

Strategies for  
Special  
Education  
Students

# Recall & Reasoning

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”



**Joby Hollis** 🏳️‍🌈 🇪🇺

@Jobium

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Hello my name is Joby, I have a PhD in Physics and I work for NASA and I just had to look up the equation for the volume of a sphere

10:41 AM - 3 Sep 2018

43,124 Retweets 269,326 Likes



1.5K 43K 269K

# Tell me everything you know about...

1

## SPHERES

On an index card, take a moment and write down everything you know about SPHERES.

2

## LISTEN & SHARE

Find a talk partner nearby. Take turns sharing everything you wrote down.

3

## REVISE

Return to your seat and continue writing on your card: Everything you know about SPHERES.

”



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# Today's Topics

- How can we increase recall in students with IEPs?
- How can we help struggling students make sense of the math we use in class?

# MEMORY & DISABILITIES

- Retrieval of math facts
- 



	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100



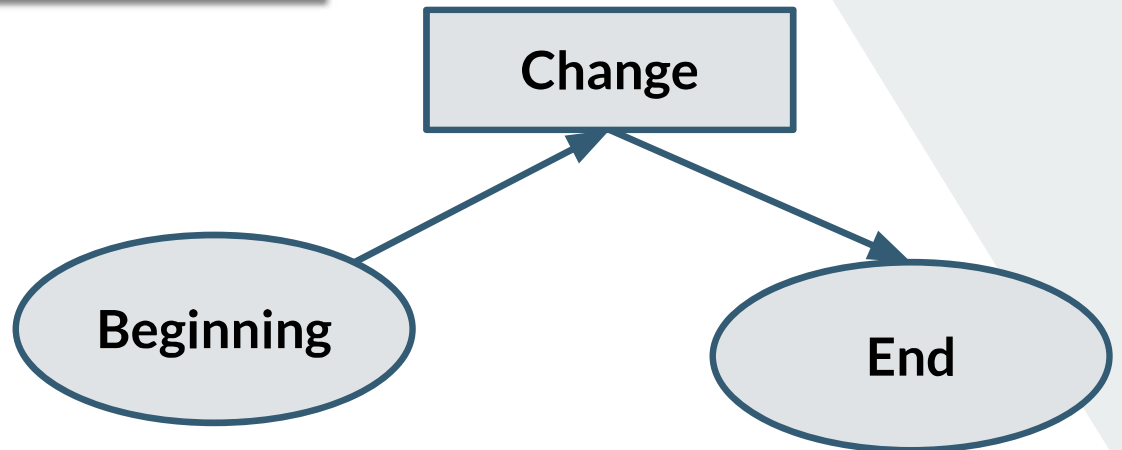
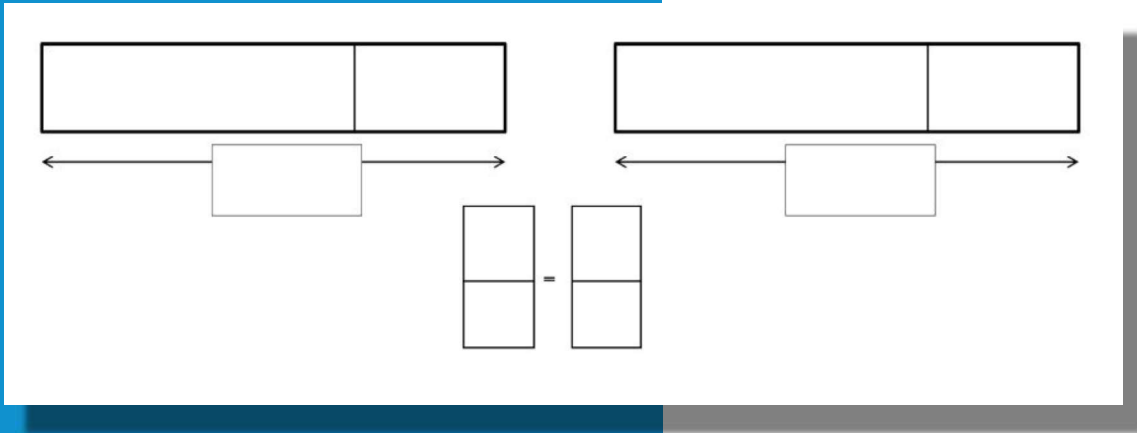
Calculation Aids



