General Information

Lesson Parts & Duration

Total Duration: 2 to 2 ½ hours

- Segment 1: Synthesizing Text Features (photographs) *(45 Minutes)*
- Segment 2: Synthesize Text and Key Details, Cause & Effect, & Vocabulary *(30-45 Minutes)*
- Segment 3: Synthesize Text and Key Details, Cause & Effect, Vocabulary, and Summary *(45 Minutes)*
- Segment 4: Geometry and Science & Haiku Poem *(30 Minutes)*

Subject(s)

- Informational Texts: "The Mendenhall Glacier" & "Thermal Expansion" by Janna Duffy
- Synthesize Text and Key Details, Cause & Effect, Vocabulary, and Summary (RI. 4.1-4.4)

Objective

- Students will take literal interpretation of informational text to evaluation and synthesizing.
- Students will produce a "book" which includes: cause and effect, vocabulary and key details.
- Students will use the "book" they create to write a summary of the informational texts.
- Students will create a visual comparison of glaciers and ice cubes.
- Students will write a Haiku poem that captures the intent of "The Mendenhall Glacier."

Materials

- **Required:** copies of Informational Texts, (pages 12-13), **or** display on a document camera (optional)
- blank pieces of white paper
- lined pieces of paper
- pencil and crayons (markers or colored pencils)
- **Optional:** document camera or similar device to share color photos, text, and drawings with class
- **Optional:** dictionaries
- **Optional:** printable pictures (page 11) (if technology is not available, color copies of the pictures are needed)
- **Optional:** printable "Break Up Your Day" brain/movement break ideas (page 16)

Protocols (on page 15)

- Used throughout lesson - be familiar with each protocol.
- Place Protocols under a document camera (if available) as necessary throughout the lesson.

Throughout these lessons, you will find:

- ***Scripted Text*** indicates things that need to be said directly. Bullets starting with a **"T"** followed by *italicized type* indicate scripted text
- **Clarifiers** within scripted text are in orange
- **Teacher Directions** indicate things you should be doing
- **Side notes** provide helpful hints, ELL strategies, differentiation and information
- **Break Up Your Day** (Brain/Movement Breaks) are in green boxes (at the end)

Remember!

Quality over quantity. All components do not have to be accomplished; lessons may be ended at any time and resumed later.

Instructional Plan: Segment 1: 45 minutes

Subject

- Synthesize Text Features (photographs)

Objective

- Students will take literal interpretation of informational text to evaluation and synthesizing.

Materials

- blank pieces of white paper
- pencil and crayons (markers or colored pencils)
- **Resources:** document camera or similar device to share color photos, text, and drawings with class
- **Optional:** printable pictures (page 11) (if technology is not available, color copies of the pictures are needed)

Distribute a blank piece of paper to the students.

Introduction

T *Today we are going to evaluate text like a scientist.*
T *We will look for key details, causes and effects while thinking like a scientist.*
T *We are going to fold our piece of paper in half creating a "Book."*
T *Write your name and date in top right corner and number all four pages.* Model this step so students can follow along with your example.

Give time for students to fold, put their name on it, and number the pages. Monitor students and provide assistance as needed.

T *I will be showing you three pictures for only 30 seconds.*
T *Watch carefully.*

Place pictures of glaciers (page 11) under the document camera and allow students to look at pictures for 30 seconds. After 30 seconds take the pictures away.

Book: Page 1

T *What was your initial reaction, in other words what were your thoughts or questions?*
T *Please write your reaction on the top part of page 1 of your "Book."*

Put pictures back under document camera for 20 seconds.

T *What details in the pictures support your initial reaction?*
T *Write the details below your reaction on page 1 of your "Book".*

Give time for students to write their details. Monitor students and provide assistance as needed.

T *What jumps out at you when you look at the sequence of pictures?*
T *Write what jumped out at you when you looked at the sequence of pictures.*

Put pictures back under document camera and leave for next protocol.

Partner discussion protocol: Students will use: Back to Back and Face to Face while answering the 2 questions. Then use On your feet/ Get ready to meet/ Go and Greet to get a new partner. With their new partner, they will again use Back to Back and Face to Face while answering the same 2 questions. Continue this 2 Rounds. This would be a good time to review those 2 protocols before beginning.

Back to Back and Face to Face
- When in pairs, direct students to stand back to back
- Ask the students to consider the question
- Give students at least a minute to consider their response

On your feet/ Get ready to meet/ Go and Greet (should take less than one minute)
- Students stand up and put their hand up in the air
- Students find another student that has their hand up to have a "new" partner (and get them moving around)
- Once they are with their new partner, they put their hands down and face the teacher

Back to Back and Face to Face

Partner discussion:

1. What was your initial reaction to the pictures? Why?

2. When I initially saw the photos I (thought/observed/felt) _____.

After 2 rounds students return to their own seats.

T *Let us think like a scientist.*
T *What questions or wonderings do you have from the photos?*
T *Write at least 2 questions or wonderings at the bottom of page 1 in your "Book".*

Follow Ask, Answer, and Justify protocol for the next portion.

Ask, Answer, and Justify
- Put students in pairs: have them assign themselves a number 1 or 2
- Roles for number assignments:
  - 1's will ask the question first and 2's will respond
  - Then 2's will ask the question and 1's will respond

Partner discussion:

Question:
What are you wondering about? Why?
Response:
As a scientist, I (questioned/wondered/thought) _____.

Note:
Tell students to consider their previous conversation and revise/improve their details and "jump at me" statements.

Book: Page 2

T *On page 2 of your book you are going to write what you believe is happening to the glaciers.*
T *In other words, in two or three sentences, what is the main idea of the photographs?*
T *Write your answers in the bottom half of page 2.*
T *Add illustrations to validate your answers.*

Make sure to "Break Up Your Day!"
Now is a great time to take a break and get students re-energized.
See our list of engaging movement and brain break ideas to get your students moving and ready to refocus! (see page 16)

Instructional Plan: Segment 2: 30-45 minutes

Subject

- ELA; Informational Text: "The Mendenhall Glacier" & "Thermal Expansion"
- Synthesize Text and Key Details, Cause & Effect, & Vocabulary

Objective

- Students will take literal interpretation of informational text to evaluation and synthesizing.
- Students will produce a "book" which includes: cause and effect, vocabulary and key details.

Materials

- **Required:** copies of Informational Text, (page 12), **or** display a copy on a document camera
- "Book" students began in segment 1
- pencil and crayons (markers or colored pencils)
- **Resources:** document camera or similar device to share color photos, text, and drawings with class
- **Optional:** dictionaries
- **Optional:** printable pictures (page 11) if technology is not available, color copies of the pictures are needed

Distribute Text #1 to the students.

T *Please read Text #1 independently.*
T ***Circle*** *one* ***unfamiliar word*** *in each paragraph.*
T ***Underline*** *what you consider to be* ***important details*** *in the text.*
T ***Take notes*** *in the margin of any* ***questions or wonderings*** *you have of the text.*

Give time to complete this task. Monitor students and provide assistance as needed.

Back to Back and Face to Face
- When in pairs, direct students to stand back to back
- Ask the students to consider the question
- Give students at least a minute to consider their response

T *Now we are going to use* Back to Back and Face to Face *to share with a partner what you believe is the "gist of the text".*
T *The "gist" means the main idea or essence of the text.*

Book: Page 3

T *Now that you have had the opportunity to share ideas with a partner, it is time for you to write your own "gist".*
T *Remember it is okay to modify your own answer after discussing with a partner.*
T *On page 3 of your "book" please write 2-3 sentences at top of the page stating what you believe is the "gist" of "The Mendenhall Glacier".*

Give time to complete this task. Monitor students and provide assistance as needed.

On your feet/ Get ready to meet/ Go and Greet (should take less than one minute)
- Students stand up and put their hand up in the air
- Students find another student that has their hand up to have a "new" partner (and get them moving around)
- Once they are with their new partner, they put their hands down and face the teacher

On your feet/ Get ready to meet/ Go and Greet
(students take Text #1 and their book/pencil)
then Back to Back and Face to Face protocol

Partner discussion:

Ask your partner:
"What details did you underline that support what you believe the text is about?"

Reply using sentence frame:
The details I underlined are _____because_____.

T *Create a list of details that support your "gist" statement on page 3.*
T *We will now use* On your feet/ Get ready to meet/ Go and Greet *to find a new partner to ask and reply to the same questions.*
T *Remember this is a good time to add details to your "gist" list.*
T *Make sure to take your text #1, your book, and your pencil with you when you go to find a new partner.*

On your feet/ Get ready to meet/ Go and Greet
(students take Text #1 and their book/pencil)
then Back to Back and Face to Face protocol

Partner discussion:

T *We will now use* On your feet/ Get ready to meet/ Go and Greet *to find our last new partner to ask and reply to the same questions.*
T *Remember this is a good time to add details to your "gist" list.*

Give time to complete this task. Monitor students and provide assistance as needed.

T *Now that you have met with 3 partners and hopefully added details to your list, please return to your own seat.*
T *Reread paragraph #1 in "The Mendenhall Glacier".*
T ***Underline*** *the phrase* ***"the Little Ice Age".***
T *What details in paragraph #1 help you understand and "see" the Little Ice Age?*
T *Work with a partner to find the details that support the reader's' understanding of the Little Ice Age.*

Give time to complete this task. Monitor students and provide assistance as needed.

Place the pictures back under the document camera.

T *What details in the picture(s) help you paint a picture in your mind of what the Little Ice Age looked like 3,000 years ago?*
T *Write at least 3 details from the pictures that help you "paint the mental picture" in your mind.*

Follow the Back to Back and Face to Face **protocol**

Partner discussion:

Students ask:

"What details did you decide helped you "see" the Little Ice Age" from the pictures?"

Give time to complete this task. Monitor students and provide assistance as needed.

