Building Skills with Brick Math
A 5-Day Program to Sharpen Basic Math Skills

Fraction Division

Program Overview

During this **Building Skills with Brick Math** program, students dive deeply into dividing fractions. They use a variety of learning techniques including manipulatives, drawing, verbal explanation, physical movement, and song. Students work with a partner, use the vocabulary fluently in math conversations, and assess themselves on their abilities.

The program is written in the following daily format:

1. Introduction to the topic
2. Teacher and students work together on the new concepts
3. Student practice
4. Movement related to concepts
5. Student independent practice
6. Content assessment
7. Story problems
8. Self-assessment on content and partnering

The Brick Math program is successful because students transfer knowledge from using manipulatives to drawing and verbal explanations.

Take the time your students need to learn each concept. Some classes will find one concept easily learned and a second concept much harder, requiring a slower pace. If all the daily activities are not completed during a session, you can choose to move the remaining activities to the following day or truncate an activity if you feel the students have fully learned the math concepts.

Day 1	**Understanding Fraction Division** • Discover the meaning of fraction division • Learn the meaning of the term reciprocal • Discover how fraction division and fraction multiplication are related	**Vocabulary** • Dividend • Divisor • Quotient • Reciprocal • Multiplicative Inverse • Division
Day 2	**Dividing a Fraction by a Fraction** • Dividing fractions by fractions • Discover how fraction division and fraction multiplication are related • Apply the term reciprocal	**Vocabulary** • Dividend • Divisor • Quotient • Reciprocal • Multiplicative Inverse • Division
Day 3	**Dividing a Whole Number by a Fraction** • Divide a whole number by a fractional part • Discover that the result of a fractional division of a whole number will result in a number larger than the whole number dividend in the problem if the fraction is proper • Learn the role of multiplicative inverse in the process of dividing a whole number by a fraction	**Vocabulary** • Dividend • Divisor • Quotient • Reciprocal • Multiplicative Inverse • Division

Day 4	**Dividing a Mixed Number by a Fraction** • Divide mixed numbers by fractions • Represent division of mixed numbers using a linear model	**Vocabulary** • Dividend • Divisor • Quotient • Reciprocal • Multiplicative Inverse • Division • Mixed number
Day 5	**Word Problems** • Use fraction division in everyday life situations	**Vocabulary** • Dividend • Divisor • Quotient • Reciprocal • Multiplicative Inverse • Division • Mixed number

Common Core Math Standards addressed:

Note: If your school uses other standards, please refer to these standards as a guide.

Materials Needed
- Brick Math Fraction Division Teacher Edition book
- Brick Math Fraction Division Student Edition book (one per student)
- Brick Math brick sets – (one per student or one per pair of students)
- Math journal - can be created from lined paper stapled together with a tagboard cover or a spiral notebook (one per student – will be used daily)
- Chart paper
- Markers (one set per student or pair of students)
- Colored pencils or crayons (one set per student or pair of students)
- Pencils (one per student)
- Cardstock (one per student)
- Dice (one die per student)
- Optional: Foam sheets or shelf liner cut into rectangles approximately 12" x 18" (one sheet per student)

Before the first day:

1. Read the Introduction and How to Teach with Brick Math on pages 5-10 in the *Fraction Division Teacher Edition.*

2. Label all the Brick Math brick sets your students will use. Choose a system such as Set 1, Set 2, Set 3, etc., or Zebra, Elephant, Tiger, etc.

3. Assign one brick set to each student or pair of students. They will use this same set every day. This materials management step allows the students to be responsible for their pieces. At the end of each day, the students will inventory one compartment of bricks in the box at your direction.

4. Students will need the following supplies:
   - One Brick Math Fraction Division Student Edition book per student. If you are using PDFs, you will need to make copies of all the specific pages in each day's lesson so students can correctly show and explain their work and make the knowledge transfer from manipulatives to drawings and verbal explanations.
   - Colored pencils or crayons (one set per student or pair of students)
   - Student journals you have prepared (one per student)
   - Optional: One foam sheet or shelf liner cut into a 12" x 18" rectangle per student. These sheets help keep the bricks from sliding off desks and tables.

Note: There are blank baseplate paper templates on pages 51 - 52 in the Fraction Division Teacher Edition book. They may be helpful for the daily story problem activities. Make additional copies of blank baseplate paper as needed.

Day 1 – Parts of a Fraction

Welcome

Tell the students something similar to the following:

> *Welcome! We are going to do a lot of interesting activities this week. We are going to build with LEGO® Bricks, work with a partner, create a team name, exercise with numbers, and more. Are you ready to get started?*

Show the students a Brick Math brick set.