# MEMORY & DISABILITIES

- Retrieval of math facts
- Decreased working memory capacity



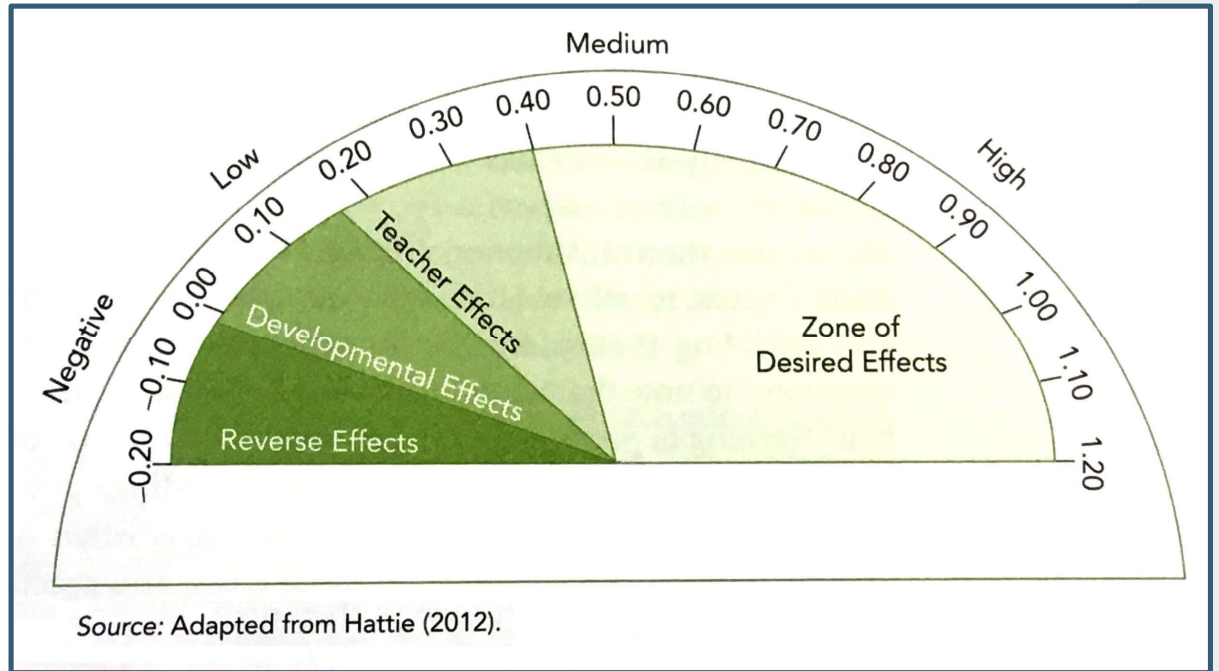
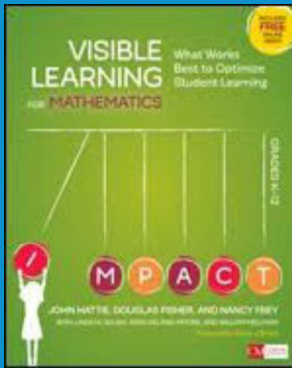