Add details to page 3:

T *Add one new detail that your partner shared at the bottom of page 3.*

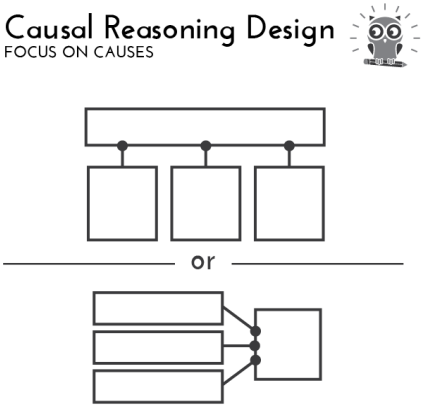
Book: Page 4

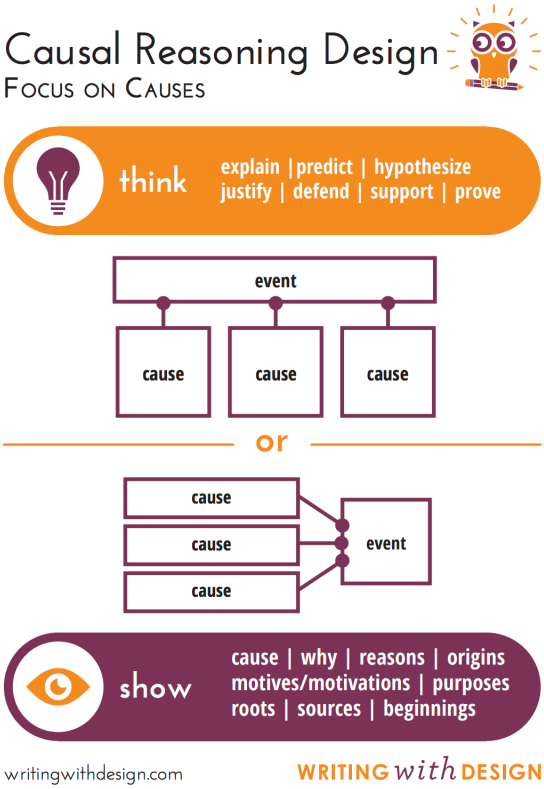
T *Scientists are always considering cause & effect relationships.*

Create and display "Cause and Effect" organizer on document camera Sample Cause and Effect Graphic Organizer found on the right.

T *You are going to recreate this graphic organizer on page 4 of your book.*

T *Reread "The Mendenhall Glacier" looking for a cause and an effect.* Possible answer: Cause: when the glacier moves; Effect: the debris leaves horizontal gouges in the rock walls





Make sure to "Break Up Your Day!"

Now is a great time to take a break and get students re-energized.

See our list of engaging movement and brain break ideas to get your students moving and ready to refocus! (see page 16)

Instructional Plan: Segment 3: 45 minutes

Subject

- ELA; Informational Text: "Thermal Expansion"
- Synthesize Text and Key Details, Cause & Effect, Vocabulary, and Summary

Objective

- Students will take literal interpretation of informational text to evaluation and synthesizing.
- Students will produce a "book" which includes: cause and effect, vocabulary and key details.
- Students will use the "book" they create to write a summary of the informational texts.

Materials

- **Required:** copies of Informational Texts (1 & 2), (pages 12-13)), **or** display a copy on a document camera
- "Book" students began in segment 1 & 2
- lined pieces of paper
- pencil and crayons (markers or colored pencils)
- **Resources:** document camera or similar device to share

Distribute Text #2: "Thermal Expansion"

Introduction

T *You are now going to read "Thermal Expansion" like a scientist and find a second cause and effect.*
T *Please read "Thermal Expansion" independently.*

Give time to complete this task. Monitor students and provide assistance as needed.

T *What is causing the icebergs to melt?*
T *Now you will reread "Thermal Expansion" with a buddy.*
T *I would like you to take turns and alternate sentences.*

Give time to complete this task. Monitor students and provide assistance as needed.

Ask, Answer, and Justify

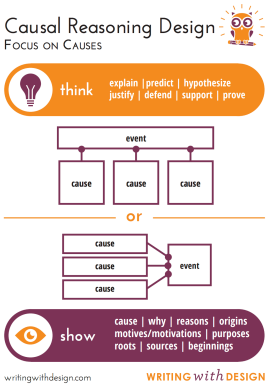
(students take Text #2 and their cause & effect graphic organizer/pencil)

then Give one & Get one protocol

Ask, Answer, and Justify
- Put students in pairs: have them assign themselves a number 1 or 2
- Roles for number assignments:
  - 1's will ask the question first and 2's will respond
  - Then 2's will ask the question and 1's will respond

Give one & Get one
- Students share information in Ask & Justify
- Each student in the pair writes down the information shared by their partner
- If the information is already written, a check is put by the information

T *Now with your partner you are going to first* Ask, Answer, and Justify *and then* Give one & Get one
T *This will help you to add more details to your graphic organizer.*
T *Complete your Cause and Effect Graphic Organizers with your partners using "Thermal Expansion".* Example: Cause: object changes temperature; Effect: the object expands or contracts



Give time to complete this task. Monitor students and provide assistance as needed.

T *Please return to your original seats.*
T *Books need titles, illustrations, and captions for any pictures.*

T *It is time to finalize your "Book" with a title, illustrations and captions to clarify your ideas.*

Collect the books and annotated texts, and leave them for the teacher

Writing a Summary:

Pass out 1 piece of lined paper per student.

T *On your paper write, "I will organize key details and write a paragraph summary."*
T *You will write 5 to 7 sentences summarizing the informational texts.*
T *You may use your informational texts, book and Cause and Effect Graphic Organizer.*
T *Make sure that you edit your work.*
T *You should be focusing on your spelling mistakes, punctuation marks, that your ideas make sense.*
T *There are several things you need to make sure you do when writing your summary.*
T *Indent the first line.*
T *Use complete sentences.*
T *Used transition words.*
T *Use details from the text and place the exact words from the text in quotes.*
T *And last, be sure you finished with a concluding sentence.*

Students share their sentences as the writing process continues.

Encourage students to edit their work: spelling mistakes, punctuation marks, etc.

Students may read their paragraphs with a buddy or share with the class.

Checklist for TEACHERS

- I indented the first line only
- I started with a topic sentence (example: "The informational text explains that glaciers create icebergs which melt in the water due to thermal expansion.)
- I used complete sentences
- I used transition words (first, next, then, last)
- I used details from the text and placed the exact words from the text within quotes (example: The author states that thermal expansion "explains how matter changes" which demonstrates how glaciers and icebergs melt.)
- I finished with a concluding sentence (example: The informational text demonstrates that glaciers, icebergs and ice cubes use the physical property of thermal expansion.)

Checklist for Students

- I indented the first line only
- I started with a topic sentence
- I used complete sentences
- I used transition words
- I used details from the text and placed the exact words from the text within quotes
- I finished with a concluding sentence

Make sure to "Break Up Your Day!"

Now is a great time to take a break and get students re-energized.
See our list of engaging movement and brain break ideas to get your students moving and ready to refocus! (see page 16)

BONUS LESSON

Instructional Plan: Segment 4: 30 minutes

Subject

- Geometry and Science & Haiku Poem

Objective

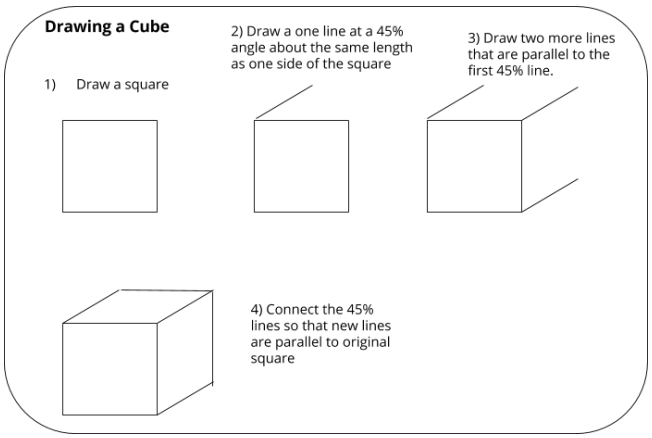
- Students will create a visual comparison of glaciers and ice cubes.
- Students will write a Haiku poem that captures the intent of "The Mendenhall Glacier".

Materials

- **Required:** copies of Drawing cube activity on page 14 **or** display a copy on a document camera
- 1 piece of lined paper
- **Resources:** document camera or similar device to share

Part 1: "Geometry and Science!" (15 min) Drawing a Cube activity

Pass out 1 piece of lined paper per student. If you printed the handout on page 14 for students, pass that out as well.



T *We have been talking about glaciers today.*

T *What geometric solid or three-dimensional shape do you think of when you think of ice.*

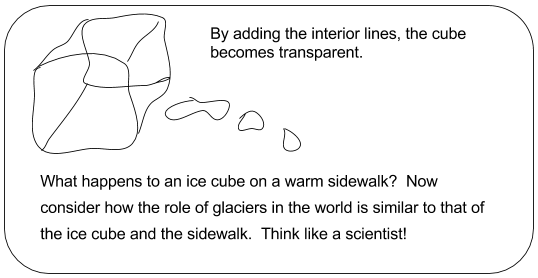
T *Hint the answer is in a phrase we use to call ice.*

T *I may put an ice ____ in my drink.*

T *Who knows what shape I am referring to?* **Call on students. Answer: cube**

T *I am going to show you how to draw a cube today.*

T *On your piece of paper, first draw a square.* **Model this on either the board or a document camera for students to follow. Give time for students to complete this step. Monitor and provide assistance as needed.**



T *Next draw one line at a 45-degree angle, about the same length as one side of the square.* **Model this on either the board or a document camera for students to follow. Give time for students to complete this step. Monitor and provide assistance as needed.**

T *After that we will draw 2 more lines that are parallel, or run side by side, to the first 45-degree line.* **Model this on either the board or a document camera for students to follow. Give time for students to complete this step. Monitor and provide assistance as needed.**

T *Last, connect the 45 degree lines so that new lines are parallel to your original square.* **Model this on either the board or a document camera for students to follow. Give time for students to complete this step. Monitor and provide assistance as needed.**

T *Now, let's think like a scientist!*

T *What happens to an ice cube on a warm sidewalk?*

T *Now consider how the role of glaciers in the world is similar to that of the ice cube and the sidewalk.*

T *Turn and discuss your thoughts with a partner.*

Give time to complete this task. **Monitor students and provide assistance as needed.**

T *Let's share what you and your partner discussed.* **Call on students to share their ideas. Annotate their ideas on the board as they share.**

Part 2: "Writing a Haiku Poem" (15 min)

Start with the back side of lined piece of blank paper:

- ***T*** *A Haiku poem has only three lines.*
- ***T*** *The first line has five syllables, the second line has seven syllables, and the last line has five syllables.*
- ***T*** *These lines usually do not rhyme.*
- ***T*** *Can you capture the intent of "The Mendenhall Glacier" in a Haiku poem?*

Example of Haiku poem showing syllable count in parentheses:

"The Mendenhall Glacier": a Haiku Poem

Glaciers move slowly (5)
Brilliant blue is what's left (7)
Calve icebergs to sea (5)

- ***T*** *You should be focusing on your spelling mistakes, punctuation marks, and that your ideas make sense.*
- ***T*** *There are several things you need to make sure you do when writing your Haiku poem.*
- ***T*** *Make sure to write about the central message.*
- ***T*** *Check to see the first line has 5 syllables, the second line has 7, and the third line has 5.*

Once you have finished I will let you read your Haiku poem with either a buddy or the whole class.