Say:

> *First, I want to show you the brick set. What colors do you see? Each color has a name. Each of you has a name. We need to learn all the names of the people in our class and the names of the bricks. I would like you to sit in a large circle. Each person will say his or her name. Then, please choose one*

piece from the set. Tell us which color piece you chose and something about the piece.

I will start.

My name is _____. I chose a purple brick because purple is the same color as my favorite flower.

Go around the room with the brick set so each student can select a brick. After each person has said his or her name and chosen a brick, have the class repeat the names. For example: "Mrs. Smith, Paula, Alan, Rebecca." Then, if the next child is Ben, you would all say together: "Mrs. Smith, Paula, Alan, Rebecca, Ben." When all the students have said their names, have the students who chose a particular color stand with their bricks in their hands.

Say:

Everyone who chose a purple brick, please stand. Let's see if we can remember their names. Together, let's say the names of the children who are standing.

Say all the students' names, then have them sit down. Continue with different colors until all the children have stood and been called by name.

Look at the shapes of the bricks chosen. Explain to the students how the shapes also have names.

Explain to students how to name the bricks. Start with your brick. Perhaps you chose a 2x2 brick. Show students your brick. If you want, pass it around.

Say:

This is called a 2x2 brick because it is a square with 2 studs or bumps on one side (width) and 2 studs or bumps on another side (length).

Show students a 1x1 brick.

Say:

Can you guess what this brick is called? It has 1 stud in width and 1 stud in length – but it has a total of only 1 stud.

Make sure students understand that it is a 1x1 brick. Then show students a 1x6 brick. Continue to go through the bricks until students can do a good job of naming the bricks.

Ask the students to go around the circle and tell the name of the brick they chose. If a student is not sure or names it incorrectly, ask the student to count the width and length in studs, then help with the correct name.

When all the bricks have been named, ask the students to put the bricks into the proper location in the set. Their pieces should match the compartment or area in the container so the brick "family" will be all together.

Fractions

Have students sit in two groups. Ask the class to look around the room.
Tell students the *whole* class has been *divided* into *two groups*. (You may need to be part of one group to make it even.) The class has been divided in half or into two groups. The two is the *denominator* or the number that represents *how many groups* one whole is divided into. The denominator is the bottom number of a fraction.

Have students look around the room and see things that they could divide into two or three equal parts. For example, the windows in the room might be divided in half (two equal panes). Or they could divide the number of desks or tables evenly into two or three groups. If the desks or tables were divided into three groups, the fraction would be 1/3 instead of 1/2.

Help students think about the concept of fractions by having them explain their ideas of dividing items in the room. What items are easily divided into two groups? What items are more easily divided into three groups?

Show students the fraction 1/3.
Ask students to name the top number in a fraction. [numerator, in the fraction 1/3, the numerator is 1]
Ask students to name the bottom number in a fraction. [denominator, in the fraction 1/3, the denominator is 3]

Give students the equation $5 \div \frac{1}{2} = ?$
Ask students which number is the dividend. [5]
Ask students which number is the divisor. [1/2]
Ask students what represents the quotient. [?]

Ask students if they have heard the term "reciprocal"? If some students have, allow them to explain. Make sure students know that a reciprocal is one of a pair of numbers that when multiplied together equals 1.

Give students the cards with fractions and mixed numbers.
Ask them to find the reciprocals for each – and that some numbers may have more than one way to write a reciprocal. Ask students would a reciprocal be easier to work with if it were a mixed number or a fraction. [Generally, a fraction]

  1/2 [2]
  2 [1/2]
  1/3 [3]
  3 [1/3]
  5/9 [9/5, 1-4/5]
  9/5 [5/9]
  2/3 [3/2, 1-1/2]
  3/2 [2/3]
  3/4 [4/3, 1-1/3]
  4/3 [3/4]
  2/7 [7/2, 3-1/7]
  7/2 [2/7]
  1-4/5 [5/9]
  1-1/2 [2/3]
  1-1/3 [3/4]
  3-1/2 [2/3]

Have students return the cards.

Math Journals
Give each student a journal. Tell students they will be using the math journal every day.
Give students 5-10 minutes to decorate the covers with markers or colored pencils.

Tell students that they will be working with a partner during the program and that they can learn from each other.
Say:
  Are you ready to work with a partner and do some fun building while you learn about fractions?

Working with a Partner

Ask students their favorite thing about working with a partner. Then ask them what is the best way to work with a partner. Help students create answers like the following:

- Partners share the work, but neither person does the other one's work.
- Partners learn together and can help each other learn.
- Partners communicate (talk) kindly with each other.
- Partners care about each other.
- Partners do not give each other the answers but help the other person understand how to find an answer.

Create a set of Partner Rules and put them on chart paper and display them in the classroom so you can refer to them as needed.

