the strategies with your students?
5. What are **potential challenges** and ways to address them?

[2] The five recommendations are listed in the order used in the course. A sixth recommendation, Timed Activities, is available in the WWC Guide.

H3. Try an Example Routine

Routine: Sort, Explain, and Generalize

Steps:

1. Sort cards and explain reasons.
2. Discuss and generalize.
3. Wrap up and reflect.

Mathematics Focus: Compare fractions with benchmark numbers.

Step 1. Sort Cards and Explain Reasons.

a. Teacher goes over the directions and shows an example fraction card for the class to place. On the card, the shaded parts show the fraction. The goal is to sort the cards into three categories:

Closer to 0 **Closer to $\frac{1}{2}$** **Closer to 1**

b. Students work in pairs and take turns placing the cards.

- One partner picks a card and decides where to place it.
- The student places the card in a category and explains why using the sentence starter:

  The fraction is closer to _____ because…

- Then, the other partner will respond by saying whether they agree or disagree and why.

  I agree because… **I disagree because…**

Step 2. Discuss and Generalize.

a. Teacher reveals the answers for each category. Students check their work and can ask questions.

b. Teacher facilitates a discussion of one category at a time.

- What do you notice about the fractions that are closer to 0? [Closer to $\frac{1}{2}$? Closer to 1?]
- Look at the visual models. How do you know that these fractions are closer to 0? [$\frac{1}{2}$, 1]
- Look at the numbers. How do you know that these fractions are closer to 0? [$\frac{1}{2}$, 1]

Optional Questions: Which of the fractions is closest to 0? [Closest to $\frac{1}{2}$? Closest to 1?] Why?

Step 3. Wrap up and Reflect.

a. Students complete an exit task to reflect on their learning about comparing fractions with benchmark numbers. Have students share responses in pairs or with the whole group.

b. Teacher summarizes the mathematics focus on comparing fractions with benchmark numbers.

Appendix A has resources for the routine, including reproducible fraction cards and an exit task.

H4. Video Observations and Discussion

Background Information

The video, *Instructional Routine: Sort, Explain, and Generalize*, shows a grade 4 mathematics intervention class. The intervention teacher and students are using a routine that incorporates recommended strategies from the WWC Guide.

Video Watching Norms

- Observe, without judging, the teacher and students.
- Look for ideas to apply in your practice.

Focus Questions

As you watch, focus on these questions and write notes. Afterwards, we will discuss the questions.

Observations

1. How does the teacher support students in sorting fractions[3] and explaining their thinking?

2. What do you notice about the students' understanding of and challenges with comparing fractions with benchmark numbers?

Ideas to Apply

3. What ideas from the video would you like to apply with your students?

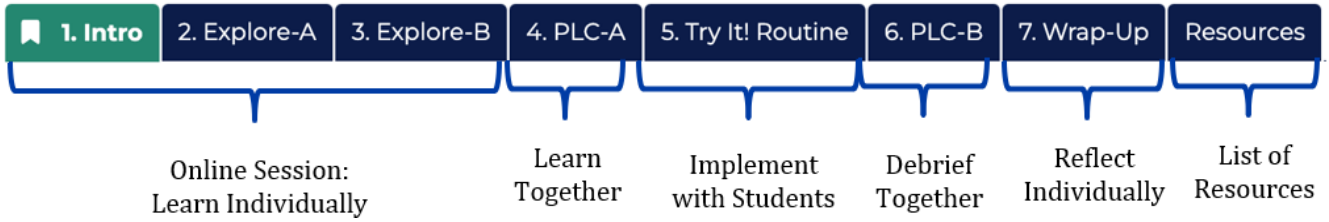
[3] The fraction cards used in the video are slightly different from those used in the Kick-Off Session.

H5. Walk-Through of Online Component

Purpose: To get to know the Online Component in preparation for starting the next module on mathematical language.

Directions

1. Go to the Mathematics Intervention Toolkit's website: https://ies.ed.gov/ncee/rel/math-support-grades-3-6.
2. Select "Teachers' PD Course Modules." Then select "Module 1: Mathematical Language" from the pull-down menu.
3. The Mathematical Language module is about 5 weeks long. The Online Component has tabs numbered (1–7) to show the sequence of activities and a Resources tab.



4. Starting with the Intro tab, open each tab to get a sense of what you will do in the Online Component. Move through the tabs in order from left to right.
   - **On each tab:** Take a quick look at the information and activities. Do **not** do the activities.
   - **To go to a new tab:** Use the Next button at the bottom of the page or go up to the top menu to select the new tab.
5. **Check off** the tabs that you visited:

   ☐ 1. Intro

   ☐ 2. Explore-A

   ☐ 3. Explore-B

   ☐ 4. PLC-A

   ☐ 5. Try It! Routine

   ☐ 6. PLC-B

   ☐ 7. Wrap-Up

   ☐ Resources

H6. Course Checklist

Use this checklist to keep track of your progress in the course.