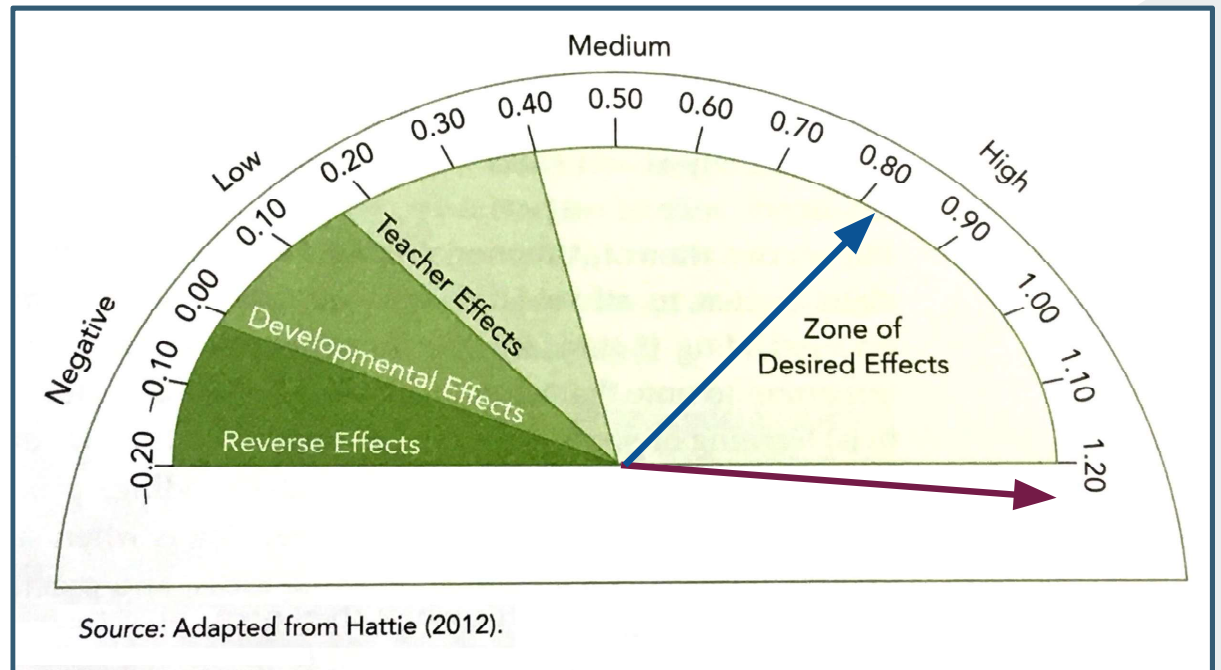
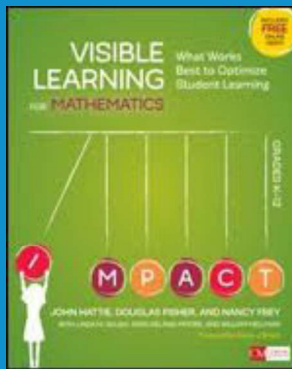
**Graphic Organizers & Schema**

# MEMORY & DISABILITIES

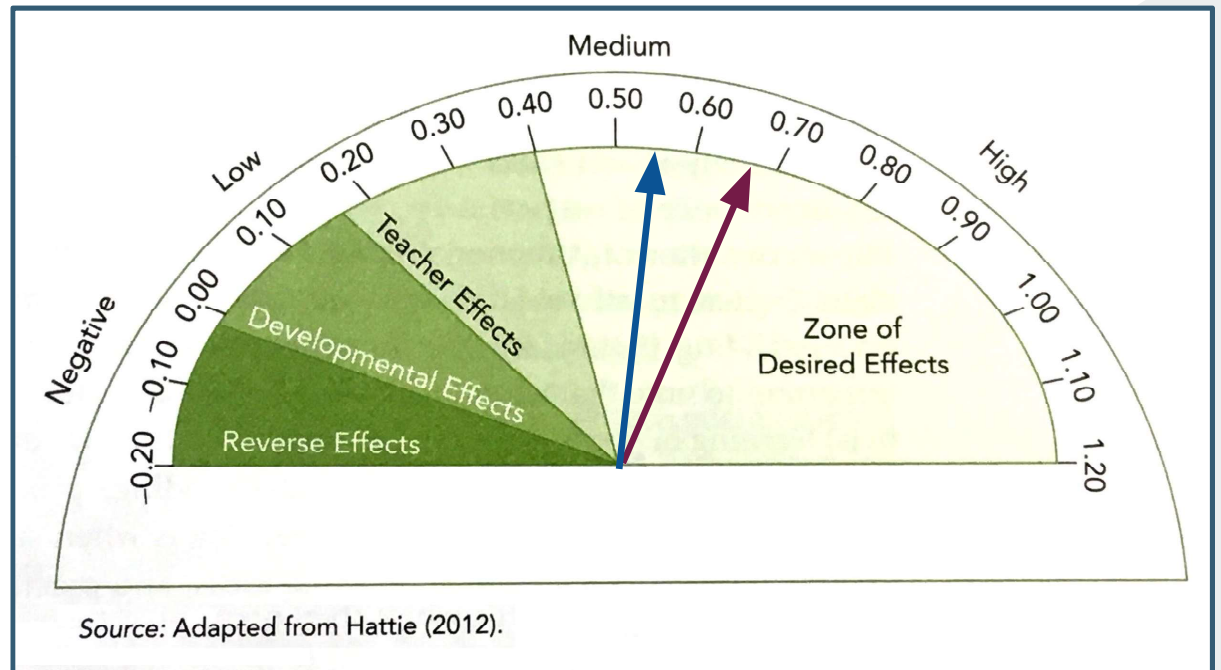
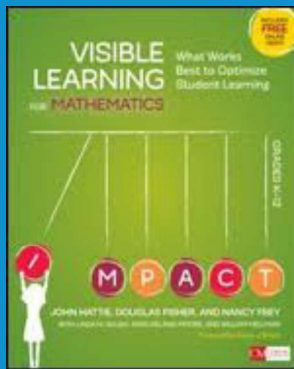
- Retrieval of math facts
- Decreased working memory capacity