Choose two students to be partners and assign them a place to sit at desks or tables. Students of the same ability level tend to work well together. Have each set of partners move to that location as you assign them. Give the pair of students their Brick Math materials (either one set for two people or one set per person.) Tell each group that they always get set #X when it is time to gather materials. Tell the class that each team is responsible for all the bricks being returned to the set every time the set is used.

When all the students have their sets, give every student a 20x20 baseplate.

Say:

> You will work together every day. Being a partner is an important responsibility. You need to help one another and be kind to your partner.

Students take bricks from the divided box as needed.

Understanding Fraction Division
Part 1: Show Them How
Follow the instructions on page 12in the Brick Math Fraction Division Teacher Edition. Students complete page 5, Part 1, #1-3 in the Brick Math Fraction Division Student Edition.

Follow the instructions on pages 13-14 in the Brick Math Fraction Division Teacher Edition. Complete Problem #1. Students complete pages 6-7, Problem #1, Steps 1-6 in the Brick Math Fraction Division Student Edition.

Follow the instructions on pages 14-15 in the Brick Math Fraction Division Teacher Edition. Complete Problem #2. Students complete pages 7-8, Problem #2, Steps 1-6 in the Brick Math Fraction Division Student Edition.

Follow the instructions on pages 15-16 in the Brick Math Fraction Division Teacher Edition. Complete Problem #3. Students complete pages 8-9, Problem #3, Steps 1-5 in the Brick Math Fraction Division Student Edition.

Move with Music

Time for some movement! Show students the Keep, Change, Flip from Instructabeats. Then have students stand and move into small groups of their choice. Have students start to sing along as they wish. Ask students how the Keep, Change, Flip is part of the building process they are using.

Divide the class into two equal groups. You may have to join a group to make them equivalent. Ask students to model a fraction problem 1/2 ÷ 1/4 using people. [They may have 4 people divided into two groups of 2.] [Answer is 2.]

Ask students to model the problem 1/4 ÷ 1/2 [This will be a bit harder for them, potentially, because it is hard to break a person into parts.] [Answer is 1/2.]

Part 2: Show What You Know

Read aloud the instructions for Part 2, #1 on page 16 in the Brick Math Fraction Division Teacher Edition. Students complete page 9, Part 2, #1 in the Brick Math Fraction Division Student Edition.

Read aloud the instructions for #2 on pages 16-17 in the Brick Math Fraction Division Teacher Edition. Students complete page 10, #2 in the Brick Math Fraction Division Student Edition.

Read aloud the instructions for #3 on page 18 in the Brick Math Fraction Division Teacher Edition. Students complete page 11, #3 in the Brick Math Fraction Division Student Edition.

Content Assessment

Tell students that they will complete the Content Assessment on their own. However, they will ask their partners to check the work *after* they have completed the assessment. Partners check the work but they should not change their partner's models nor write anything on another person's paper. Partners discuss the differences they might have on an answer.

Students complete Assessment #1 on page 12 in the Brick Math Fraction Division Student Edition.

Discuss the answers with the class. Help students to improve their answers as needed.

Students complete Assessment #2 on page 13 in the Brick Math Fraction Division Student Edition.

Ask partners to check the work but explain that they should not change their partner's model or write anything on another person's paper. They should only discuss this with their partners. Walk around the room and check students' work.

Students complete Assessment #3 on page 13 in the Brick Math Fraction Division Student Edition.

Ask partners to check the work. Walk around the room and check students' work.

Story Problem

Tell students a story problem like the following:

> Juan had ½ of a candy bar. He shared the candy bar with his friend
> Antonio. He and Antonio divided half of a candy bar into 4 equal pieces.
> What fraction of a complete candy bar did each small piece represent?
> [1/2 ÷ 4/1 = 1/2 x 1/4 = 1/8]

Students use their brick sets and journals to answer the story problem.

Have each pair work together to create a new story problem using brick models. Have students write the story problem they created in their journals.

As time allows, have students share their stories and models with at least one other team.

Inventory Check

Have students place all the bricks they have used today back into the correct compartments of the Brick Math box.

Have the students remove all the 1x2 bricks from the box and count them. After the students have verified the number (30), they replace those bricks into the compartment and give you a thumbs-up. The brick set is ready for collection and storage.

Self-Assessment

Remind students about the partner's rules they created earlier today. Refer to the Partner's Rules Chart to refresh their memories.

Ask students to use the journals. Students need colored pencils or crayons to complete.

Ask students to write the word "partner" in their journals. Read aloud the statements to the students and have them draw the correct color brick.