	Introductory Module	Dates
☐	Kick-Off Session	
☐	Wrap-Up (Complete tab 4 of Online Component)	
	Module 1. Mathematical Language	
☐	Online Session (Complete tabs 1–3 of Online Component)	
☐	PLC Session-A	
☐	Try It!: Use Routine with Students	
☐	PLC Session-B	
☐	Wrap-Up (Complete tab 7 of Online Component)	
	Module 2. Representations	
☐	Online Session (Complete tabs 1–3 of Online Component)	
☐	PLC Session-A	
☐	Try It!: Use Routine with Students	
☐	PLC Session-B	
☐	Wrap-Up (Complete tab 7 of Online Component)	
	Module 3. Number Lines	
☐	Online Session (Complete tabs 1–3 of Online Component)	
☐	PLC Session-A	
☐	Try It!: Use Routine with Students	
☐	PLC Session-B	
☐	Wrap-Up (Complete tab 7 of Online Component)	
	Module 4. Word Problems	
☐	Online Session (Complete tabs 1–3 of Online Component)	
☐	PLC Session-A	
☐	Try It!: Use Routine with Students	
☐	PLC Session-B	
☐	Wrap-Up (Complete tab 7 of Online Component)	
	Module 5. Systematic Instruction	
☐	PLC Session	
☐	Wrap-Up (Complete tab 3 of Online Component)	

Course Website: https://ies.ed.gov/ncee/rel/math-support-grades-3-6.

H7. Reflection

Directions: Reflect on your learning in this module by writing responses to the questions below.

1. What ideas are you taking away from Introductory Module? List **two important ideas** related to supporting students struggling with mathematics.

   -
   -

2. What **topics or questions** are you interested in learning about for each recommendation? List a few in the table.

Recommendation	What topics and questions would you like to learn about in the course?
Mathematical Language	
Representations	
Number Lines	
Word Problems	
Systematic Instruction	

Appendix A: Resources for Card Sorting Routine

This appendix includes resources, such as reproducible handouts, for the card sorting routine on comparing fractions with benchmark numbers.

Resources for Teachers

Reproducible Resources to Use with Students

One-Page Overview of Routine for Teachers

Routine: Sort, Explain, and Generalize Total time: 25–35 min.

Step 1. Sort cards and explain reasons. (Whole group, Pairs) 10-15 min.

a. With the whole group, go over the directions and place one fraction card together.

b. Working in pairs, students take turns sorting the cards and explaining their reasons:

- One partner picks a fraction card, determines which benchmark it is closer to, and places the card in that category (**Closer to 0**, **Closer to** $\frac{1}{2}$**,** or **Closer to 1).** They **explain** their reasons using the sentence starter:

  This fraction is closer to __ because…

- Then, the partner will respond by using one sentence starter:

  I agree because… or **I disagree because…**

As pairs work, circulate to ask questions and provide additional support as needed. Have fraction tiles or circles available for students to use.

Step 2. Discuss and generalize. (Whole Group) 10 min.

a. Show the Answer Key by revealing one category at a time. Prompt students to check their own sort with the Answer Key and make corrections as needed.

- Take a look at the answers for the category [Closer to 0, $\frac{1}{2}$, 1].
- Ask: Which cards do you have a question about?

b. Engage students in discussing **one category at a time**. Use the same set of questions for each category with the corresponding benchmark number.

- What do you notice about the fractions that are closer to 0? [$\frac{1}{2}$, 1]
- Look at the visual models. How can you tell they are closer to 0? [$\frac{1}{2}$, 1]
- Look at the numbers. How can you tell these fractions are closer to 0? [$\frac{1}{2}$, 1]

Optional Questions: Which of these fractions is closest to 0? [$\frac{1}{2}$, 1] Why?

Step 3. Wrap up and reflect. (Individual and Pair/Whole Group) ~5-10 min.

a. Have students complete the exit task individually. Have students share with a partner and then with the whole group, if time allows.

b. Close the activity by summarizing the mathematics focus on comparing fractions with benchmark numbers.

Strategies in the Routine: Information for Teachers

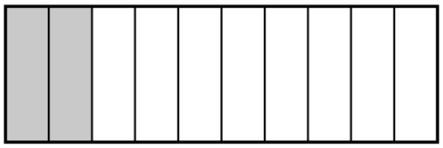
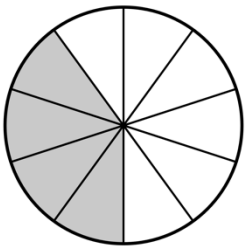
This handout has background information for teachers.

The Sort, Explain, and Generalize routine incorporates strategies from several recommendations in the WWC Guide. This **table** lists the strategies and the corresponding recommendations.