Rubric for Students

- I wrote about the intent (central message) of the text
- The first line has 5 syllables
- The second line has seven syllables
- The third line has five syllables

If there is time... Students may illustrate their Haiku poem.

Collect all papers and leave them for the teacher.

Make sure to "Break Up Your Day!"

Now is a great time to take a break and get students re-energized.
See our list of engaging movement and brain break ideas to get your students moving and ready to refocus! (see page 16)

Photo A

Photo B

Photo C

Text #1

The Mendenhall Glacier

(1) The Little Ice Age began around 3,000 years ago. During this era the polar ice caps covered 32% of all land on the Earth. The polar ice caps had even crept into the tropical latitudes. When the ice caps eventually receded, they left behind glaciers that can still be seen today. One of these glaciers is the Mendenhall Glacier in Juneau (**joo**-noh), Alaska.

(2) The Mendenhall Glacier is a striking glacier emitting a vibrant blue hue. White, along with all other colors of the color spectrum, has been absorbed by the dense ice. The outcome is the only color visible to the human eye is cobalt blue. The impact of the unique color is captivating.

(3) A visitor to this magnificent glacier said, "The unreal blue draws your eyes as if magnetized to its depth and distinctiveness."

(4) Glaciers are rivers of ice which move slowly but surely downhill. The Mendenhall glacier travels at a rate of six to twelve inches per day. Caught inside the glacier are rocks and boulders. As might be expected when the glacier moves these rocks and boulders down the valley the debris leaves horizontal gouges in the rock walls.

(5) "The canyon's sides look like an enormous creature had clawed its way out of the ice. There are scars carved deep into the rock walls," averred a hiker.

(6) Where the Mendenhall Glacier meets Mendenhall Lake dozens of small icebergs float in the water. These icebergs were once part of the glacier before calving into the frigid water. They may slowly melt on their journey to the ocean, or if large enough, they will reach the Auke Bay as so many captured moments in time, held virtually intact inside their frozen memories.

Text #2

Thermal Expansion

(1) Have you ever seen an ice cube melt? Scientists can explain this everyday occurrence through the physics of thermal expansion.

(2) When an object changes temperature it expands, contracts, and can even change state. When you see an ice cube melt, it is warming and its state is changing from a solid to a liquid.

(3) Thermal expansion is a physical property that explains how matter changes in shape, area, and volume when its temperature is changed.

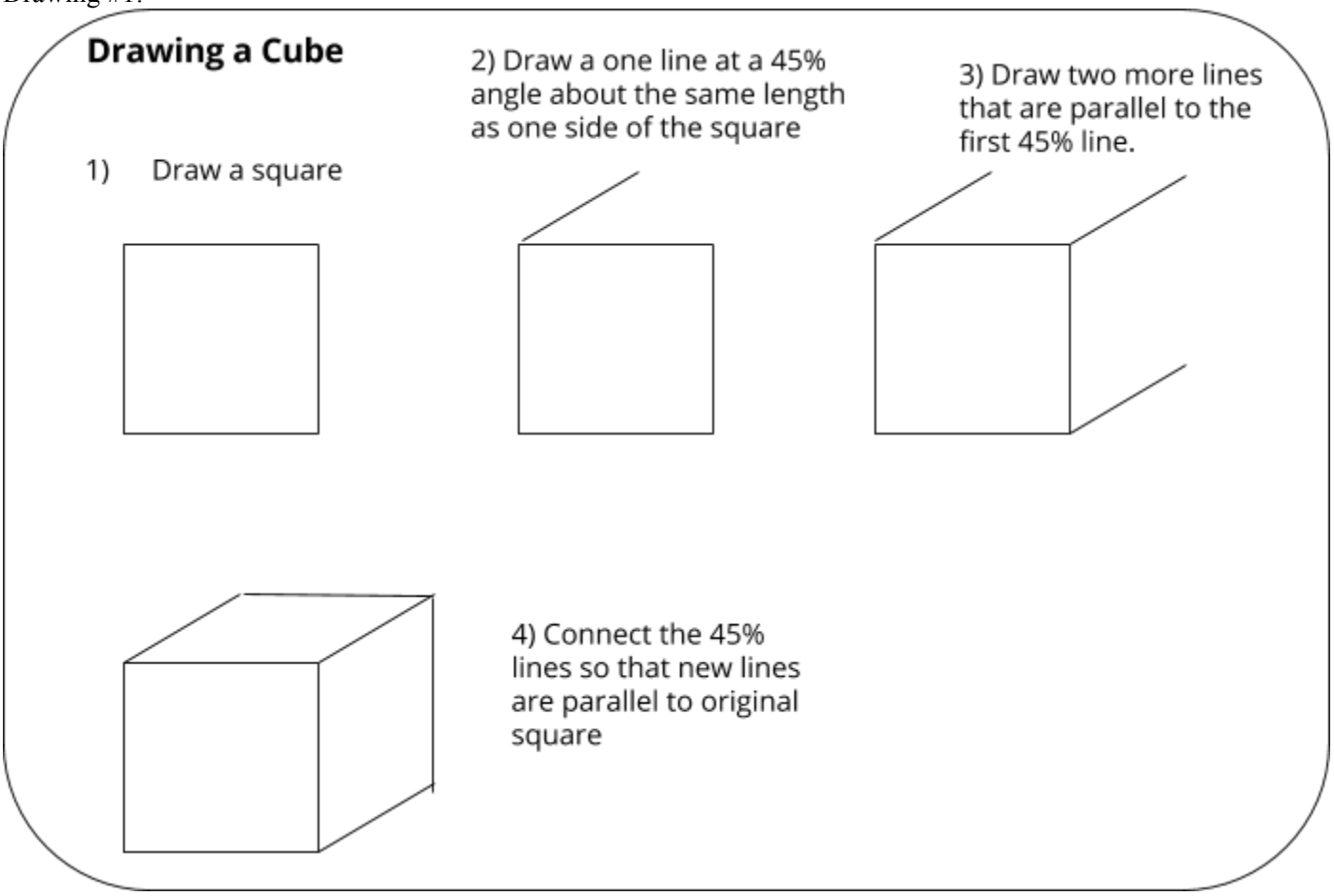
(4) If ice is exposed to heat, like sunlight or warm water, then thermal expansion will take place.

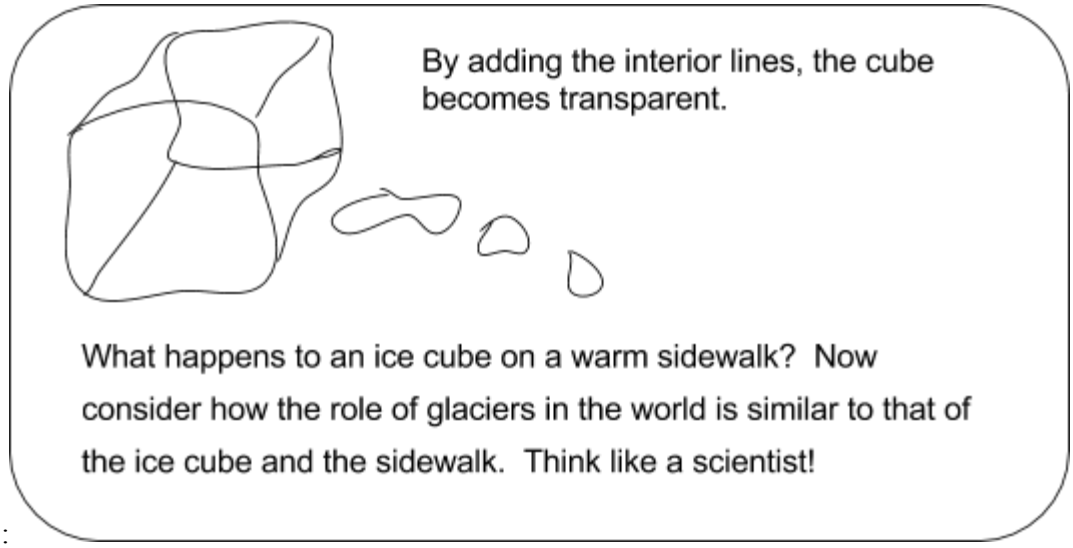
(5) Large sheets of ice cover the northern and southern poles of the Earth. When sunlight warms their surfaces, the ice melts from the top. If the ice reaches a warmer part of the ocean, the ice melts also from the bottom.

(5) What happens to an ice cube on a warm sidewalk? What is happening to glaciers? Consider how the role of glaciers in the world is similar to that of the ice cube and the sidewalk. Think like a scientist!

"Geometry and Science!"

Drawing #1:





Drawing #2:

Protocols:

Ask, Answer, and Justify

- Put students in pairs: have them assign themselves a number 1 or 2
- Roles for number assignments:
  - 1's will ask the question first and 2's will respond
  - Then 2's will ask the question and 1's will respond
  - The next time 2's ask the question first

On your feet/ Get ready to meet/ Go and Greet (should take less than one minute)

- Students stand up and put their hand up in the air
- Students find another student that has their hand up to have a "new" partner (and get them moving around)
- Once they are with their new partner, they put their hands down and face the teacher

Give one & Get one

- Students share information in Ask & Justify
- Each student in the pair writes down the information shared by their partner
- If the information is already written, a check is put by the information

Back to Back and Face to Face

- When in pairs, direct students to stand back to back
- Ask the students to consider the question
- Give students at least a minute to consider their response
- Have them turn face to face
- Follow the protocol for Ask and Justify

Share out and check for understanding

- Follow the protocol for Ask and Justify
- Ask students to share their response to the question
- Verify that response or conclusion is correct
- If needed, provide clarification

(Used throughout lesson - be familiar with each protocol.)