Students should draw a specific color brick after the word "partner" based on the following:
Say:

> *I need to work on being a better partner. I did not listen to and help my partner as I should have.*
> *If this describes you today, draw an orange brick after the word "partner."*

> *I was a good partner today. I helped my partner but sometimes I did their work for them or I let them do my work.*
> *If this describes you today, draw a green brick after the word "partner."*

> *I was a very good partner today. I helped my partner by checking their work and not by doing their work. If this describes you today, draw a blue brick after the word "partner."*

Ask students to write "*I can identify the reciprocal of a number or fraction*" in their journals. Students should draw a specific color brick after the words "*I can identify the reciprocal of a number or fraction*" based on the following self-assessment.
Say:

> *I need help identifying the reciprocal of a number or fraction. If this describes you today, draw an orange brick after the words "I can identify the reciprocal of a number or fraction."*

I can identify the reciprocal of a number or fraction. If this describes you today, draw a green brick after the words "I can identify the reciprocal of a number or fraction."

I can help others identify the reciprocal of a number or fraction. If this describes you today, draw a blue brick after the words "I can identify the reciprocal of a number or fraction."

Day 2 – Dividing a Fraction by a Fraction

Welcome

Welcome students back to day 2 of Building Skills with Brick Math.

Ask students to welcome their partners and tell them that they look forward to working together.

Ask students if they can remember how to identify the reciprocal of a number.

> 1/8 [8/1 or 8]
> 2/3 [3/2 or 1-1/2]
> 4/5 [5/4 or 1-1/5]
> 1-2/3 [3/5]
> 2-2/7 [7/16]

Tell students that today they will create team names and fractional division.

Have students team up with their partners and get colored pencils or crayons and one cardstock or tagboard sheet per team.

Show students an example of a team name and a fraction.

Example: All Stars and 7/8 ÷ 1/2

Partners work together to determine a team name and then write the name in the middle of the sheet. Partners should determine a fraction.

Have students color the edge of the sheet with the numbers in the division problem. In the example above, they could draw and color seven slices of a pizza cut into 8 slices and divide each of the slices in half.

Working with a Partner

Remind students of the partner rules created on Day 1. Have students share one good thing they saw a partner do yesterday.

Have students get their assigned brick set(s) and 2 baseplates for their team.

Dividing a Fraction by a Fraction

Have ten students stand in a single line of ten. Ask the class how many students are in the line. [10]

Ask the students to break the group of ten into two equal groups. Ask students what each group represents using a fraction. [$10 \div 2 = 5,\ 5/10$ equals 1/2 of the group.]

Ask students to work together to create another fraction of students by dividing a group. Have them explain the fraction they are creating.

Have students draw and explain in their journals how they could show the reciprocal of 1/4. Have partners share what they drew and wrote with at least one other set of partners.

Have students return to their desks/tables with their partners.

Part 1: Show Them How

Follow the instructions on page 20 in the Brick Math Fraction Division Teacher Edition. Complete Problem #1. Students complete page 14, Problem #1, Steps 1-3 in the Brick Math Fraction Division Student Edition.

Follow the instructions on page 21 in the Brick Math Fraction Division Teacher Edition. Complete Problem #2. Students complete page 15, Problem #2, 1-5 in the Brick Math Fraction Division Student Edition.

Move with Music

Have students work in groups of 3 or 4 to create a rhyme or rap. Current partners should not work together. Ask students to create a rhyme or rap that helps them remember how to divide fractions. All students in the group write the words they create in their journals. They will add to their rhyme or rap tomorrow.

Have students return to their desks/tables with their partners. Have partners compare the rhymes or raps created. Each student should determine which rhyme or rap helps them understand and remember how to divide fractions. If a student likes a different version than the one he or she worked on, that student should add it to the journal.

Part 2: Show What You Know

Read aloud the instructions on page 22 in the Brick Math Fraction Division Teacher Edition.
Students complete page 16, Problem #1 in the Brick Math Fraction Division Student Edition.

Read aloud the instructions on page 23 in the Brick Math Fraction Division Teacher Edition.
Students complete page 17, Problem #2 in the Brick Math Fraction Division Student Edition.

Read aloud the instructions on page 24 in the Brick Math Fraction Division Teacher Edition.
Students complete page 18, Problem #3 in the Brick Math Fraction Division Student Edition.

Content Assessment
Remind students that they will complete the Content Assessment on their own. However, they will ask their partners to check the work *after* they have completed the assessment. Partners check the work but they should not change their partner's models nor write anything on another person's paper. Partners discuss the differences they might have on an answer.

Students complete the Assessment on pages 19-20 in the Brick Math Fraction Division Student Edition.
Discuss the answers with the class. Help students to improve their answers as needed.

Story Problem
Tell students a story problem like the following:

> Julia plans to volunteer for 4-1/2 hours on Saturday. She wants to work 1-1/2 hours at each charity. How many charities can she volunteer with on Saturday? [9/2 ÷ 3/2 = 3 charities]

Help students complete the story problem, build models, and explain the fraction and the fractional number of the whole.