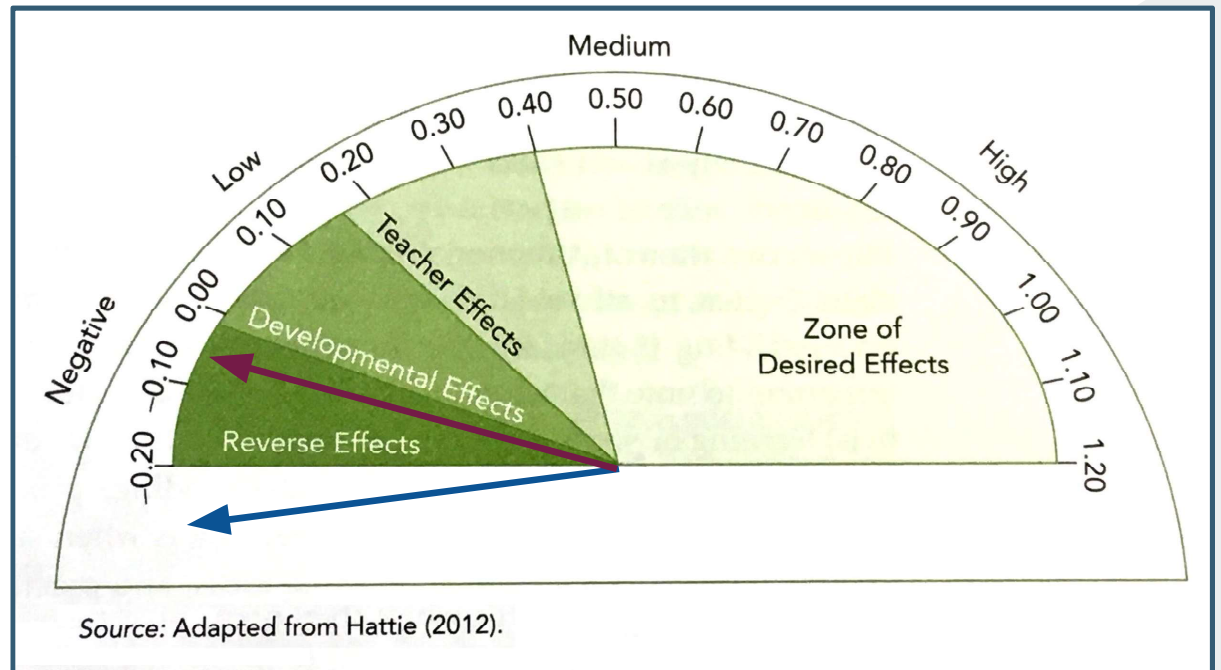
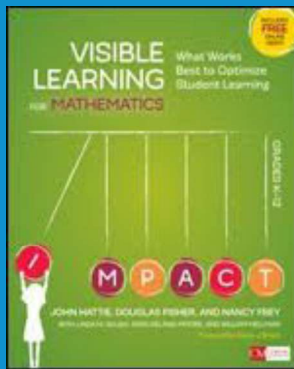