Note: Place Protocols under a document camera (if available) as necessary throughout the lessons

Make sure to "Break Up Your Day!"

These can be used in the middle of a lesson or at the end of your lesson.
Here are a few engaging movement and brain break ideas to get your students moving and ready to refocus!

Break Up Your Day: Chain of Events!

- Teacher states: "I will start a story.
- You and your shoulder buddy must continue the story using only cause and effects.
- For example, if I said, "One day you were late to school…
- The effect could be you missed breakfast at school.
- The missed breakfast is now the cause and the effect of that is you couldn't concentrate during math.
- Lack of concentration is now the cause and the effect is you failed your math quiz.
- I had only four cause→effects: 1) late, 2) missed breakfast, 3) couldn't concentrate, 4) failed quiz.
- Keep going until you run out of time.
- I will give you one minute to see how many cause and effects you and your buddy can find for your Chain of Events!
- Your chain starts with, "One day I couldn't find my shoes…"

Break Up Your Day: Be a Scientist!

- A scientist separates fact from fiction or fact from opinion.
- Listen to these 3 statements: #1Today is a school day. #2 It is a good day to be a scientist. #3 We live on the planet Earth.
- Students show teacher which statement is an opinion (answer: #2).
- Now, turn to your buddy and create 3 facts or opinions. See if your buddy can be a scientist!
- Monitor student statements.
- Round 2 of "Be a Scientist" can include facts or opinions from the texts.

Break Up Your Day: Thumbs Up!

- Student is called on (use name cards or equity cards if available) to state a quality they see in themselves (kindness, honesty, hard work, humor).
- Other students signify whether they see that quality in themselves.
- Tally their responses.
- The quality with the most votes or Thumbs Up is the theme for the classroom!

General Information

Lesson Parts & Duration

Total Duration: 2 to 2 ½ hours

- Segment 1: Equivalent Fractions: Using Multiplication (60 Minutes)
- Segment 2: Equivalent Fractions: Using Division (60 Minutes)
- Segment 3: Game: "Every Fraction Needs a Buddy!" (30Minutes)

Subject(s)

- Equivalent Fractions: Recognize, Generate, & Explain Using Visual Models (4.NF.A.1).

Objective

- Students will generate equivalent fractions through multiplication (n x a)/ (n x b).
- Students will illustrate equivalent fractions using visual models.
- Students will recognize how the number and size of parts differ even though two fractions are the same size.
- Students will generate equivalent fractions through division (a ÷ n) / (b ÷ n).
- Students will compare fractions using <, >, or =.

Materials

- **Required:** printable game cards (pages 16-19) (1 set per pair) or index cards (38 per pair)/5 pieces (per pair) of blank paper folded into eights and then cut to create game cards (segment 3)
- blank paper (3 per student)
- pencil & crayons/colored pencils
- document camera or whiteboard
- scissors (if you printed off the cards or are cutting up paper) (segment 3)
- personal student dry erase boards & dry erase marker (if not available use paper and pencil) (segment 3)
- **Optional:** printable "Exit Slips" (page 15)
- **Optional:** printable "Break Up Your Day" brain/movement break ideas (page 20)

Instructional Setting

- Students should be seated with or near another student for partner work.

Throughout these lessons, you will find:

- ***Scripted Text*** indicates things that need to be said directly. Bullets starting with a **"T"** followed by *italicized type* indicate scripted text
- **Clarifiers** within scripted text are in orange
- **Teacher Directions** indicate things you should be doing
- **Side notes** provide helpful hints, ELL strategies, differentiation and information
- **Break Up Your Day** (Brain/Movement Breaks) are in green boxes (at the end)

Remember!

Quality over quantity. All components do not have to be accomplished; lessons may be ended at any time and resumed later.

Instructional Plan: Segment 1: 60 minutes

Subject

- Equivalent Fractions: Using Multiplication (60 Minutes)

Objective

- Students will generate equivalent fractions through multiplication (n x a)/ (n x b).
- Students will illustrate equivalent fractions using visual models.
- Students will recognize how the number and size of parts differ even though two fractions are the same size.

Materials

- blank paper (2 per student)
- pencil & crayons/colored pencils
- document camera or whiteboard
- **Optional:** printable Exit Slip (page 15)

Pass out 2 pieces of paper per student. One will be for "Notes" and the other for practice.

Introduction

T *Fractions show us parts of a whole.*

T *Sometimes a fraction is part of a whole shape, like a piece of cake is a "fraction" of the cake.*

T *Fractions can also be part of a set, like one student out of all of the students in this class, or a few pieces of candy from the whole bag of candy.*

T *Those are "fractions" of a set.*

T *Today we will be examining fractions of a whole and how two fractions can be called "equivalent" in value.*

T *Equivalent just means that two things are the same or equal in value.*

T *In third grade, you identified equivalent fractions by looking at visual models, like shapes or number lines.*

T *However, in 4th grade you are ready to create your own equivalent fractions using multiplication.*

T *Then once you have created your equivalent fractions you can illustrate and prove that they are equivalent using visual models.*

Setting up Paper

T *Write your name and date in the top right hand corner of your paper.* See example & model so students can follow.

T *On the top center of your paper, title it "Notes".* See example & model so students can follow.

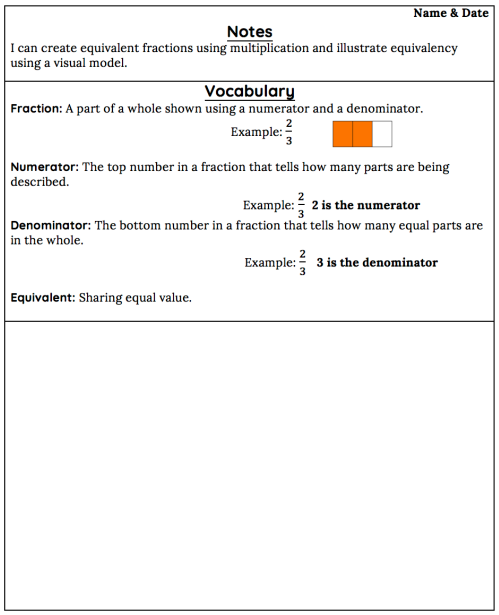
T *Underneath your title write the statement, "I can create equivalent fractions using multiplication and illustrate equivalency using a visual model."* See example & model so students can follow.

T *Below this statement write "Vocabulary".* See example & model so students can follow.

T *The first vocabulary word we need to know is "fraction".*

T *Let's define this in our "Notes" as: "A part of a whole shown using a numerator and denominator.* Write this definition into your notes so that the class can copy.

T *Then we will write an example of a fraction, like* $\frac{2}{3}$.



Name & Date

Notes

I can create equivalent fractions using multiplication and illustrate equivalency using a visual model.

Vocabulary

Fraction: A part of a whole shown using a numerator and a denominator.

Example: $\frac{2}{3}$

Numerator: The top number in a fraction that tells how many parts are being described.

Example: $\frac{2}{3}$ **2 is the numerator**

Denominator: The bottom number in a fraction that tells how many equal parts are in the whole.

Example: $\frac{2}{3}$ **3 is the denominator**

Equivalent: Sharing equal value.

T *$\frac{2}{3}$ isn't a complete whole, it is only part of a whole.*

T *Does anyone know how many thirds I would need to make 1 whole?* **Call on several students. Answer: 3**

T *3 thirds are equal to 1 whole.*

T *Now let's examine the parts of a fraction, we have a top number and a bottom number.*

T *Does anyone know the name for either the top or bottom number of a fraction?*

T *Discuss with the person next to you what you think we call them.* **Call on several students. Answer: numerator and denominator.**

T *Let's add these names into our "Notes" and define them.*

T *The top number of a fraction is the "Numerator".*

T *Under fraction in your "Notes", write numerator and define it as: "The top number in a fraction that tells how many parts are being described."* **Write this definition into your notes so that the class can copy.**

T *Using the previous example, the 2 in our fraction is the numerator.*

T *Our bottom number in a fraction is called, the denominator.*

T *I like to remember this by thinking "d" for down.*

T *Below numerator in your "Notes" write denominator.*

T *We will define this as: "The bottom number in a fraction that tells how many equal parts are in the whole".* **Write this definition into your notes so that the class can copy.**

T *In our example $\frac{2}{3}$ the 3 in this fraction is the denominator.*

Name & Date

Notes

I can create equivalent fractions using multiplication and illustrate equivalency using a visual model.

Vocabulary

Fraction: A part of a whole shown using a numerator and a denominator.

Example: $\frac{2}{3}$ 

Numerator: The top number in a fraction that tells how many parts are being described.

Example: $\frac{2}{3}$ **2 is the numerator**

Denominator: The bottom number in a fraction that tells how many equal parts are in the whole.

Example: $\frac{2}{3}$ **3 is the denominator**

Equivalent: Sharing equal value.

Creating Equivalent Fractions

Whatever is done to the numerator must also be done to the denominator. Otherwise the value of the fraction will change.

1. Select a number you would like to multiply by. **Example: 2**
2. Multiply both the numerator and the denominator by that number.