Have each pair work together to create a new story problem that they can model with bricks. Have students write the story problem they have created in their journals.

As time allows, have students share their stories and models with at least one other team.

Inventory Check

Have students place all the bricks they have used today back into the correct compartments of the Brick Math box.

Have the students remove all the 2x2 bricks from the box and count them. After the students have verified the number (20), they replace those bricks into the compartment and give you a thumbs-up. The brick set is ready for collection and storage.

Self-Assessment

Ask students to use their journals. Students need colored pencils or crayons to complete.

Ask students to write the word "partner" in their journals. Read aloud the statements to the students and have them draw the correct color bricks.

Students should draw a specific color brick after the word "partner" based on the following:
Say:

> *I need to work on being a better partner. I did not listen to and help my partner as I should have.*
> *If this describes you today, draw an orange brick after the word "partner."*

> *I was a good partner today. I helped my partner but sometimes I did their work for them or I let them do my work.*
> *If this describes you today, draw a green brick after the word "partner."*

> *I was a very good partner today. I helped my partner by checking their work and not by doing their work. If this describes you today, draw a blue brick after the word "partner."*

Ask students to write "I can divide a fraction by a fraction" in their journals.
Students should draw a specific color brick after the words "I can divide a fraction by a fraction" based on the following:
Say:

> *I need help dividing a fraction by a fraction. If this describes you today, draw an orange brick after the words "I can divide a fraction by a fraction."*

> *I can divide a fraction by a fraction. If this describes you today, draw a green brick after the words "I can divide a fraction by a fraction."*

I can help others divide a fraction by a fraction If this describes you today, draw a blue brick after the words "I can divide a fraction by a fraction."

Day 3 – Dividing a Whole Number by a Fraction

Welcome

Ask students if they remember which part of a fraction is the numerator and which part is the denominator. Have them tell the numerator and denominator for the following fractions:

1/4 [numerator 1, denominator 4]

2/3 [numerator 2, denominator 3]

8/9 [numerator 8, denominator 9]

Ask students to identify the reciprocal for each fraction.

1/4 [4/1]

2/3 [3/2]

8/9 [9/8]

Ask students to determine the dividend, the divisor, and the quotient in the following equations:

1/3 ÷ 3/4 = 4/9 [Dividend 1/3, Divisor 3/4, Quotient 4/9]

1/2 ÷ 5/6 = 3/5 [Dividend 1/2, Divisor 5/6, Quotient 6/10 = lowest terms 3/5]

2/9 ÷ 1/7 = 14/9 or 1-5/9 [Dividend 2/9, Divisor 1/7, Quotient 14/9 = lowest terms as a mixed number 1-5/9]

Ask students about taking a number to lowest terms. Why and how can you tell when a fraction is really in lowest terms?

Working with a Partner

Remind students of the partner rules created on Day 1. Have students share with the class one good thing they did as a partner yesterday.

Have students find their partners and go to their desks/tables. Have students get their assigned brick set(s) and two baseplates for their team.

Part 1: Show Them How

Follow the instructions on page 26, Part 1 in the Brick Math Fraction Division Teacher Edition. Students complete page 21, Part 1, in the Brick Math Fraction Division Student Edition

Follow the instructions on page 26 in the Brick Math Fraction Division Teacher Edition. Complete Problem #1, steps 1 - 3. Students complete pages 21 - 22, Problem #1, steps 1 - 3 in the Brick Math Fraction Division Student Edition.

Follow the instructions on pages 27 - 28 in the Brick Math Fraction Division Teacher Edition. Complete Problem #2, steps 1 - 5. Students complete page 23, Problem #2, steps 1 - 5 in the Brick Math Fraction Division Student Edition.

Follow the instructions on page 29 in the Brick Math Fraction Division Teacher Edition. Complete Problem #3, steps 1 - 3. Students complete page 24, Problem #3, steps 1 - 3 in the Brick Math Fraction Division Student Edition.

Move with Fractions

Give each student a die. Have students work with a partner other than their regular partner. Have each student designate if they are Partner A or Partner B.
Partner A rolls his or her die to create a dividend number.
Partner B rolls his or her die to create a divisor fraction.
Both partners use their journals to write the equation and solve it. They may use a brick set as needed. When the partners agree on the answer they should stand up.

Have all students change partners. Partner A should look for a new Partner B and vice versa. Allow no more than 30 seconds to find a new partner. Students sit and roll their dice to create new problems and use their journals and sets (as needed) to solve them.
Repeat this activity three additional times until all students have completed 5 problems.
Collect the dice and have students return to work with their regular partners.