Classroom Discussion (0.82)  
Response to Intervention (1.29)



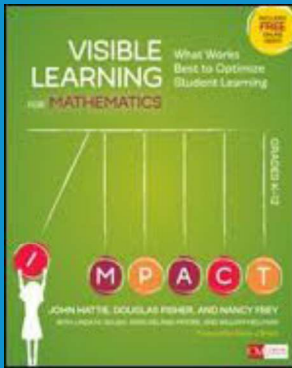
Cooperative Learning (0.53)  
Establishing Learning Goals (0.68)



Retention (-0.32)  
Lack of Sleep (-0.05)

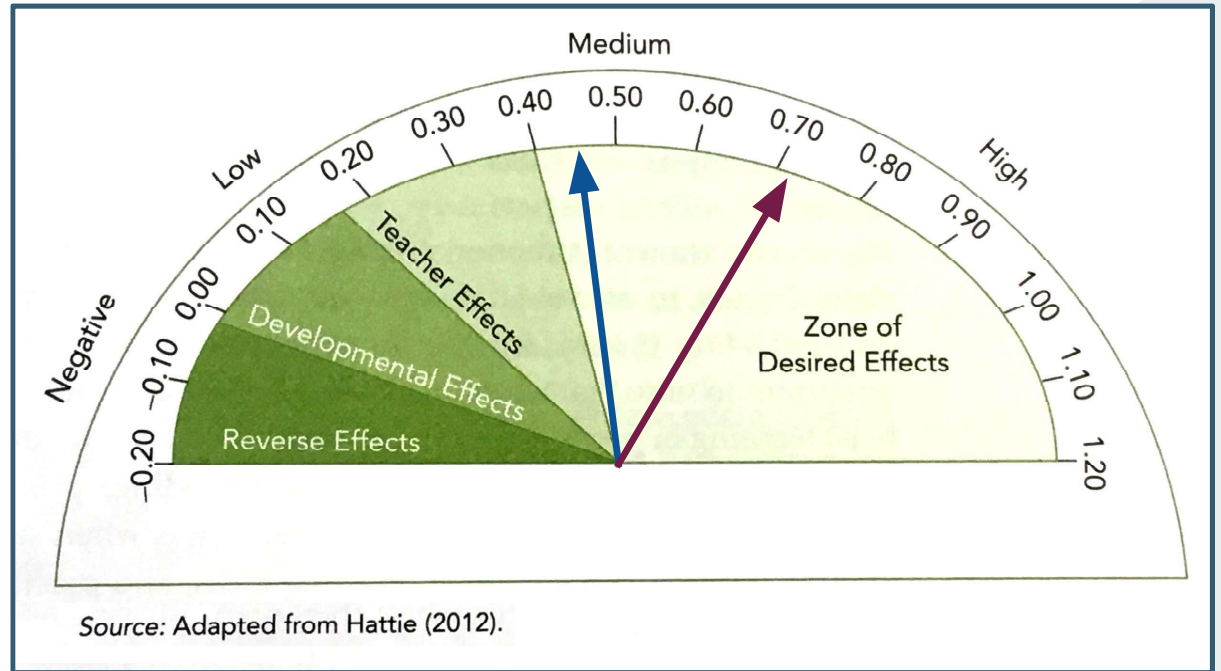
Spaced Practice provides multiple exposures over a long period of time

Effect size: 0.71



Mnemonics links information together but should not replace understanding

Effect size: 0.45

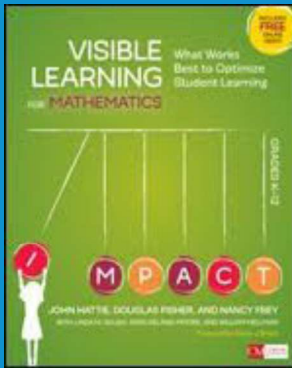


Mnemonics (0.45)  
Spaced Practice (0.71)



