



ACADEMIC ENGLISH
MASTERY PROGRAM

6th Grade
MATH
RESOURCES

ORDER OF OPERATIONS

P

E

M / D



A / S



PLEASE EXCUSE MY DEAR AUNT SALLY.

Name: _____

Date: _____

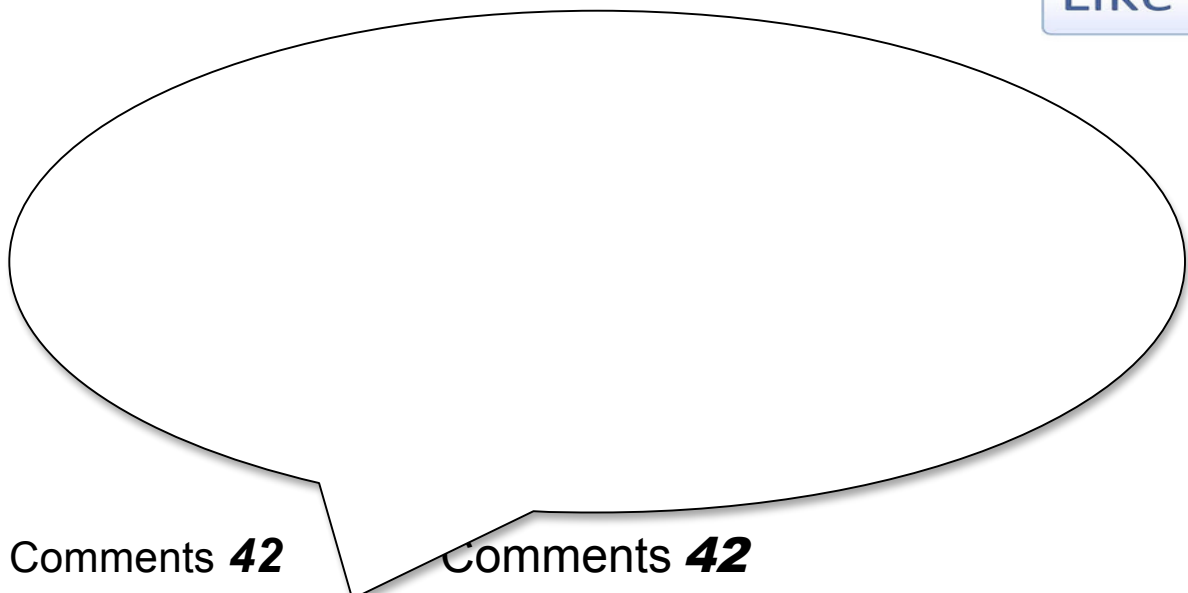
Period: _____



Mathematics Facebook Post

Solve and show your work.

Explain & Support Reasoning



Comments **42**

Comments **42**

Constructive Conversation Skills Poster

Goal: Students independently build up ideas (knowledge, agreement, solution) using these skills.

Create



Prompt starters:

What is your idea?
How can we combine these ideas?
What do we need to do?
What are other points of view?
What do you think about...?
Why...How...I wonder...

Response starters:

One idea could be ...
My hypothesis is ...
That reminds me of ...
I noticed the pattern of ...
I think it depends on ...

Evaluate & Compare

(If more than 1 Idea)



Prompt starters:

How can we decide which is the more ___ idea?
How does evidence for your argument compare to mine?
What criteria do we use to evaluate the weight of the evidence?
How do we compare "apples" of ... to the "oranges" of ...?
Which has the heaviest/ strongest evidence?
What is your opinion? Why?
How might we take the best from both ideas?
How is that evidence stronger than this evidence?

Response starters:

I think we should use the criteria of ... because...
___ is very strong evidence because...
A point of disagreement that I have is...
Even though it seems that ...
That is a valid point, but...
I think the negatives of... outweigh the positives of ...

BUILD IDEA(S)



(& if >1 Idea, Choose 1)

Prompt starters:

Can you elaborate on the...?
What does that mean?
What do you mean by...?
Can you clarify the part about...?
Say more about...
Why... How... What... When...
How is that important?
I understand the part about... but I want to know...
Can you be more specific?
Is what I just said clear?
Does that make sense?
Do you know what I mean?
What do you think?
I'm not sure if I was clear.

Response starters:

I think it means...
In other words,
More specifically, it is ... because...
An analogy might be...
It is important because...
Let me see if I heard you right...
To paraphrase what you just said, you...
In other words, you are saying that...
What I understood was...
It sounds like you think that...
It all boils down to...
A different way to say it...

Fortify/Support



Prompt starters:

Can you give an example from the text?
Where does it say that?
What are examples from other texts?
What is a real world example?
Are there any cases of that in real life?
Can you give an example from your life?
What is the strongest support for...?
How does it support the idea?

Response starters:

For example,
In the text it said that...
Remember in the other story we read that...
An example from my life is
One case that illustrates this is...
Strong support evidence



Clarify

Math Constructive Conversation Skills Poster

Clarify Problem and Ideas for Solving It



Prompt starters:

- What are we trying to do?
- What is the problem asking?
- How does the problem begin?
- What happens in the problem?
- What do we need to know?
- How can we break this down?
- What type of problem is this?
- What patterns do we notice?
- What's a possible plan for solving it?
- What is your estimate for the answer?
- Why are you doing that?
- Where did that number come from?

