

Bringing ELL Students into the Math Conversation

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Fact:

Nearly 3 in 4 American classrooms now includes at least one English-language learner, and these students make up roughly 1 in 10 public school students. Education Week, 2106

What do English Language Learners need?

- 1.
- 2.
- 3.

What do teachers need to teach English Language Learners?

Definitions:

Language . . . a system for communicating _____, _____, _____, and _____ through sounds, gestures, signs and marks.

Academic Language . . . the _____ needed by students to do the work in schools.

Mathematical Register. . . specific uses of language for _____ purposes. This includes the words and structures of _____, both spoken and written, and the meanings they express.

“We must teach the language of math in order to give students - especially English learners - access to math.”

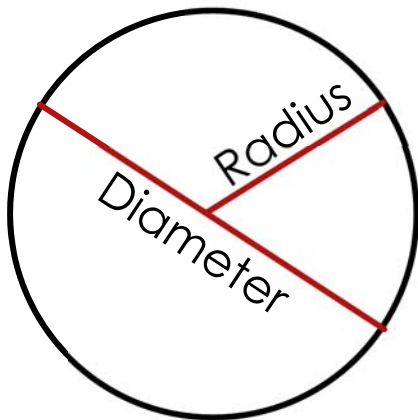
Harold Asturias, Director
Center for Mathematics Excellence and Equity
University of California, Berkeley

Question: Am I providing my students opportunities to use academic language?

Teach key academic words

Longer

Shorter



Bigger

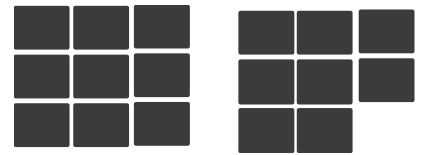
Smaller



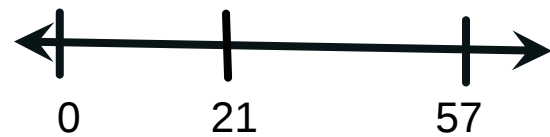
Greater Than

Less Than

$$9 > 8$$



$$21 < 57$$



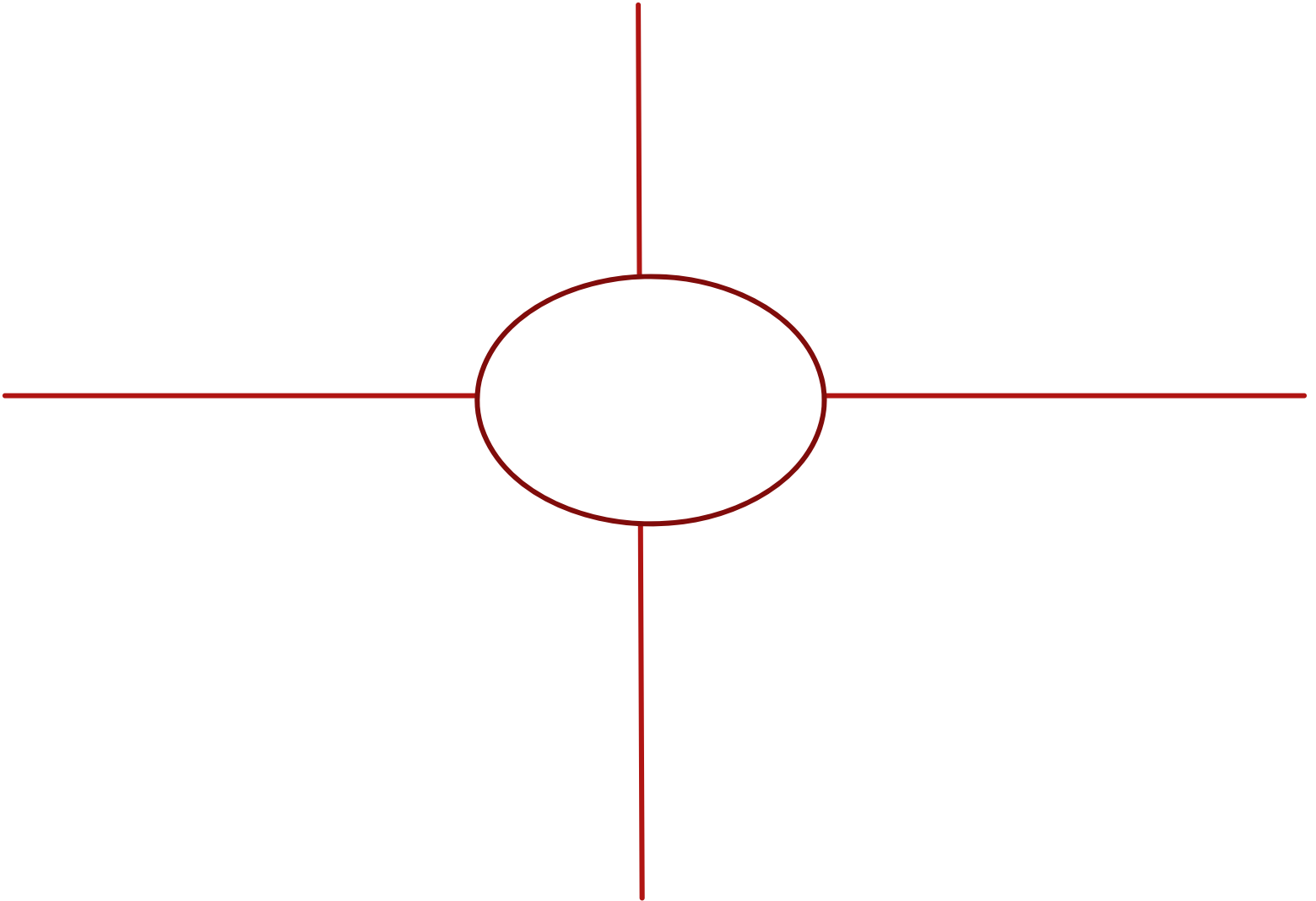
Personal Goal:

Sample: I will support student participation in discussions, listening and uncovering the content in what they are saying

Question:

Am I providing my students opportunities to use *mathematical* language?

Simplify the language, not the mathematics



Personal Goal:

Question: How am I creating the need for students to use the language?

Use sentence frames to give students practice with mathematical language

Samples of language functions and Sentence Frames			
<i>Function</i>	<i>Beginning</i>	<i>Intermediate</i>	<i>Advanced</i>
Describing Nouns	A ____ has _____. A ____ is _____.	A ____ has _____, _____, and _____. A ____ is _____, _____, and _____.	A _____ might have _____ or _____, but it will always have _____.
Categorizing	A ____ is a _____.	A _____ is a _____ because _____.	A _____ might have _____ or _____, but it will always have _____.
Summarize	A fraction has _____ and a _____.	Fractions always have _____ and _____. Some _____ are _____ and some are _____.	In conclusion, fractions have _____ and _____; however, _____ are not always _____.
Sequencing	First, I _____. Second, _____.	First, I _____ and then, _____.	After I _____, I _____.

Adapted from Supporting English Language Learners in Math Class, Math Solutions,

MathSolutions.com

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Personal Goal:

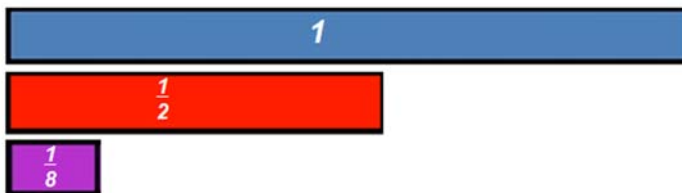
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**Question: What strategy can I use to get my students to talk about the math?**

***Make the math visual***

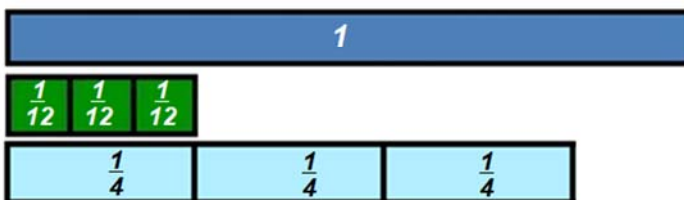
**Strategy 1:** Compare Unit Fractions

$$\frac{1}{2} \quad \frac{1}{8}$$



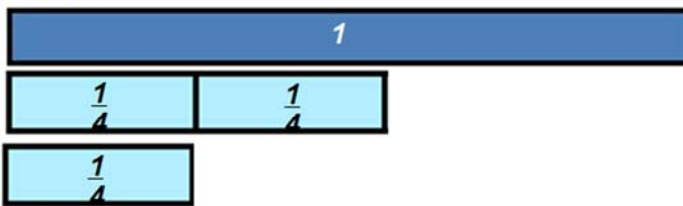
**Strategy 2:** Compare Fractions With Common Numerators

