

My Problem-Solution Space

Name: _____

Date: _____

I am learning how to **make sense of a math problem** and how to **make a convincing argument** about my solution.

- ◇ **Paraphrase** or retell the problem in your own words.
- ◇ Create and label a **visual model to represent** the problem and the solution.

- ◇ Use **numbers to solve** the problem.

- ◇ Write your **answer** in complete sentences.
- ◇ Use specific **information** from the problem to support your thinking.
- ◇ Apply what you know mathematically to make a **convincing argument about your solution**.

2x2 or 3x3 Sentence Builders

(Also known as *Structural Indexing*)

Purpose:

- To use new math vocabulary in sentences in order to reinforce students' understanding of math concepts;
- To help students link related math words in order to construct complete sentences that are mathematically correct;
- To practice math vocabulary in order to build students' ability to use vocabulary fluently and create logical arguments independently

Steps:

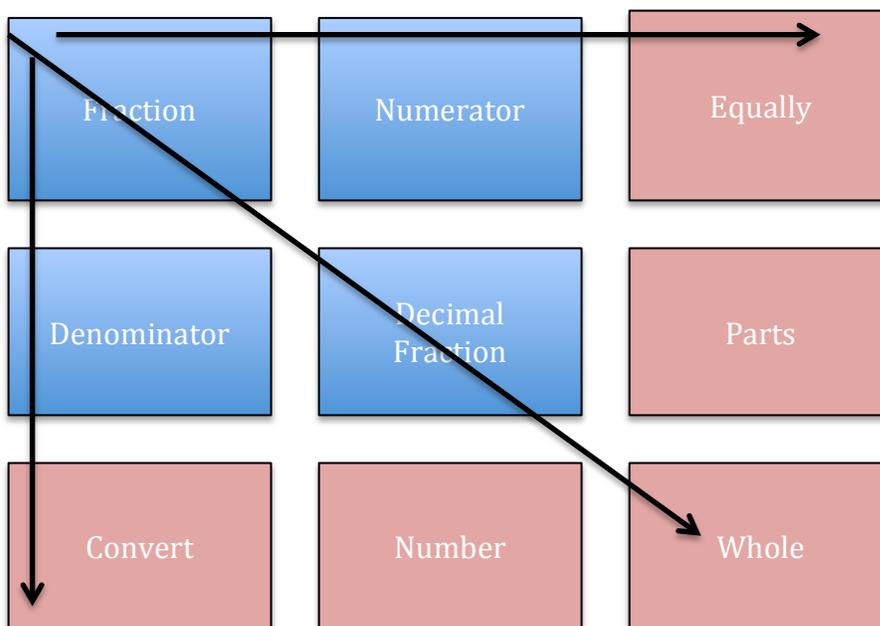
1. Think of 4 math words.* Write each word on an index card/post-it. See the words *fraction*, *numerator*, *denominator*, and *decimal fraction* as examples in the boxes below.
2. Place the cards in a 2 x 2 array**.
3. Ask students to work in pairs to create a sentence using the two words from each column, row, and diagonal. A total of 3-6 sentences can be created. Students can be asked to create sentences orally or in writing.
4. Emphasize that sentences MUST be complete and mathematically reasonable.

*9 words can be used to make the activity more challenging. See the added words *equally*, *parts*, *convert*, *number*, and *whole* in the boxes below.