Part 2: Show What You Know

Read aloud the instructions for Problem #1 on page 30 in the Brick Math Fraction Division Teacher Edition. Students complete Problem #1 on page 25, steps 1 - 4 in the Brick Math Fraction Division Student Edition.

Read aloud the instructions for Problem #2 on page 31 in the Brick Math Fraction Division Teacher Edition. Students complete page 26, Problem #2, steps 1 - 3 in the Brick Math Fraction Division Student Edition.

Read aloud the instructions for Problem #3 on page 32 in the Brick Math Fraction Division Teacher Edition. Students complete page 27, Problem #3, steps 1-4 in the Brick Math Fraction Division Student Edition.

Content Assessment

Remind students that they will complete the Content Assessment on their own. However, they will ask their partners to check the work *after* they have completed the assessment. Partners check the work but they should not change their partner's models nor write anything on another person's paper. Partners discuss the differences they might have on an answer.

Students complete Assessment #1 on page 28 in the Brick Math Fraction Division Student Edition. Discuss the answers with the class. Help students to improve their answers as needed.

Students complete Assessment #2 on page 28 in the Brick Math Fraction Division Student Edition.
Ask partners to check the work but explain that they should not touch the brick model or write anything on another person's paper. They should only discuss this with their partners. Walk around the room and check students' work.

Students complete Assessment #3 on page 29 in the Brick Math Fraction Division Student Edition.
Ask partners to check the work but explain that they should not touch the brick model or write anything on another person's paper. They should only discuss this with their partners. Walk around the room and check students' work.

Story Problems

Tell students a story problem like the following:

> Cecilia and Erin each have 6 bars of candy to share. They want to divide each bar into 1/8 sections. How many sections will they have? [6 ÷ 1/8 = 48 sections]

Help students complete the story problem, build a model, and explain the answer.

Have students work with their partners to solve the story problem and write the answer in their journals.

Have each pair work together to create a new story problem, build a model and explain the answer. Have students write the story problem they have created in their journals.

As time allows, have students share their stories and models with at least one other team.

Inventory Check

Have students place all the bricks they have used today back into the correct compartments of the Brick Math box.

Have the students remove all the 2x3 bricks from the box and count them. After the students have verified the number (10), they replace those bricks into the compartment and give you a thumbs-up. The brick set is ready for collection and storage.

Self-Assessment

Ask students to use their journals to complete the self-assessment. Students need colored pencils or crayons to complete.

Ask students to write the word "partner" in their journals. Read aloud the statements to the students and have them draw the correct color brick.

Students should draw a specific color brick after the word "partner" based on the following:
Say:

> *I need to work on being a better partner. I did not listen to and help my partner as I should have.*
> *If this describes you today, draw an orange brick after the word "partner."*

I was a good partner today. I helped my partner but sometimes I did their work for them or I let them do my work.
If this describes you today, draw a green brick after the word "partner."

I was a very good partner today. I helped my partner by checking their work and not by doing their work. If this describes you today, draw a blue brick after the word "partner."

Ask students to write "I can divide a whole number by a fraction" in their journals. Students should draw a specific color brick after the words "I can divide a whole number by a fraction" based on the following:

Say:

I need help dividing a whole number by a fraction. If this describes you today, draw an orange brick after the words "I can divide a whole number by a fraction."

I can divide a whole number by a fraction. If this describes you today, draw a green brick after the words "I can divide a whole number by a fraction."

I can help others divide a whole number by a fraction. If this describes you today, draw a blue brick after the words "I can divide a whole number by a fraction."

Day 4 – Dividing a Mixed Number by a Fraction

Welcome

Welcome students to Day 4. Ask students if they remember how to divide a whole number by a fraction. Ask them how to make a whole number into a fraction. [The whole number becomes the numerator and the denominator is 1.]

Ask students how to make a mixed number into a fraction. [Multiple the whole number by the denominator and add it to the numerator. The result is the new numerator and the denominator stays the same.]

Ask students to create a fraction and explain the process for the following mixed numbers:
1-2/3 [5/3]
4-1/2 [9/2]
5-4/5 [29/5]
[The process is to multiply the whole number by the denominator and add the result to the numerator. The sum becomes the numerator and the denominator stays the same.]

Have students find their partners and go to their places at the desks or tables. Have students get the correct Brick Math set(s) and two baseplates for their team.

Working with a Partner

Remind students of the partner rules created on Day 1. Have students share something with their partners that they appreciate about working with that person.

Part 1: Show Them How

Follow the instructions for Part 1 on pages 34-35 in the Brick Math Fraction Division Teacher Edition. Students complete page 30, Part 1 in the Brick Math Fraction Division Student Edition.

Follow the instructions for Problem #1 on page 35 in the Brick Math Fraction Division Teacher Edition. Complete 1-4. Students complete pages 30-31, Problem #1, 1-4 in the Brick Math Fraction Division Student Edition.