$$\frac{3}{12} \quad \frac{3}{4}$$



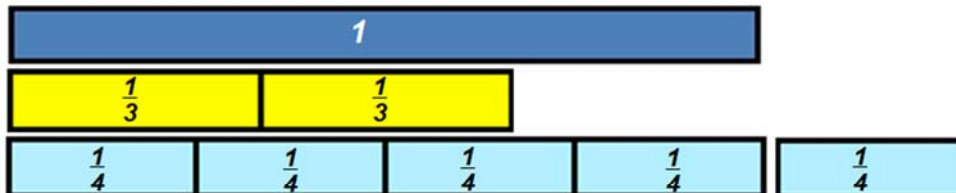
**Strategy 3:** Compare Fractions With Common Denominators

$$\frac{2}{4} \quad \frac{1}{4}$$



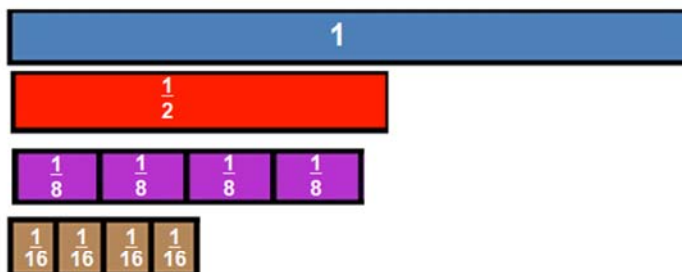
**Strategy 4:** Compare Fractions One Unit Fraction From 1

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



**Strategy 5:** Compare Fractions to  $\frac{1}{2}$

$$\frac{4}{8} \quad \frac{4}{16}$$



**Strategy 6:** Change fractions to equivalent fractions

$$\frac{2}{12} \quad \frac{1}{4}$$



**Personal Goal:**

## Question: What happens when my students talk very little, if at all?

### *Respect a little bit of silence*

#### Why do they get confused:

- eighths vs eights
- sum vs some
- divided into vs. divided by
- expression vs expression
- assuming X is true, then Y

Try to ask “What did you learn in today’s lesson?” “What questions do you still have?”

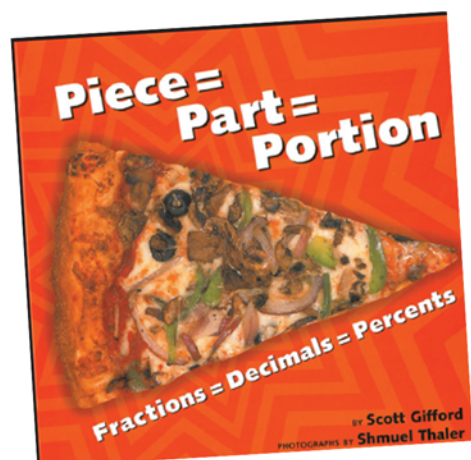
#### Why do they get confused: **EVEN**

##### In common usage . . .

- ✓ portions being **even** when each person has the same amount
- ✓ knitting stitches being **even** when they are consistently the same size
- ✓ person having an **even** disposition
- ✓ getting **even** when we feel we've been wronged
- ✓ **even** Stephen
- ✓ **even** if
- ✓ **even** when

##### In the context of mathematics . . .

a whole number divisible by 2, which means it can be divided into two equal groups with a remainder of zero.



#### **Hello   Hola   Bonjour**

Each of these words mean the same thing—a friendly greeting—in a different language.

#### **Glad   Merry   Joyful**

Each of these words refers to the same thing—a happy feeling—in a slightly different way.

## Personal Goal:

Question: What happens when my student talk very little, if at all?

Work in small groups

# Game Rules for 101 and Out

## HOW TO PLAY

**What you need**

- Workspace page 32 or 33
- Blue number cube (1–6)

➤ Players take turns for up to 6 rolls each.

1

5

1

7

| Player A |   |                                   |
|----------|---|-----------------------------------|
| Roll 1   | 5 | 1 + <u>  </u> = <u>  </u>         |
| Roll 2   |   | <u>  </u> + <u>  </u> = <u>  </u> |

Roll the number cube and record it.

2

| Player A |   |                                   |
|----------|---|-----------------------------------|
| Roll 1   | 5 | 1 + <u>50</u> = <u>51</u>         |
| Roll 2   |   | <u>  </u> + <u>  </u> = <u>  </u> |

Decide whether to use the roll as tens or ones.  
Add to your starting number.

3

| Player A |   |                                   |
|----------|---|-----------------------------------|
| Roll 1   | 5 | 1 + <u>50</u> = <u>51</u>         |
| Roll 2   |   | <u>51</u> + <u>  </u> = <u>  </u> |

Record the sum as your starting number for the next turn.