** Create a 3 x 3 array if 9 cards are used.

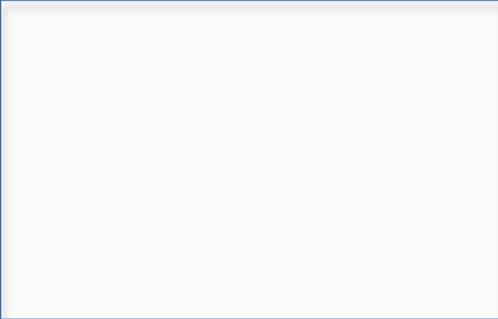
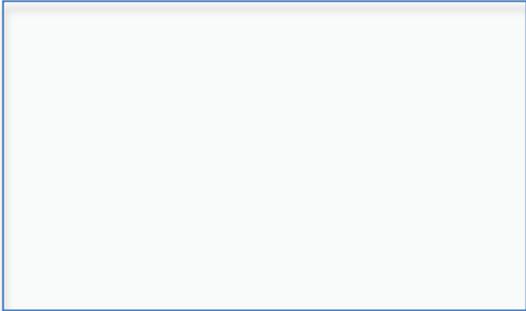
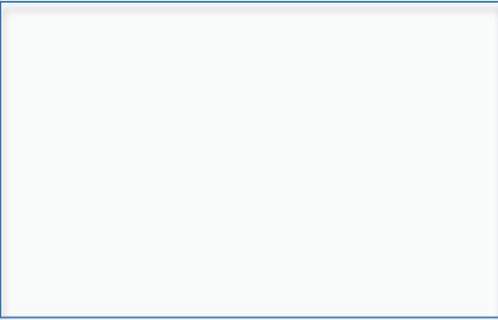
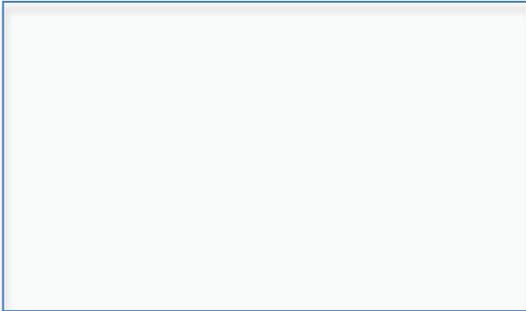
Tip: When a challenge arises, you might allow students to rearrange the cards.

Examples:



Name _____

1. Write 4 important mathematical words in each box below. The words might or might not be connected to the same mathematical concept that you learned.
2. Create at least 3 sentences using two words *horizontally*, *vertically*, or *diagonally*.
3. Make sure each sentence is complete and makes sense mathematically.
4. Share your sentences with a partner. What did you notice?

Horizontally 	Vertically 	Diagonally 
		
		

1. _____

2. _____

3. _____

4. _____



Cubing Game

Purpose: To look at a concept from different perspectives.

- **Describe** it.
- **Apply** it.
- **Compare** it with.../**Contrast** it to...
- **Connect** it to/**Associate** it with...
- **Create** a visual representation of it/a story problem.
- **Define** it.

Now, Let's Play a Cubing Game!

Concept: AREA

1. **With a partner, read the ways/perspectives below.**

- | | | |
|------------|---------------------|----------|
| • Describe | • Compare/Contrast | • Create |
| • Apply | • Connect/Associate | • Define |

2. **Now discuss how you might use these perspectives when talking about area. See some examples below but you can't use these examples when you play.**

Examples:

1. Describe: *Area is a space that the rectangle covers.*
2. Apply: *My dad needed to figure out the area of the kitchen floor when he was buying some new tiles.*
3. Compare/Contrast: *The area of this rectangle is larger than that one because it covers more space.*
4. Connect/Associate: *I associate area with the bulletin board in our classroom.*
5. Create: *When I created a flowerbed, I created an area where I'll plant some flowers. This is what it looks like.*
6. Define: *Area is the amount of space inside a plane figure.*

3. **Now, take turns tossing a cube. When the cube lands, use the perspective that faces the sky to discuss AREA.**

4. **Have FUN!!!**

We are looking at _____ from different perspectives:



- Describe** it.
- Create** its visual representation.
- Apply** it.
- Connect** it to/**Associate** it with...
- Compare** it with.../**Contrast** it to...
- Define** it.