Follow the instructions for Problem #2 on page 36 in the Brick Math Fraction Division Teacher Edition. Complete 1-4. Students complete page 32, Problem #2, 1-4 in the Brick Math Fraction Division Student Edition.

Follow the instructions for Problem #3 on pages 37-38 in the Brick Math Fraction Division Teacher Edition. Complete 1-4. Students complete page 33, Problem #3, 1-4 in the Brick Math Fraction Division Student Edition.

Move with Fractions

Students will use dice and their student journals for this activity.

Give each student a die. Have students work with a partner other than their regular partner. Have each student designate if they are Partner A or Partner B.

Partner A rolls his or her die to create a dividend mixed number - three rolls one for a whole number, one for a numerator, and one for a denominator.

Partner B rolls his or her die to create a divisor fraction.

Both partners use their journals to write the equation and solve it. They may use a brick set as needed. When the partners agree on the answer they should stand up.

Have all students change partners. Partner A should look for a new Partner B and vice versa. Allow no more than 30 seconds to find a new partner. Students sit and roll their dice to create new problems and use their journals and sets (as needed) to solve them.

Repeat this activity three additional times until all students have completed 5 problems. Collect the dice and have students return to work with their regular partners.

Part 2: Show What You Know

Read aloud the instructions for Problem #1, steps 1-4 on page 38 in the Brick Math Fraction Division Teacher Edition. Students complete page 34, Problem #1, steps 1-4 in the Brick Math Fraction Division Student Edition.

Read aloud the instructions for Problem #2, steps 1-5 on page 39 in the Brick Math Fraction Division Teacher Edition. Students complete pages 35-36, Problem #2, steps 1-5 in the Brick Math Fraction Division Student Edition.

Read aloud the instructions for Problem #3, steps 1-5 on page 40 in the Brick Math Fraction Division Teacher Edition. Students complete page 37, Problem #3, steps 1-5 in the Brick Math Fraction Division Student Edition.

Content Assessment
Remind students that they will complete the Content Assessment on their own. However, they will ask their partners to check the work *after* they have completed the assessment. Partners check the work but they should not change their partner's models nor write anything on another person's paper. Partners discuss the differences they might have for an answer.

Students complete Assessment #1 on page 338 in the Brick Math Fraction Division Student Edition.
Discuss the answers with the class. Help students to improve their answers as needed.

Students complete Assessment #2 on page 38 in the Brick Math Fraction Division Student Edition.
Ask partners to check the work but explain that they should not touch the brick model or write anything on another person's paper. They should only discuss this with their partners. Walk around the room and check students' work.

Students complete Assessment #3 on page 39 in the Brick Math Fraction Division Student Edition.
Ask partners to check the work. Walk around the room and check students' work.

Story Problem
Tell students a story problem like the following:

Davie and Howie were planning a 4-1/2 mile walk to raise money for charity. Howie said they should put water every 3/4 mile so no one gets dehydrated. How many water stations should they have? [4-1/2 ÷ 3/4 = 6 water stations]

Help students complete the story problem.

Have each pair work together to create a new story problem that they can model with bricks and explain how they determined the answer. Have students write the story problem they have created in their journals.

As time allows, have students share their stories and models with at least one other team.

Inventory Check

Have students place all the bricks they have used today back into the correct compartments of the Brick Math box.

Have the students remove all the 1x3 bricks from the box and count them. After the students have verified the number (20), they replace those bricks into the compartment and give you a thumbs-up. The brick set is ready for collection and storage.

Self-Assessment

Ask students to use their journals to complete the self-assessment. Students need colored pencils or crayons to complete.

Ask students to write the word "partner" in the blank space at the bottom of page 44. Read aloud the statements to the students and have them draw the correct color brick.

Students should draw a specific color brick after the word "partner" based on the following:
Say:

> *I need to work on being a better partner. I did not listen to and help my partner as I should have.*
> *If this describes you today, draw an orange brick after the word "partner."*
>
> *I was a good partner today. I helped my partner but sometimes I did their work for them or I let them do my work.*
> *If this describes you today, draw a green brick after the word "partner."*
>
> *I was a very good partner today. I helped my partner by checking their work and not by doing their work. If this describes you today, draw a blue brick after the word "partner."*

Ask students to write "I can divide mixed numbers by fractions" in their journals. Students should draw a specific color brick after the words "I can divide mixed numbers by fractions" based on the following:

Say:

I need help dividing mixed numbers by fractions. If this describes you today, draw an orange brick after the words "I can divide mixed numbers by fractions."

I can divide mixed numbers by fractions. If this describes you today, draw a green brick after the words "I can divide mixed numbers by fractions."