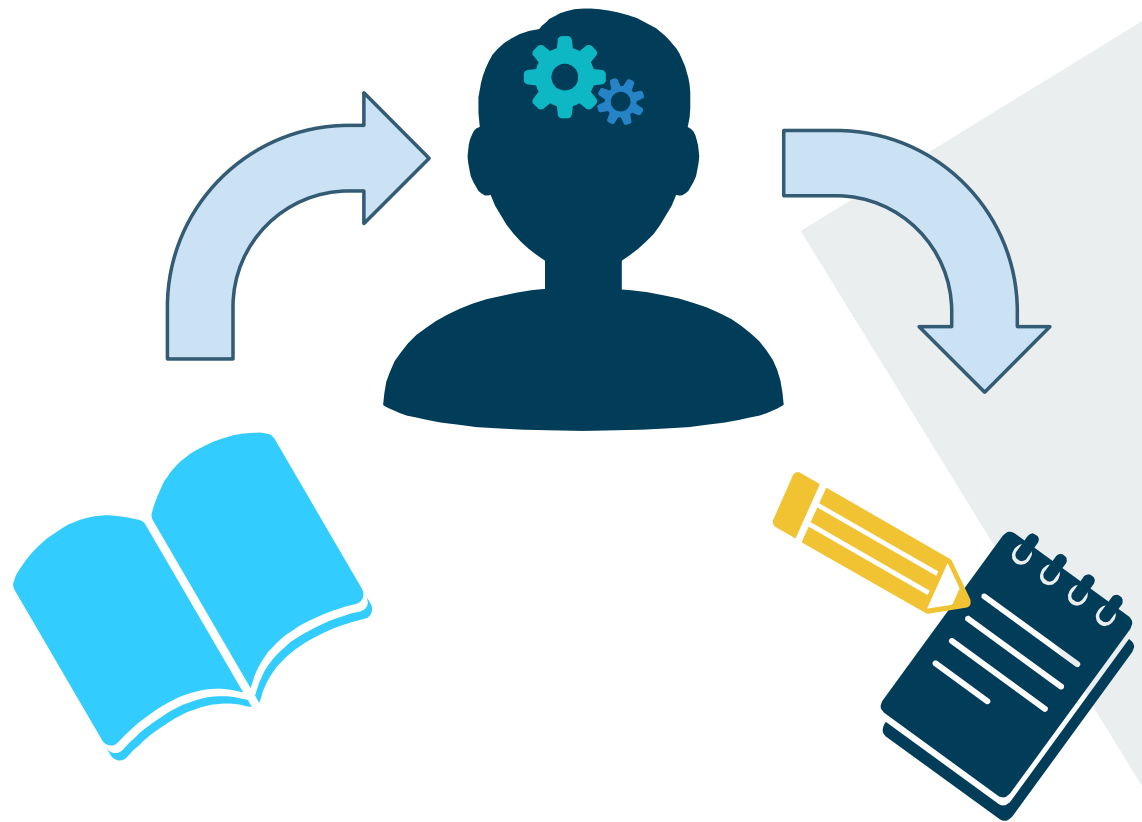
Spaced Practice provides multiple exposures over a long period of time

Effect size: 0.71



Mnemonics links information together but should not replace understanding

Effect size: 0.45



# Spaced Practice



- Reflection
- Sentence stems

- Entry/Exit Ticket
- Short quiz
- Quick poll

- Written response
- Error analysis
- Question creation

Tell me every

xed Numbers

mixed # w/d =  $9\frac{2}{3}$

improper

Fraction =  $\frac{1}{4}$

convert decimals to

Fractions =  $\frac{24}{100}$

convert fractions to  
decimals (denominators  
10 or 100)

convert improper fractions  
to mixed numbers

$$\begin{array}{r} 113 \\ 12 \overline{)113} \\ \underline{108} \\ 5 \end{array}$$