$\frac{2 \times 2}{3 \times 2} = \frac{4}{6}$ $\frac{2}{3} = \frac{4}{6}$

$\frac{2 \times 3}{3 \times 3} = \frac{6}{9}$ $\frac{2}{3} = \frac{6}{9}$

$\frac{2 \times 4}{3 \times 4} = \frac{8}{12}$ $\frac{2}{3} = \frac{8}{12}$

Equivalent Fractions: $\frac{2}{3} = \frac{4}{6} = \frac{6}{9} = \frac{8}{12}$

T *The last important vocabulary word for us to know is equivalent.*

T *What word do you almost hear in the word equivalent, or what word does it remind you of?*

T *I hear "equal".*

T *What does it mean for things to be "equal"?*

T *When discussing fractions or numbers in general, when we say "equal" or "equivalent" we mean that they have the same "value".*

T *I can use the example that 25 = 5 x 5.*

T *Although the 25 and 5 x 5 don't look the same, they both have an equal value.*

T *If I were to solve 5 x 5, I would have 25.*

T *Fractions can look different, but still have equivalent or equal value too.*

Creating Equivalent Fractions

T *As I mentioned earlier, we are going to start with basic fractions and then use multiplication to create equivalent fractions.*

T *If you think about it, the word multiply means to increase or make more.*

T *When we multiply our fraction, we are taking the same whole, but increasing the number of pieces in the whole.*

T *So, although I have more pieces, what do you think also happens to those pieces.* **Call on several students. Answer: they get smaller**

T *In our "Notes", we are going to add some helpful things to remember when creating equivalent fractions using multiplication.*

T *We will also write down the steps to find an equivalent fraction.*

T *The most important thing to remember is to be fair!*

T *This means if the numerator gets something, the denominator must also get the same thing.* Write this into your notes so that the class can copy.

T *That's only fair, right?!*

T *If I am not fair with my numerator and denominator the value of the fraction will change, rather than creating an equivalent fraction.* Write this into your notes so that the class can copy.

T *Now onto our steps.*

T *Our first step is: "Select a number you would like to multiply by, for example: 2".* Write this step into your notes so that the class can copy.

T *The second step is "To multiply both the numerator and the denominator by that same number."* Write this step into your notes so that the class can copy.

T *Let's try to practice these steps and create 3 equivalent fractions for our example:* $\frac{2}{3}$.

T *We are going to multiply* $\frac{2}{3}$ *by 2, 3, and 4.*

Name & Date

Notes

I can create equivalent fractions using multiplication and illustrate equivalency using a visual model.

Vocabulary

Fraction: A part of a whole shown using a numerator and a denominator.

Example: $\frac{2}{3}$ 

Numerator: The top number in a fraction that tells how many parts are being described.

Example: $\frac{2}{3}$ **2 is the numerator**

Denominator: The bottom number in a fraction that tells how many equal parts are in the whole.

Example: $\frac{2}{3}$ **3 is the denominator**

Equivalent: Sharing equal value.

Creating Equivalent Fractions

Whatever is done to the numerator must also be done to the denominator. Otherwise the value of the fraction will change.

1. Select a number you would like to multiply by. **Example: 2**
2. Multiply both the numerator and the denominator by that number.

$\frac{2 \times 2}{3 \times 2} = \frac{4}{6}$ $\quad \frac{2}{3} = \frac{4}{6}$

$\frac{2 \times 3}{3 \times 3} = \frac{6}{9}$ $\quad \frac{2}{3} = \frac{6}{9}$

$\frac{2 \times 4}{3 \times 4} = \frac{8}{12}$ $\quad \frac{2}{3} = \frac{8}{12}$

Equivalent Fractions: $\frac{2}{3} = \frac{4}{6} = \frac{6}{9} = \frac{8}{12}$

T *First we will multiply by 2.*

T *Copy everything that I am writing into your notes so you learn how to correctly show your work.*

T $\frac{2 \times 2}{3 \times 2} = \frac{4}{6}$ Write this into your notes so that the class can copy.

T *By multiplying our numerator 2 x 2 we get 4, this is the new numerator.*

T *Then we multiply our denominator 3 x 2 and we get 6, this is our new denominator.*

T *We have just found that* $\frac{2}{3} = \frac{4}{6}$. Write this into your notes so that the class can copy.

T *Next we will multiply our original fraction,* $\frac{2}{3}$ *by 3.*

T $\frac{2 \times 3}{3 \times 3} = \frac{6}{9}$

T *By multiplying our numerator 2 x 3 we get 6, this is the new numerator.*

T *Then we multiply our denominator 3 x 3 and we get 9, this is our new denominator.*

T *We have just found that* $\frac{2}{3} = \frac{6}{9}$. Write this into your notes so that the class can copy.

T *Last, we will multiply our original fraction,* $\frac{2}{3}$ *by 4.*

T $\frac{2 \times 4}{3 \times 4} = \frac{8}{12}$

T *By multiplying our numerator 2 x 4 we get 8, this is the new numerator.*

T *Then we multiply our denominator 3 x 4 and we get 12, this is our new denominator.*

T *We have just found that* $\frac{2}{3} = \frac{8}{12}$. Write this into your notes so that the class can copy.

Creating Visual Models for Equivalent Fractions

T *Please flip your paper to the backside.*

T *We will be drawing 2 types of visual models to help prove that our 2 fractions are equivalent.*

T *The first type is a rectangle split into pieces.*

T *The second type is a number line.*

T *Start by writing* $\frac{2 \times 2}{3 \times 2} = \frac{4}{6}$ $\frac{2}{3} = \frac{4}{6}$. Write this into your notes so that the class can copy.

T *We have both thirds and sixths.*

T *So, let's first draw a rectangle and split it into 3 equal pieces.* Draw this into your notes so that the class can copy.

T *Color 2 of those pieces to represent our fraction* $\frac{2}{3}$.

T *Next, draw a second rectangle the same size as your first rectangle, but this time divide it into 6 equal pieces.* Draw this into your notes so that the class can copy.

T *Color in 4 of your 6 pieces to represent our fraction* $\frac{4}{6}$.

T *Now we will illustrate this equivalent pair on a number line.*

T *Since our original fraction was* $\frac{2}{3}$ *we will separate our number line into 3 equal pieces.*

T *When making a number line we need to put our 2 whole numbers on it.*

T $\frac{2}{3}$ *falls between 0 and 1 on a number line, those will be on either end.*

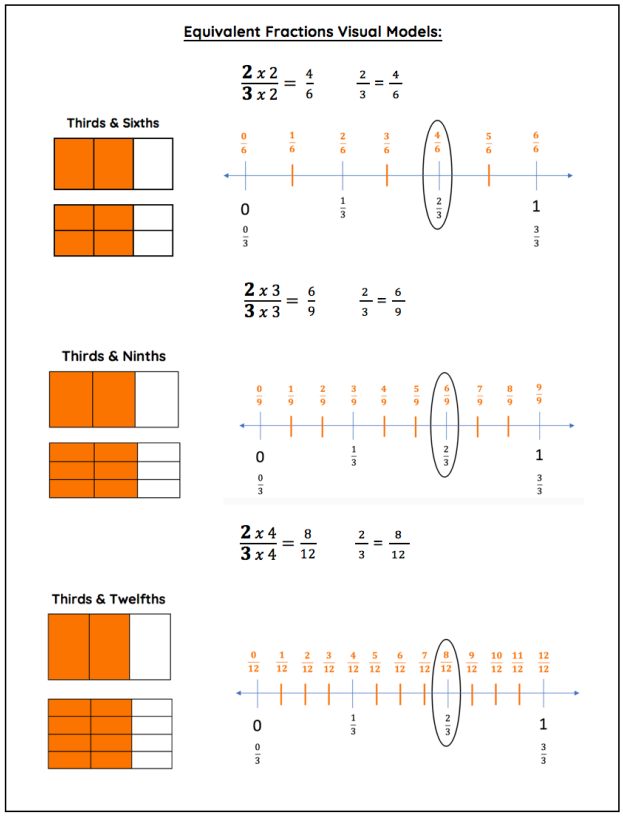
T *Next, if I want to separate my line into 3 equal pieces will I draw 3 lines?* Call on several students. Answer: No, you need only 2 lines. If you draw 3 you will have 4 pieces.

T *So now we know to draw only 2 lines to separate our number line into 3 equal pieces.*

T *Let's label our fraction along the bottom* $\frac{0}{3}, \frac{1}{3}, \frac{2}{3}, \frac{3}{3}$.

T *Now it is time to create even more spaces on this same line.*

T *Because I multiplied by 2, I can make 2 spaces in between each line.*



T *Using a crayon, make a small line in between* $\frac{0}{3}$ *and* $\frac{1}{3}$, $\frac{1}{3}$ *and* $\frac{2}{3}$, *and* $\frac{2}{3}$ *and* $\frac{3}{3}$.

T *Now we can label our new fraction parts on the top of the line using our crayon.*

T *Label these fractions:* $\frac{0}{6}, \frac{1}{6}, \frac{2}{6}, \frac{3}{6}, \frac{4}{6}, \frac{5}{6}, \frac{6}{6}$.

T *The very last thing we will do is make a big loop around our equivalent fractions* $\frac{2}{3}$ & $\frac{4}{6}$.

T *Now with a buddy sitting next to or near you I would like you to create these 2 types of visuals for our other 2 examples in our "Notes".*

T *Make sure to write the number model on the top before doing your two illustrations.*

T *Once you finish these 2, come and get your answers checked by me.*

T *If you are correct I will give you another piece of paper to create even more equivalent fractions of your choice using multiplication and illustrate them.*

Differentiation:

Challenge those students who "get it" to continue trying to create equivalent fractions on the new paper. Support: If students are struggling have them focus on just 1 or 2 of the 3 tasks. Either the just find equivalent fractions with multiplication, or they can find equivalent fractions with multiplication and only show one visual model.

Give time for students to complete this task. Walk around and monitor students understanding.

Important Note:

If students still appear to need more practice with this skill, continue practicing the concepts in this segment and skip segment 2. Or if some students appear ready, you may want to do a small group lesson and teach segment 2 to only the students that appear ready. During this time the other students can continue to practice creating equivalent fractions using multiplication.

***You may use the exit slip at the end of this lesson as a quick assessment of student understanding. Either print them out (page 15), or simply have students copy the problems on a half sheet of paper.**

Name: __ANSWER KEY____Date: _____

Exit Slip: Segment 1

Equivalent Fractions: Use multiplication to create equivalent fractions Answers will vary

1. Name 3 equivalent fractions for each. (show your work)

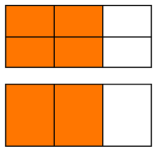
a. $\frac{2}{3}$ $\frac{2 \times 2}{3 \times 2} = \frac{4}{6}$ $\frac{2 \times 3}{3 \times 3} = \frac{6}{9}$ $\frac{2 \times 2}{3 \times 2} = \frac{4}{6}$

b. $\frac{5}{6}$ $\frac{5 \times 2}{6 \times 2} = \frac{10}{12}$ $\frac{5 \times 3}{6 \times 3} = \frac{15}{18}$ $\frac{5 \times 4}{6 \times 4} = \frac{20}{24}$

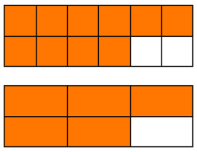
c. $\frac{3}{4}$ $\frac{3 \times 2}{4 \times 2} = \frac{6}{8}$ $\frac{3 \times 3}{4 \times 3} = \frac{9}{12}$ $\frac{3 \times 4}{4 \times 4} = \frac{12}{16}$

2. Use a visual model (rectangle or number line) to explain the equivalency of 2 equivalent fractions from part a, b, & c above.