1. How can you **describe** _____?

2. How can you **create** a visual representation of _____?

3. How can you **apply** _____?

4. How can you **connect** _____ to _____?

5. How can you **compare/contrast** _____?

6. How can you **define your next steps** based on _____?

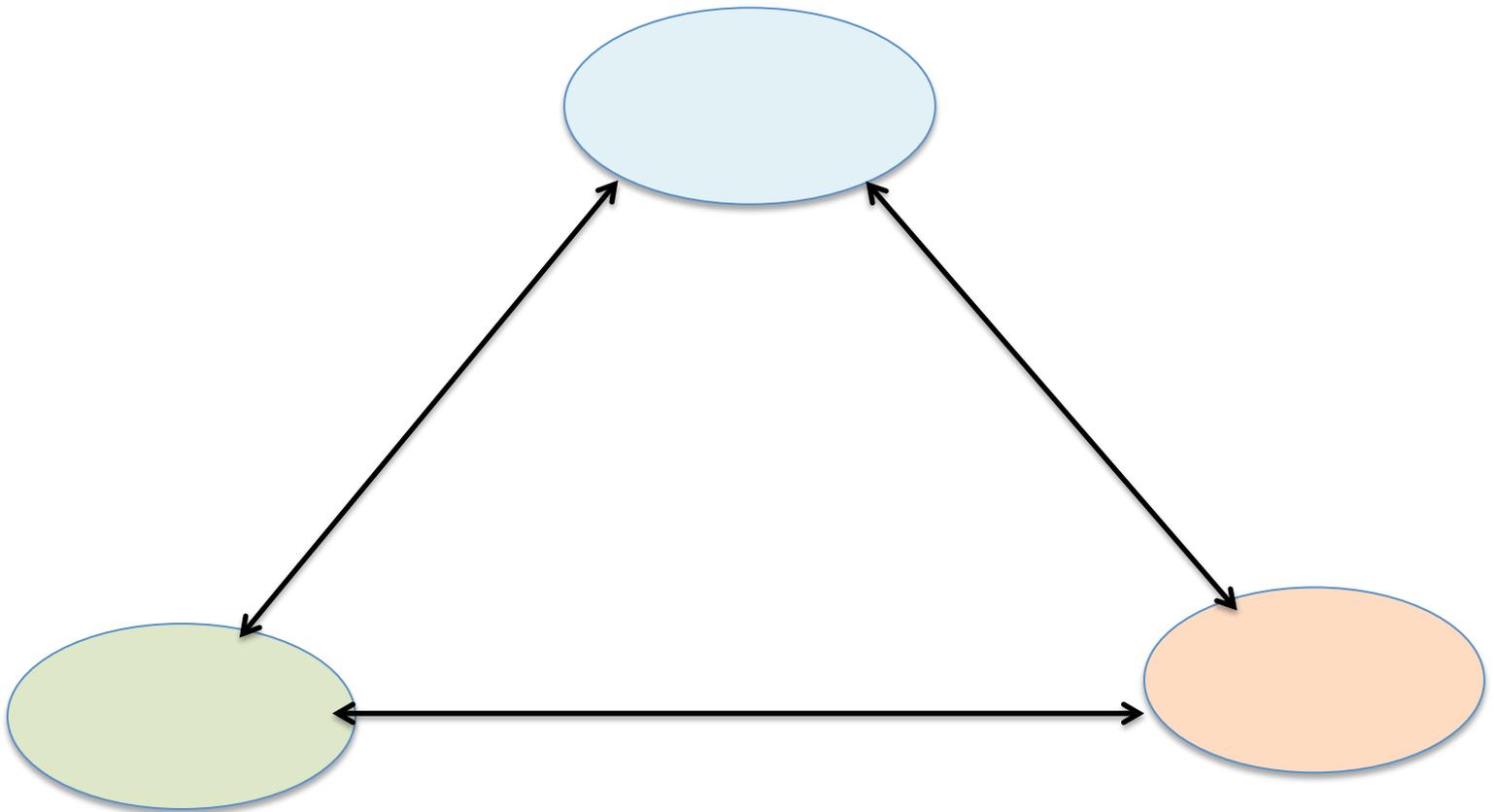
Three-Way-Tie Graphic Support

Let's Investigate and Prove the Connections/Relationships

Purpose: To provide an opportunity to think and discuss relationships between mathematical concepts or terms.

Steps:

1. Identify an important mathematical concept/term.
2. Graphically triangulate the concept/term with two other related concepts/terms.
3. Along each arrow/side, write a sentence that shows a relationship between the two concepts/terms.
Make sure that your sentences are complete and mathematically reasonable.
4. After you complete three sentences, share your sentences with a partner.
5. Discuss what you noticed about the sentences. Reflect how the sentences are similar or different. Why?



Let's Investigate and Prove the Connections!

Name: _____

I can describe how _____, _____, and _____ relate to each other!