Response starters:

- In order to ____, we need to ...
- In other words,
- More specifically, it is ... because...
- Let's see, it is similar to the problem about ... that we did because...
- It is important to ____ because
- Let's stay focused on ...
- Let's get back to the idea of...
- In future problems like this one we need to remember to...

Build Math Solutions, Ideas, & Understandings

Explain & Support Reasoning



Chain of reasoning w/ principles, axioms, constraints, properties, visuals, patterns...

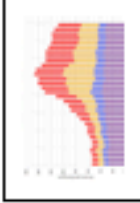
Prompt starters:

- Can you explain why you...?
- What does that mean?
- What are you doing?
- What math rule are you using?
- Can you give an example?
- How does the sample problem help us?
- What are examples of this problem from real life?
- Can you clarify where you...?
- How did you get this answer?

Response starters:

- If we ____, then we need to ____ because...
- A key mathematical principle is making sure that you...
- In real life this is similar to when you want to...
- An example from my life is
- One case that illustrates this is...
- In math, we always need to...
- Let me show you what I mean.
- We can't do that because it...

Discuss Representations and Models



$$\int_0^{\infty} \sum_{l=0}^{\infty} \frac{A_l(x)}{2\pi}$$

Prompt starters:

- How else can we show this?
- How can we draw or graph this?
- What symbols can we use?
- How can we explain this to others?
- How can we write what we are thinking/doing?
- How can we use symbols to represent this problem?

Response starters:

- Maybe we can use...
- Another way to show this is...
- We can make a data table and...
- We can draw it like this because it says...
- This variable stands for...

Use Multiple Methods for Solving

| Visual | Verbal | Symbols | Objects |
|--------|--------|---------|---------|
| | | | |

Prompt starters:

- How can we solve it with symbols, ...
- What do you think about this strategy for solving it?
- What else could we do?
- We could also move this over there to ...
- What are other ways to solve this?
- How can we write this in sentences?
- Let's try other methods for this problem.
- Let's back up and try a different way.
- Which method is most useful? Why?



Response starters:

- I think these two methods relate because...
- I want to add on to your idea of...
- That method works because...
- I see it a different way,
- That makes me think of...
- We can agree that...
- Let's try to... and see what happens.

Math Constructive Conversation Skills Poster

Math Paired Conversation Protocol

PROBLEM:

| | | | |
|---|---|---|---|
| <p align="center">Paraphrase and clarify problem for one another (pairs) <i>(What is asked; what is given; what happens; what the units are; possible plans for solving it)</i></p> <p align="center">TALK</p> | | | |
| <p align="center">Estimate the answer <i>(Each partner generate and justify your own estimate; then compare them)</i></p> <p align="center">TALK</p> | | | |
| <p align="center">METHOD A <i>(name it)</i></p> | | <p align="center">METHOD B <i>(name it)</i></p> | |
| <p>Visuals, Drawings, Charts, Symbols, Calculations, Solution</p> | <p align="center">  Justify what you do TALK </p> | <p>Visuals, Drawings, Charts, Symbols, Calculations, Solution</p> | <p align="center">  Justify what you do TALK </p> |
| <p>Check answer and compare to estimated ones TALK</p> | | <p>Check answer and compare to estimated ones TALK</p> | |
| <p align="center">Discuss (argue) which method you would recommend for problems like this. Why? TALK</p> | | | |
| <p align="center">Discuss connections between the two methods. How do they relate? TALK</p> | | | |
| <p align="center">Generate a final summary for how to solve problems like this; use this problem as an example. TALK</p> | | | |
| <p align="center"><i>Co-create a similar problem, write it on the back, and solve it (then share the problem with others)</i> TALK & WRITE</p> | | | |



My Numerical Expression Handout



Directions: Assign a numerical value to each figure you will include in your expression. Your numerical expression must include parenthesis, an exponent, and all operational symbols. Once you have arranged your numerical expression in model form, recreate your expression on your handout using the appropriate corresponding colors for each figure selected. Be sure to include a legend, which outlines the values for each geometric figure used.