I can help others divide mixed numbers by fractions. If this describes you today, draw a blue brick after the words "I can divide mixed numbers by fractions."

Day 5 – Word Problems

Welcome

Welcome students to Day 5, the final day of the course!

Ask the students if they can think of ways that people use fractions and specifically fraction division in the real world.

Ask students if they can think of a way to use fraction division in measuring distance. [Perhaps dividing up a track into parts or finding the distance of a portion of the track.]

Ask students if they can think of a way to use fraction division in measuring ingredients. [Perhaps dividing portions in a recipe to make a smaller portion.]

Have students find their partners and go to their places at the desks or tables.

Working with a Partner

Remind students of the partner rules created on Day 1. Have students write a thank-you note to their partner. They will give the thank-you notes to their partners at the end of the day.

Have students get the correct Brick Math set(s) and two baseplates for their team.

Part 1: Show Them How

Follow the instructions for Problem #1 on pages 42-43 in the Brick Math Fraction Division Teacher Edition. Complete 1-4. Students complete pages 40-41, Problem #1, 1-4 in the Brick Math Fraction Division Student Edition.

Follow the instructions for Problem #2, on pages 43-44 in the Brick Math Fraction Division Teacher Edition. Complete Problem 2, 1-4. Students complete pages 41-42, Problem #2, 1-4 in the Brick Math Fraction Division Student Edition.

Follow the instructions for Problem #3, on pages 44-45 in the Brick Math Fraction Division Teacher Edition. Complete Problem 3, 1-4. Students complete pages 43-44, Problem #3, 1-4 in the Brick Math Fraction Division Student Edition.

Move to Factors

Choose four students to come to the front of the room. Each student represents 3/4 of a mile that will be run in a race. Tell students they need to create a way to show how each section will have a check station at intervals of 1/3 the section to ensure that all participants are on the correct course and are healthy. Have students work together to show how many check stations will be needed and how far apart the check stations will be.

Part 2: Show What You Know

Read aloud the instructions for Problem #1 on page 46 in the Brick Math Fraction Division Teacher Edition. Students complete page 45, #1 in the Brick Math Fraction Division Student Edition.

Read aloud the instructions for Problem #2 on page 46 in the Brick Math Fraction Division Teacher Edition. Students complete page 46, #2 in the Brick Math Fraction Division Student Edition.

Read aloud the instructions for Problem #3 on page 47 in the Brick Math Fraction Division Teacher Edition. Students complete page 47, #3 in the Brick Math Fraction Division Student Edition.

Read aloud the instructions for Problem #4 on page 47 in the Brick Math Fraction Division Teacher Edition. Students complete page 48, #4 in the Brick Math Fraction Division Student Edition.

Content Assessment

Students complete Assessment #1 on page 49 in the Brick Math Fraction Division Student Edition.
Discuss the answers with the class. Help students to improve their answers as needed.

Students complete Assessment #2 on pages 50-51 in the Brick Math Fraction Division Student Edition.
Ask partners to check the work but explain that they should not touch the brick model or write anything on another person's paper. They should only discuss this with their partners. Walk around the room and check students' work.

Story Problem

Tell students a story problem like the following:

> Tonica and Gerri were trying to make a schedule so they can equally split the 1-1/3 hours they have after school to get things done before their parents come home. They need to read and wash the dishes. They also want to watch TV and play video games. How much time will they spend on each activity?

Have students write the equation in their journals after building a model.

Have each pair work together to create a new story problem that they can model with bricks. Have students write the story problem they have created in their journals.

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As time allows, have students share their stories and models with at least one other team.

Optional Parent Activity and Materials Check-In

Allow parents to come to the classroom for the last 20 minutes of the day.
Each parent will work with their child. The child will be the teacher for these activities and will help their parents learn how to use the bricks.

If a parent is unable to attend, the student can do the activity on their own or with a partner.

Ask students to show their parents how to build a model to show 1/3 ÷ 1/4 = ? [4/3 or 1-1/3]

Have students ask their parents to build a model to show 2/3 ÷ 1/2 = ? [1/3]

Have a cheer for the parents and students!

If time allows, ask students to show their parents how to build a model to show 3-1/2 ÷ 1/4 = ? [14]
Have a cheer for the parents and students!

Inventory Check

Place all the bricks back in the correct compartments in the box.

Ask the students and parents to spot-check the compartments and make sure all the bricks are in the correct locations. Have students look on the floor to find any stray bricks.

Have each team bring their materials to you in numerical order so you can keep track of your sets. You should have your sets in order and organized for the next use.

Have each student give their partner the thank-you note that they wrote this morning.

Give each child or parent the completed Student Assessment Chart, noting growth in Fraction Division.

Tell everyone thanks for coming!