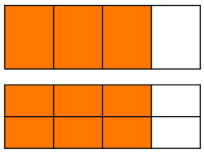
$\frac{2}{3} = \frac{4}{6}$



$\frac{5}{6} = \frac{10}{12}$



$\frac{3}{4} = \frac{6}{8}$



Make sure to "Break Up Your Day!"

Now is a great time to take a break and get students re-energized.
See our list of engaging movement and brain break ideas to get your students moving and ready to refocus! (see page 20)

Instructional Plan: Segment 2: 60 minutes

Subject

- Equivalent Fractions: Using Division

Objective

- Students will generate equivalent fractions through division (a ÷ n) / (b ÷ n).
- Students will illustrate equivalent fractions using visual models.
- Students will recognize how the number and size of parts differ even though two fractions are the same size.

Materials

- blank paper (3 per student)
- pencil & crayons/colored pencils
- document camera or whiteboard
- **Optional:** printable Exit Slip (page 15)

Only teach this segment to students who have shown mastery of the skills covered in segment 1. This segment is addressing similar skills; however, students will be required to divide larger fractions to find smaller equivalent fractions. Students who are not ready for this challenge can continue to practice skills from segment 1 or move on to the game in segment 3.

Pass out 2 pieces of paper per student. One will be for "Notes" and the other for practice.

Introduction

T *After discovering how to create equivalent fractions using multiplication and illustrating them with visual models you are now ready to learn how to create equivalent fractions with a different method.*

T *I have a challenge for you.*

T *We are still going to be creating equivalent fractions and illustrating them with visual models, however, instead of using multiplication we will now use division.*

T *The steps are very similar, but now you must think about taking a lot of pieces of a whole and making less pieces.*

T *As the number of pieces in our whole decreases, the size of each piece will increase.*

T *You will be able to see this clearly when we start illustrating our fractions.*

Setting up Paper

T *Write your name and date in the top right hand corner of your paper.* See example & model so students can follow.

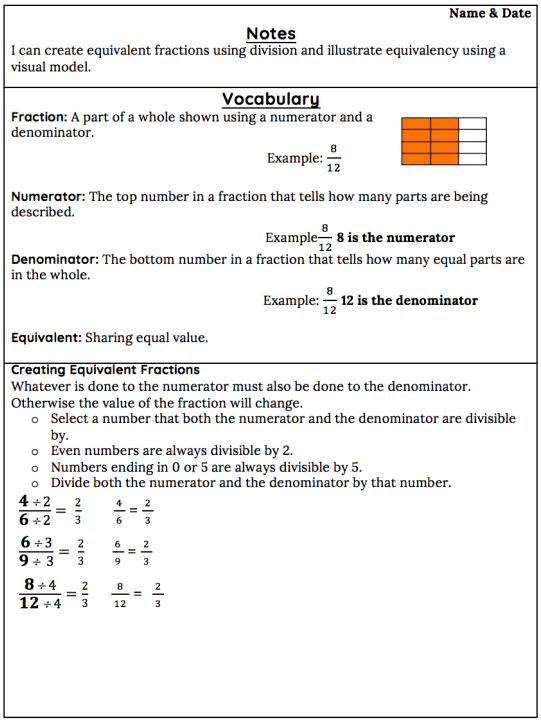
T *On the top center of your paper, title it "Notes".* See example & model so students can follow.

T *Underneath your title write the statement, "I can create equivalent fractions using division and illustrate equivalency using a visual model.* See example & model so students can follow.

T *Below this statement write "Vocabulary".* See example & model so students can follow.

T *We will be writing a lot of the same things in our notes as before, so we will go through these quickly.*

T *The first vocabulary word we need to know is "fraction".*



Name & Date

Notes

I can create equivalent fractions using division and illustrate equivalency using a visual model.

Vocabulary

Fraction: A part of a whole shown using a numerator and a denominator.

Example: $\frac{8}{12}$

Numerator: The top number in a fraction that tells how many parts are being described.

Example $\frac{8}{12}$ **8 is the numerator**

Denominator: The bottom number in a fraction that tells how many equal parts are in the whole.

Example: $\frac{8}{12}$ **12 is the denominator**

Equivalent: Sharing equal value.

Creating Equivalent Fractions

Whatever is done to the numerator must also be done to the denominator. Otherwise the value of the fraction will change.

- Select a number that both the numerator and the denominator are divisible by.
- Even numbers are always divisible by 2.
- Numbers ending in 0 or 5 are always divisible by 5.
- Divide both the numerator and the denominator by that number.

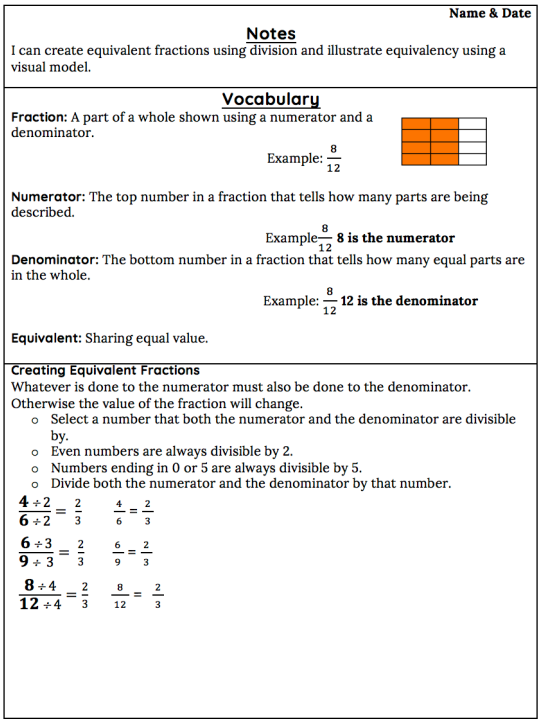
$\frac{4 \div 2}{6 \div 2} = \frac{2}{3}$ $\frac{4}{6} = \frac{2}{3}$

$\frac{6 \div 3}{9 \div 3} = \frac{2}{3}$ $\frac{6}{9} = \frac{2}{3}$

$\frac{8 \div 4}{12 \div 4} = \frac{2}{3}$ $\frac{8}{12} = \frac{2}{3}$

- ***T*** *Let's define this in our "Notes" as: "A part of a whole shown using a numerator and denominator.* Write this definition into your notes so that the class can copy.
- ***T*** *Then we will write an example of a fraction, like* $\frac{8}{12}$.
- ***T*** $\frac{8}{12}$ *isn't a complete whole, it is only part of a whole.*
- ***T*** *The top number of a fraction is the "Numerator".*
- ***T*** *Under fraction in your "Notes", write numerator and define it as: "The top number in a fraction that tells how many parts are being described."* Write this definition into your notes so that the class can copy.
- ***T*** *Using the previous example, the 8 in our fraction is the numerator.*
- ***T*** *Our bottom number in a fraction is called, the denominator.*
- ***T*** *Below numerator in your "Notes" write denominator.*
- ***T*** *We will define this as: "The bottom number in a fraction that tells how many equal parts are in the whole".* Write this definition into your notes so that the class can copy.
- ***T*** *In our example* $\frac{8}{12}$ *the 12 in this fraction is the denominator.*
- ***T*** *The last important vocabulary word for us to know is equivalent.*
- ***T*** *When discussing fractions or numbers in general, when we say "equal" or "equivalent" we mean that they have the same "value".*
- ***T*** *Fractions can look different, but still have equivalent or equal value.*

Creating Equivalent Fractions



Name & Date

Notes

I can create equivalent fractions using division and illustrate equivalency using a visual model.

Vocabulary

Fraction: A part of a whole shown using a numerator and a denominator.

Example: $\frac{8}{12}$

Numerator: The top number in a fraction that tells how many parts are being described.

Example $\frac{8}{12}$ **8 is the numerator**

Denominator: The bottom number in a fraction that tells how many equal parts are in the whole.

Example: $\frac{8}{12}$ **12 is the denominator**

Equivalent: Sharing equal value.

Creating Equivalent Fractions

Whatever is done to the numerator must also be done to the denominator. Otherwise the value of the fraction will change.

- Select a number that both the numerator and the denominator are divisible by.
- Even numbers are always divisible by 2.
- Numbers ending in 0 or 5 are always divisible by 5.
- Divide both the numerator and the denominator by that number.

$\frac{4 \div 2}{6 \div 2} = \frac{2}{3}$ $\frac{4}{6} = \frac{2}{3}$

$\frac{6 \div 3}{9 \div 3} = \frac{2}{3}$ $\frac{6}{9} = \frac{2}{3}$

$\frac{8 \div 4}{12 \div 4} = \frac{2}{3}$ $\frac{8}{12} = \frac{2}{3}$

- ***T*** *Unlike with multiplication where we started with a smaller basic fraction like thirds, now we will start with larger fractions and then use division to create an equivalent smaller fraction.*
- ***T*** *In our "Notes", we are going to add some helpful things to remember when dividing to create equivalent fractions.*
- ***T*** *We will also write down the steps to find equivalent fractions.*
- ***T*** *The most important thing to remember is to be fair!*
- ***T*** *This means if the numerator gets something, the denominator must also get the same thing.* Write this into your notes so that the class can copy.
- ***T*** *That's only fair, right?!*
- ***T*** *If I am not fair with my numerator and denominator the value of the fraction will change, rather than creating an equivalent fraction.* Write this into your notes so that the class can copy.
- ***T*** *Now onto our steps.*
- ***T*** *Our first step is: "Select a number that both the numerator and denominator are divisible by".* Write this step into your notes so that the class can copy.
- ***T*** *Even numbers are always divisible by 2.* Write this into your notes so that the class can copy.
- ***T*** *Numbers ending in 0 or 5 are always divisible by 5.* Write this into your notes so that the class can copy.
- ***T*** *The second step is "To divide both the numerator and the denominator by that number.* Write this step into your notes so that the class can copy.
- ***T*** *The hardest part about dividing to find an equivalent fraction is that it is not as easy as just picking a number and dividing.*
- ***T*** *You need to check to see if that number goes into BOTH the numerator and the denominator.*
- ***T*** *Let's try to practice these steps and create an equivalent fraction for each of our examples:* $\frac{4}{6}, \frac{6}{9}, \frac{8}{12}$.