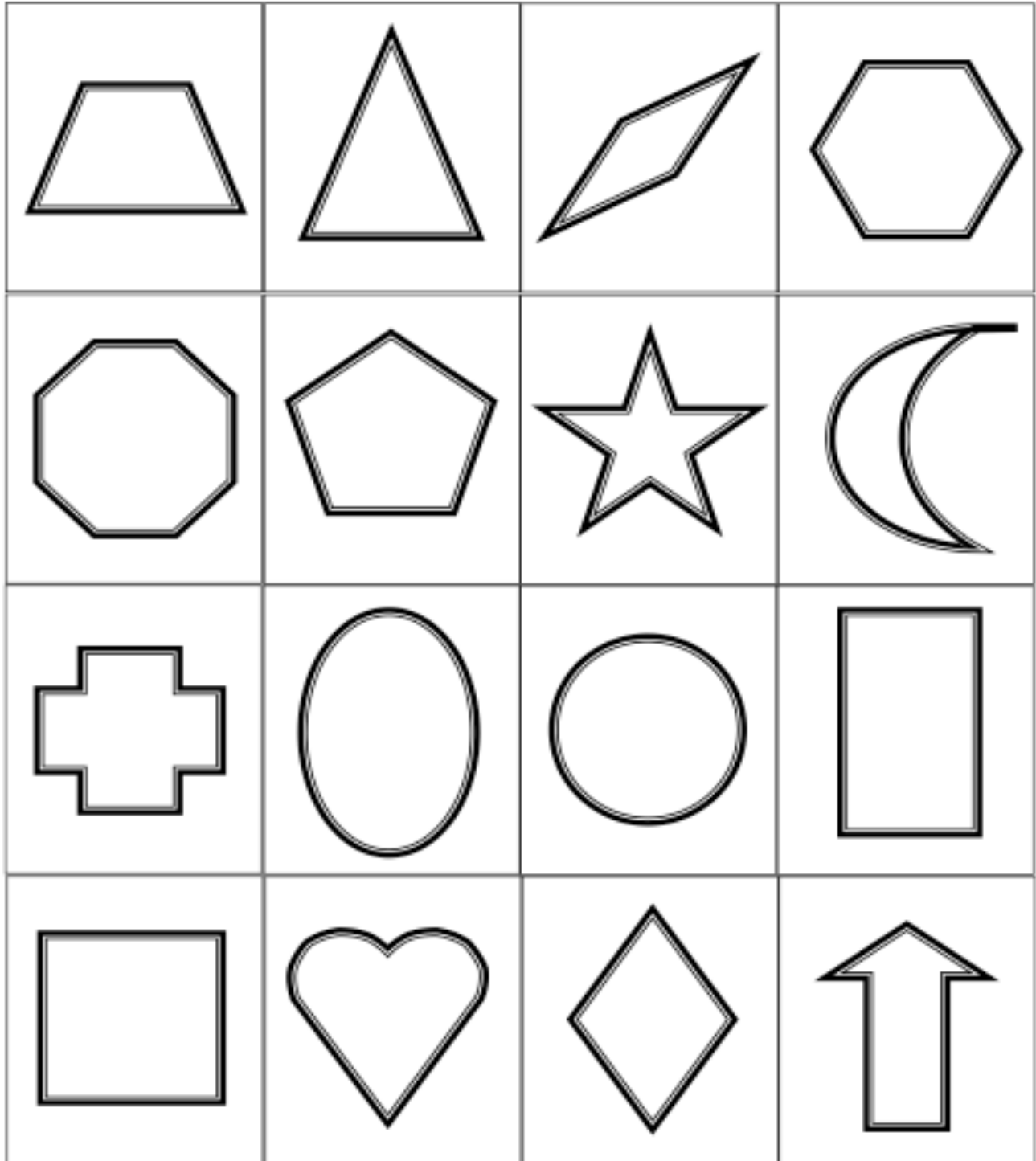
Lastly, on a separate sheet of paper justify the answer to your expression. Show all necessary steps. |

Draw Expression Here

Legend



Geometric Shapes



Investigation Materials

Order of Operations

| | | |
|----------|----------|---------------------------------|
| (|) | 2 Squared Exponent |
| . | / | + |
| - | = | |

Conversation Analysis Tool



The following tool is meant to help you reflect on two key dimensions of effective classroom conversations. Prompt students to converse about a conversation-worthy topic that you are studying and observe or record their interaction. You can use this for practice and notes. Use of numbers is optional.

DIMENSION 1: Turns build on previous turns to build up (create, clarify, fortify) an idea (and turns are also used to evaluate and choose the best idea if there are two or more competing ideas.)

- 3 Most turns build on previous turns to build up an idea (& choose the best idea, if >1 idea)
- 2 Around half of the turns build on previous turns to build up an idea (& choose the best, if >1 idea)
- 1 Few turns build on previous turns to build up an idea (& choose the best idea, if >1 idea)
- 0 Turns are not used to build up one or more ideas.

| Dimension 1: Turns build on previous turns to build up an idea. | Score |
|---|-------|
| <i>Rationale for score:</i> | |

DIMENSION 2: Turns focus on the knowledge or skills of the lesson's objectives

- 3 Most turns focus on the knowledge or skills of the lesson's objectives.
- 2 Around half the turns focus on the knowledge or skills of the lesson's objectives.
- 1 Few turns focus on the knowledge or skills of the lesson's objectives.
- 0 Turns do not focus on the knowledge or skills of the lesson's objectives.

| Dimension 2: Turns focus on the knowledge or skills of the lesson's objectives | Score |
|--|-------|
| <i>Rationale for score</i> | |

Note: We realize that turns will widely vary in quality. One turn, for example, might do an excellent job at building on previous turns, advancing the conversation, and focusing on the intended learning. Take note of this, but if the rest of the turns are weak or unfocused, then the conversation as a whole would score low.