4

5

1

7

➡

Pass the number cube to your partner.

DIGITAL GAME➡ Trade turns.

➤ The player whose total score is closer to 100 wins.

➤ Any player who goes over 100 is out!

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Home Note: Your child practices adding ones and tens to numbers by playing a game.

# Game Rules for *101 and Out*

## HOW TO PLAY

### What you need

- *WorkSpace* page 32 or 33
- Blue number cube (1–6)

➤ Players take turns for up to 6 rolls each.

1



| Player A |   |                                                             |
|----------|---|-------------------------------------------------------------|
| Roll 1   | 5 | $1 + \underline{\quad} = \underline{\quad}$                 |
| Roll 2   |   | $\underline{\quad} + \underline{\quad} = \underline{\quad}$ |

Roll the number cube and record it.

2

| Player A |   |                                                             |
|----------|---|-------------------------------------------------------------|
| Roll 1   | 5 | $1 + \underline{50} = \underline{51}$                       |
| Roll 2   |   | $\underline{\quad} + \underline{\quad} = \underline{\quad}$ |

Decide whether to use the roll as tens or ones.  
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3

| Player A |   |                                                          |
|----------|---|----------------------------------------------------------|
| Roll 1   | 5 | $1 + \underline{50} = \underline{51}$                    |
| Roll 2   |   | $\underline{51} + \underline{\quad} = \underline{\quad}$ |

Record the sum as your starting number for the next turn.

4



Pass the number cube to your partner.

**DIGITAL GAME** Trade turns.

- The player whose total score is closer to 100 wins.
- Any player who goes over 100 is out!



# 101 and Out

## HOW TO PLAY

1



| Player A |   |                                                                                  |
|----------|---|----------------------------------------------------------------------------------|
| Roll 1   | 5 | $1 + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$                        |
| Roll 2   |   | $\underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$ |

Roll the number cube and record it.

2

| Player A |   |                                                                                  |
|----------|---|----------------------------------------------------------------------------------|
| Roll 1   | 5 | $1 + \underline{50} = \underline{51}$                                            |
| Roll 2   |   | $\underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$ |

Decide whether to use the roll as tens or ones. Add to your starting number.

3

| Player A |   |                                                                        |
|----------|---|------------------------------------------------------------------------|
| Roll 1   | 5 | $1 + \underline{50} = \underline{51}$                                  |
| Roll 2   |   | $\underline{51} + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$ |

Record the sum as your starting number for the next turn.

| Player A     |  |                                                                                  | Player B     |  |                                                                                  |
|--------------|--|----------------------------------------------------------------------------------|--------------|--|----------------------------------------------------------------------------------|
| Roll 1       |  | $1 + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$                        | Roll 1       |  | $1 + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$                        |
| Roll 2       |  | $\underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$ | Roll 2       |  | $\underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$ |
| Roll 3       |  | $\underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$ | Roll 3       |  | $\underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$ |
| Roll 4       |  | $\underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$ | Roll 4       |  | $\underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$ |
| Roll 5       |  | $\underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$ | Roll 5       |  | $\underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$ |
| Roll 6       |  | $\underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$ | Roll 6       |  | $\underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$ |
| Final score: |  |                                                                                  | Final score: |  |                                                                                  |





Created by  
**Marilyn Burns**

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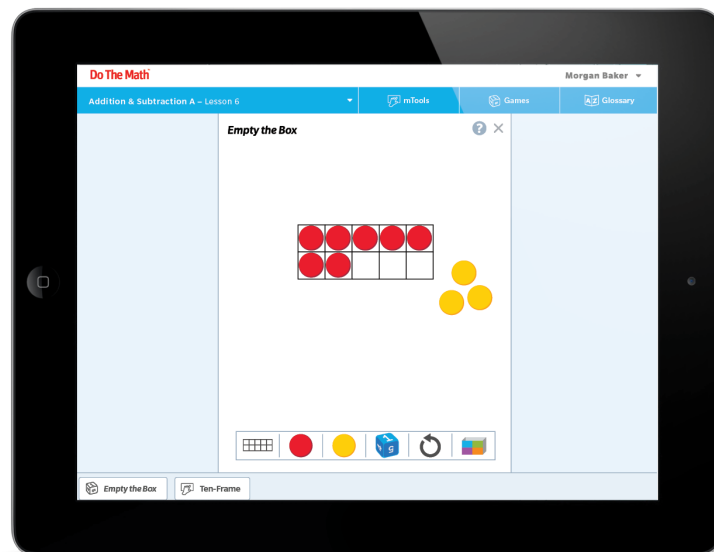
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