T *We are going to divide* $\frac{4}{6}$ *by 2 because both 4 and 6 are even numbers, meaning they are both divisible by 2.*

T *Copy everything that I am writing into your notes so you learn how to correctly show your work.*

T $\frac{\mathbf{4} \div 2}{\mathbf{6} \div 2} = \frac{2}{3}$ Write this into your notes so that the class can copy.

T *By dividing our numerator 4 by 2 we get 2, this is the new numerator.*

T *Then we divide our denominator 6 by 2 and we get 3, this is our new denominator.*

T *We have just found that* $\frac{4}{6} = \frac{2}{3}$. Write this into your notes so that the class can copy.

T *Next we will divide our original fraction,* $\frac{6}{9}$ *by 3.*

T *6 is an even number and divisible by 2, however 9 is not even, so it is not divisible by 2.*

T *So, I need to ask myself what number can go into both 6 and 9.*

T *I know that both 6 and 9 are divisible by 3.*

T $\frac{\mathbf{6} \div 3}{\mathbf{9} \div 3} = \frac{2}{3}$

T *By dividing our numerator 6 by 3 we get 2, this is the new numerator.*

T *Then we divide our denominator 9 by 3 and we get 3, this is our new denominator.*

T *We have just found that* $\frac{6}{9} = \frac{2}{3}$ Write this into your notes so that the class can copy.

T *Last, we will divide our original fraction,* $\frac{8}{12}$ *by 4.*

T *I know that both 8 and 12 are even numbers which means they are divisible by 2 as well.*

T *So, I could divide* $\frac{8}{12}$ *by 2, but that would give me a fraction that can still be made smaller or reduced.*

T *Because* $\frac{8}{12}$ *divided by 2 =* $\frac{4}{6}$.

T *And I already solved* $\frac{4}{6}$ *so instead I will divide both my numerator and denominator by 4, because both 8 and 12 are divisible by 4.*

T $\frac{\mathbf{8} \div 4}{\mathbf{12} \div 4} = \frac{2}{3}$

T *By dividing our numerator 8 by 4 we get 2, this is the new numerator.*

T *Then we divide our denominator 12 by 4 and we get 3, this is our new denominator.*

T *We have just found that* $\frac{8}{12} = \frac{2}{3}$ Write this into your notes so that the class can copy.

Creating Visual Models for Equivalent Fractions

T *Please flip your paper to the backside.*

T *We will be drawing 2 types of visual models to help to prove that our 2 fractions are equivalent.*

T *The first type is a rectangle split into pieces.*

T *The second type is a number line.*

T *Start by writing* $\frac{\mathbf{4} \div 2}{\mathbf{6} \div 2} = \frac{2}{3}$ $\frac{4}{6} = \frac{2}{3}$ Write this into your notes so that the class can copy.

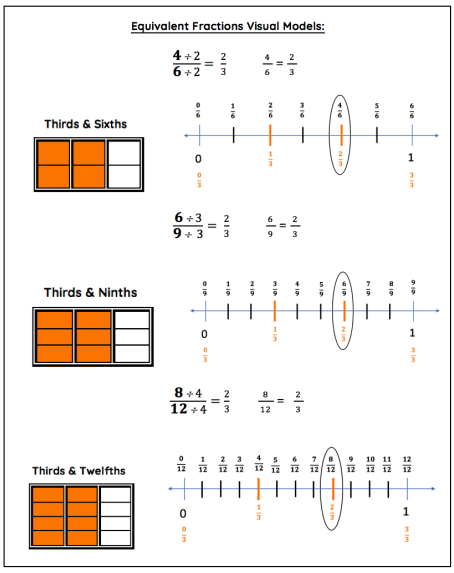
T *We have both thirds and sixths.*

T *So, let's first draw a rectangle and split it into 6 equal pieces.* Draw this into your notes so that the class can copy.

T *Color 4 of those pieces to represent our fraction* $\frac{4}{6}$.

T *Instead of drawing a new rectangle, we are going to use our crayon to outline 3 equal pieces.* Draw this into your notes so that the class can copy.

T *This shows you how we can go from several smaller pieces to fewer larger pieces.*



T *Thirds are the same as 2 sixth pieces, which I can see inside of my outline of thirds.*

T *Now we will illustrate this equivalent pair on a number line.*

T *Since our original fraction was $\frac{4}{6}$ we will separate our number line into 6 equal pieces.*

T *First, when making a number line we need to put our 2 whole numbers on it.*

T *$\frac{4}{6}$ falls between 0 and 1 on a number line, those will be on either end.*

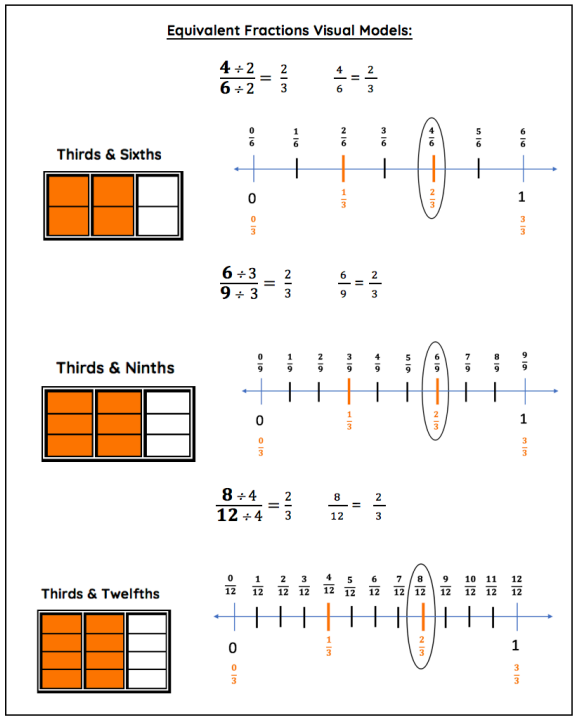
T *Next, if I want to separate my line into 6 equal pieces will I draw 6 lines?* **Call on several students.** **Answer: No, you need only 5 lines. If you draw 6 you will have 7 pieces.**

T *So now we know to draw only 5 lines to separate our number line into 6 equal pieces.*

T *Let's label our fraction along the top $\frac{0}{6}, \frac{1}{6}, \frac{2}{6}, \frac{3}{6}, \frac{4}{6}, \frac{5}{6}, \frac{6}{6}$.*

T *Now it is time to create less spaces on this same line.*

T *When I divide by 2, I can make 1 larger space at every second line.*



T *Using a crayon, make a dark line at $\frac{2}{6}$ then again at $\frac{4}{6}$.*

T *Now we can label our new fraction parts on the bottom of the line using our crayon.*

T *Label these fractions: $\frac{0}{3}, \frac{1}{3}, \frac{2}{3}, \frac{3}{3}$.*

T *The very last thing we will do is make a big loop around our equivalent fractions $\frac{4}{6}$ & $\frac{2}{3}$.*

T *Now with a buddy sitting next to or near you I would like you to create these 2 types of visuals for our other 2 examples in your "Notes".*

T *Make sure to write the number model on the top before doing your two illustrations.*

T *Once you finish these 2, come and get your answers checked by me.*

T *If you are correct, I will give you another piece of paper to create even more equivalent fractions of your choice using division and illustrate them.*

Differentiation:

Challenge those students who "get it" to continue trying to create equivalent fractions on the new paper. Support: If students are struggling have them focus on just 1 or 2 of the 3 tasks. Either the just find equivalent fractions with multiplication, or they can find equivalent fractions with multiplication and only show one visual model.

Give time for students to complete this task. Walk around and monitor students understanding.

***You may use the exit slip at the end of this lesson as a quick assessment of student understanding. Either print them out (page 15), or simply have students copy the problems on a half sheet of paper.**

Name: __ANSWER KEY___Date: _____

Exit Slip: Segment 2

Equivalent Fractions: Use division to create equivalent fractions. Answers will vary

1. Name 1 equivalent fractions for each. (show your work)

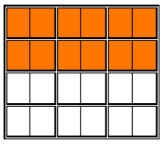
d. $\frac{12}{24}$ $\frac{12 \div 2}{24 \div 2} = \frac{6}{12}$ $\frac{12 \div 3}{24 \div 3} = \frac{4}{8}$ $\frac{12 \div 4}{24 \div 4} = \frac{3}{6}$

e. $\frac{15}{20}$ $\frac{15 \div 5}{20 \div 5} = \frac{3}{4}$

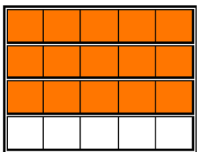
f. $\frac{8}{32}$ $\frac{8 \div 2}{32 \div 2} = \frac{4}{16}$ $\frac{8 \div 4}{32 \div 4} = \frac{2}{8}$ $\frac{8 \div 8}{32 \div 8} = \frac{1}{4}$

2. Use a visual model (rectangle or number line) to explain the equivalency of 2 equivalent fractions from part a, b, & c above. Answers will vary

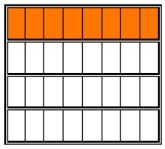
$\frac{12}{24} = \frac{6}{12}$



$\frac{15}{20} = \frac{3}{4}$



$\frac{8}{32} = \frac{1}{4}$



Make sure to "Break Up Your Day!"

Now is a great time to take a break and get students re-energized.
See our list of engaging movement and brain break ideas to get your students moving and ready to refocus! (see page 20)

Instructional Plan: Segment 3: 30 minutes

Subject

- Game: "Every Fraction Needs a Buddy!"

Objective

- Students will generate equivalent fractions through multiplication (n x a)/ (n x b).
- Students will generate equivalent fractions through division (a ÷ n) / (b ÷ n).