Strategies in Routine	WWC Guide Recommendations
Use **concrete** (3D) and **semi-concrete** (2D) **representations** that accurately represent fractions. • The cards have semi-concrete representations of fractions as shaded parts of circles and rectangles. • Fraction circles and tiles are used as needed. These proportional manipulatives accurately show the relative sizes of the fractions.	Representations • Systematic Instruction
Connect representations (concrete, semi-concrete, and abstract numeric) of fractions.	• Representations • Systematic Instruction
Have students **use representations to explain ideas**, such as using fraction circle pieces or a drawing to explain why a fraction is closer to 1.	• Representations • Mathematical Language • Systematic Instruction
Use **accessible fractions** and **benchmark numbers** to support students in comparing the magnitude of fractions.	• Representations • Number Lines • Systematic Instruction
Use **sentence starters** to support students in explaining their reasons for placing a fraction in a category and why they agree or disagree with a placement.	• Mathematical Language • Systematic Instruction
Pose questions to support students in explaining ideas and to find out about their understanding of fractions.	• Mathematical Language • Representations • Systematic Instruction
Use **partner work/discussions** to support students in talking about their mathematics ideas.	• Mathematical Language • Systematic Instruction
Review previously learned content by using engaging activities with opportunities for students to explain and discuss their ideas.	• Systematic Instruction

Fraction Cards: Reproducible Handout

Print and cut out these cards to make one card set per pair of students. The set has 16 cards labeled A–P. It's helpful to have students place the cards in order, starting with card A.

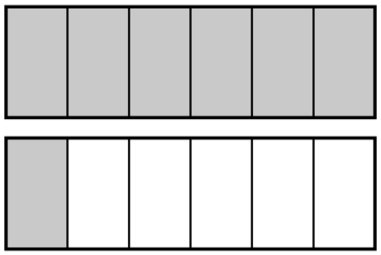
A. 	B. 
C. $\frac{9}{10}$	D. 

E.

F.

$$\frac{7}{12}$$

G.



1 large rectangle = 1 whole

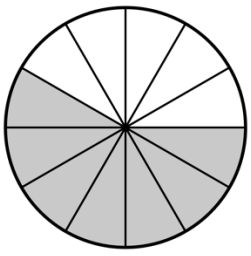
H.

$$\frac{1}{8}$$

I.

$$\frac{2}{12}$$

J.



K.

$$\frac{6}{10}$$

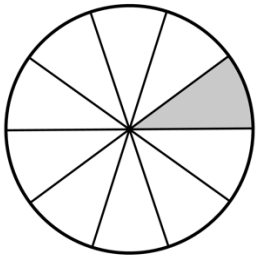
L.

$$\frac{9}{8}$$

M.

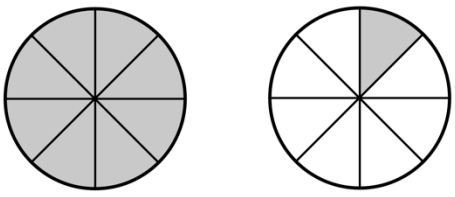
$$\frac{1}{5}$$

N.



O.

P.



1 circle = 1 whole

Category Cards: Reproducible Handout

Print and cut out the cards. Each pair of students needs one set of three cards: Closer to 0, Closer to $\frac{1}{2}$, and Closer to 1. This handout has four sets of category cards.

Closer to 0	Closer to 0
Closer to $\frac{1}{2}$	Closer to $\frac{1}{2}$
Closer to 1	Closer to 1
Closer to 0	Closer to 0
Closer to $\frac{1}{2}$	Closer to $\frac{1}{2}$
Closer to 1	Closer to 1

Sentence Starters

This page has two sets of the same sentence starters. Print and cut out copies for students to use during the sorting activity. Post them in a visible place or give copies to students.

Use these sentence starters to explain your reasons.

The fraction is closer to ___ because…

I agree because…

I disagree because…

Use these sentence starters to explain your reasons.

The fraction is closer to ___ because…

I agree because…

I disagree because…

Name:_____ Date:_____

Exit Task

1. Look at fraction card A and answer the questions.

Which benchmark number is this fraction closer to?

___ Closer to 0 ___ Closer to $\frac{1}{2}$ ___ Closer to 1

Explain your reasons for your choice.

Fraction Card A

$$\frac{5}{8}$$

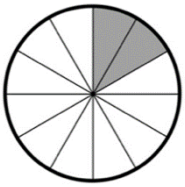
2. Look at fraction card B and answer the questions.

Which benchmark number is this fraction closer to?

___ Closer to 0 ___ Closer to $\frac{1}{2}$ ___ Closer to 1

Explain your reasons for your choice.

Fraction Card B



The shaded parts show the fraction.

3. Reflect on your learning by completing this sentence starter.

One strategy that I used to compare fractions with benchmark numbers is...

Answer Key for Card Sorting Routine

This chart shows which fraction cards belong in each category.

Closer to 0 (6 cards)	Closer to $\frac{1}{2}$ (4 cards)	Closer to 1 (6 cards)
A	B	C
E	F	D
H	J	G
I	K	L
M		O
N		P

Variation for the Routine

Use two categories for sorting the fractions. Have students compare the fractions with the benchmark of $\frac{1}{2}$. This version tends to be easier than the three-category version. Use the same fraction cards, but use these new category cards and sentence starters.

Category Cards

Less than $\frac{1}{2}$	Greater than $\frac{1}{2}$

Sentence Starters

The fraction is _____ $\frac{1}{2}$ because…
less than, greater than

I agree because…

I disagree because…