Materials

- **Required:** one of these options
  - printable game cards (pages 16-19) (1 set per pair)
  - index cards (38 per pair) or
  - 5 pieces (per pair) of blank paper folded into eights and then cut into squares
- document camera or whiteboard
- scissors (if you printed off the cards or are cutting up paper)
- personal student dry erase boards & dry erase marker (if not available use paper and pencil)

Print off one set of game cards (pages 16-19) for each pair or start lesson by having groups make their fraction cards.

$\frac{1}{2}$	$\frac{2}{2}$	$\frac{1}{3}$
$\frac{2}{3}$	$\frac{3}{3}$	$\frac{1}{4}$
$\frac{2}{4}$	$\frac{3}{4}$	$\frac{4}{4}$
$\frac{1}{5}$	$\frac{2}{5}$	$\frac{3}{5}$

$\frac{4}{5}$	$\frac{5}{5}$	$\frac{1}{6}$
$\frac{2}{6}$	$\frac{3}{6}$	$\frac{4}{6}$
$\frac{5}{6}$	$\frac{6}{6}$	$\frac{1}{8}$
$\frac{2}{8}$	$\frac{3}{8}$	$\frac{4}{8}$

$\frac{5}{8}$	$\frac{6}{8}$	$\frac{7}{8}$
$\frac{8}{8}$	$\frac{1}{10}$	$\frac{2}{10}$
$\frac{3}{10}$	$\frac{4}{10}$	$\frac{5}{10}$
$\frac{6}{10}$	$\frac{7}{10}$	$\frac{8}{10}$

$\frac{9}{10}$	$\frac{10}{10}$

Introduction

T *Today we will be playing a game called, "Every Fraction Needs a Buddy!".*
T *In this game, you will be trying to create as many equivalent fractions as you can.*
T *We will start by getting our playing cards ready first and then I will explain to you how to play the game.*

Follow the "Getting Ready" section based on if you are creating cards or have printed them.

Getting Ready: Using Printable Game Cards

T *You and a partner will only need one set of cards to play with.*
T *When I say "Equivalent," I want you to find a partner that you have not worked with already today.*
Monitor that all students are finding partners, step in if students are struggling to pair up.
T *"Equivalent!"*
T *With your scissors, you need to carefully cut along the lines to cut out the 4 sheets of fraction cards.*
T *Split up the work with your partner so that everyone is working equally.*

Getting Ready: Using Printable Game Cards

T *You and a partner will only need one set of cards to play with.*
T *When I say "Equivalent," I want you to find a partner that you have not worked with already today.*
Monitor that all students are finding partners, step in if students are struggling to pair up.

T *"Equivalent!"*
T *I will give each group (38 index cards or 5 pieces of blank paper to fold into eights and cut out).*
T *You need to write 1 fraction per card.*
T *We are writing halves, thirds, fourths, fifths, sixths, eighths, and tenths.*
T *Remember that* $\frac{2}{2}, \frac{3}{3}, \frac{4}{4}, \frac{6}{6}, \frac{8}{8}, \frac{10}{10}$ *all need to be included.* List all 38 fractions on the board for them to reference and write on their cards.

How to Play

T *Since the name of the game is, "Every Fraction Needs a Buddy!", the goal of our game is to create equivalent fractions or "buddies".*
T *You will start by spreading out all of your cards face down.*
T *When it is your turn, you will pick any card and turn it over.*
T *The card you pick will be your fraction.*
T *You will then have 30 seconds to try to create as many equivalent fractions as you can.*
T *Your partner will watch the clock for 30 seconds while you work.*
T *The catch is that you must show all of your work.*
T *This means that you need to show either the multiplication or division equation you used to create your equivalent fractions.*
T *Once time is up, your partner will check your work to see how many correct equivalent fractions you were able to create.*
T *If you can create 3 or more correct equivalent fractions in 30 seconds you earn 5 points.*
T *2 correct equivalent fractions earn you 2 points, 1 correct earns you 1 point and 0 correct earns you 0 points.*
T *Then it is your partner's turn to pick a fraction card.*
T *They will also get 30 seconds to create as many correct equivalent fractions as they can.*

Practice Round Demonstrate spreading out cards face down to prepare to play.

T *Let's say that the first card I pick is* $\frac{2}{3}$.
T *I am going to need a buddy to watch the clock for 30 seconds for me.* Call on a student to be your partner and watch the clock.
T *When my partner says go, I will try to write as many equivalent fractions to* $\frac{2}{3}$ *as I can.* Model writing equivalent fractions on either the whiteboard or document camera. Use the examples on the right.
T *Now that time is up you can see I was able to write* tell how many equivalent fractions you created *equivalent fractions in 30 seconds.*
T *My partner will now check my work to see how many are correct.* Assist student in checking you work for demonstration purposes.

$$\frac{2 \times 2}{3 \times 2} = \frac{4}{6} \qquad \frac{2}{3} = \frac{4}{6}$$

$$\frac{2 \times 3}{3 \times 3} = \frac{6}{9} \qquad \frac{2}{3} = \frac{6}{9}$$

$$\frac{2 \times 4}{3 \times 4} = \frac{8}{12} \qquad \frac{2}{3} = \frac{8}{12}$$

T *So, my partner agrees that I earned:* 5 points for 3 or more, 2 points for 2, 1 point for 1 or 0 points for 0 *points during my turn.*
T *Now it is my partner's turn to try.*
T He/She *will pick any fraction card.*
T He/She *picked* name fraction selected.
T *I will watch the clock for 30 seconds while my partner tries to make as many equivalent fractions as* he/she *can in 30 seconds.* Watch the clock for 30 seconds.
T *Ok, time is up!*
T *My partner made* name how many fractions he/she created *equivalent fractions.*
T *Now I will check* his/her *work.* Check the accuracy of the answers.

T *My partner earned:* 5 points for 3 or more, 2 points for 2, 1 point for 1 or 0 points for 0 *points during* his/her *turn.*

T *You will continue to play until there are no cards left or you run out of time.*

T *Remember to be a good sport and congratulate the winner!*

Walk around and monitor students as they play. If students are struggling join them for a round to get them on track. If students are off task, give them a warning that they will not be allowed to play if they continue to be off task.

Make sure to "Break Up Your Day!"

Now is a great time to take a break and get students re-energized.
See our list of engaging movement and brain break ideas to get your students moving and ready to refocus! (see page 20)

Name: _____Date: _____

Exit Slip: Segment 1

Equivalent Fractions: Use multiplication to create equivalent fractions.

1. Name 3 equivalent fractions for each. (show your work)

a. $\frac{2}{3}$ $\frac{2\,x}{3\,x} =$ $\frac{2\,x}{3\,x} =$ $\frac{2\,x}{3\,x} =$

b. $\frac{5}{6}$ $\frac{5\,x}{6\,x} =$ $\frac{5\,x}{6\,x} =$ $\frac{5\,x}{6\,x} =$

c. $\frac{3}{4}$ $\frac{3\,x}{4\,x} =$ $\frac{3\,x}{4\,x} =$ $\frac{3\,x}{4\,x} =$

2. Use a visual model (rectangle or number line) to explain the equivalency of 2 equivalent fractions from part a, b, & c above.

$\frac{2}{3} =$ $\frac{5}{6} =$ $\frac{3}{4} =$

Name: _____Date: _____

Exit Slip: Segment 2

Equivalent Fractions: Use division to create equivalent fractions.

1. Name 1 equivalent fractions for each. (show your work)

g. $\frac{12}{24}$ $\frac{12 \div}{24 \div} =$

h. $\frac{15}{20}$ $\frac{15 \div}{20 \div} =$

i. $\frac{8}{32}$ $\frac{8 \div}{32 \div} =$

2. Use a visual model (rectangle or number line) to explain the equivalency of 2 equivalent fractions from part a, b, & c above.

$\frac{12}{24} =$ $\frac{15}{20} =$ $\frac{8}{32} =$

$\frac{1}{2}$	$\frac{2}{2}$	$\frac{1}{3}$
$\frac{2}{3}$	$\frac{3}{3}$	$\frac{1}{4}$
$\frac{2}{4}$	$\frac{3}{4}$	$\frac{4}{4}$
$\frac{1}{5}$	$\frac{2}{5}$	$\frac{3}{5}$

$\frac{4}{5}$	$\frac{5}{5}$	$\frac{1}{6}$
$\frac{2}{6}$	$\frac{3}{6}$	$\frac{4}{6}$
$\frac{5}{6}$	$\frac{6}{6}$	$\frac{1}{8}$
$\frac{2}{8}$	$\frac{3}{8}$	$\frac{4}{8}$

$\frac{5}{8}$	$\frac{6}{8}$	$\frac{7}{8}$
$\frac{8}{8}$	$\frac{1}{10}$	$\frac{2}{10}$
$\frac{3}{10}$	$\frac{4}{10}$	$\frac{5}{10}$
$\frac{6}{10}$	$\frac{7}{10}$	$\frac{8}{10}$

$\frac{9}{10}$	$\frac{10}{10}$

Make sure to "Break Up Your Day!"

These can be used in the middle of a lesson or at the end of your lesson.
Here are a few engaging movement and brain break ideas to get your students moving and ready to refocus!

Break Up Your Day: Math Outside!

- Students take a scratch paper and pencil and find fractions outside.
- Students draw and label the fractions they find (¼ of a four-square court, ⅛ steps on the slide, etc.)

Break Up Your Day: Buddy, Buddy!

FORMATION: Partners
EQUIPMENT: Paper
RULES/DIRECTIONS:

- Have partners ball up a piece of paper and place it on the floor.
- Ask the partners to pick up the paper using the body parts called out by the teacher: Elbow and elbow, Foot and foot, Knee and knee, Forearm and elbow, Foot and elbow, Knee and elbow, Forehead and back of hand, Toe and finger
- Students can place the paper ball back on their desks, or move it to other parts of the room.

Break Up Your Day: Fractions in Your Family!

- Students discuss with a shoulder buddy what part of a fraction they represent in their immediate family (1 out of 4 people would be ¼ of the family).
- Have them extend their family to include grandparents (1 out of 8 people would be ⅛ of the family).
- Have them extend again to count aunts, uncles, cousins, etc.
- Compare their findings with their shoulder buddy and see if they have the same "Fraction Family!"