convert mixed numbers  
to improper fractions

$$6\frac{5}{8} = \frac{8 \times 6 + 5}{8} = \frac{53}{8}$$

All Who  
But no  
Whole  
Fact

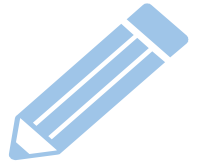
Integers  
ers are  
s and  
it

# Sentence Stems

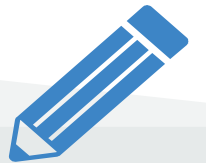
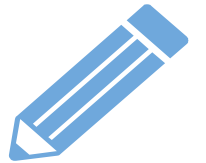
To find the volume of a sphere, the information I need is...



The steps I will use are...



I can check my answer by...



# Reflection

What did you learn in class today?



How will you know when you have mastered it?



What are some details you need to remember about what you learned?



# BUILDING MEMORY

- Big Ideas & Concepts
- Contextual Meaning vs. Rote Steps
- Achieve Mastery of Fewer Concepts



A conceptual understanding will stay with a student longer and provides a stronger foundation for future learning



# VOCABULARY MATCH

- Vocabulary Terms
- Descriptions

Description cards may contain definitions, notes, or illustrations.

You have one blank card to fill in with your own description.

- Combine Sets
- Compare & Contrast

Put your cards with your neighbor's (#1 → #1).

How are those terms alike or different?



# VOCABULARY INSTRUCTION

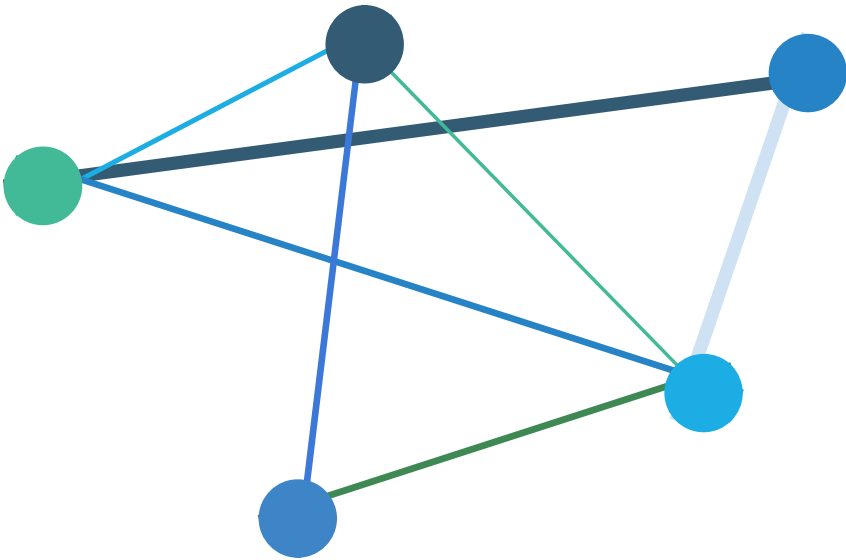
Pre-Lesson

Mid-Lesson

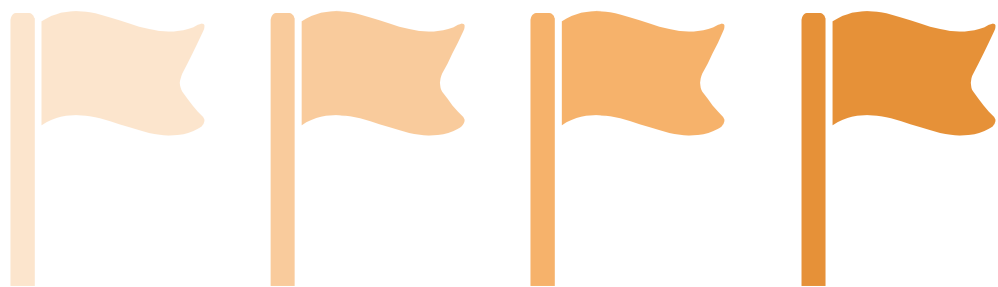
Post-Lesson



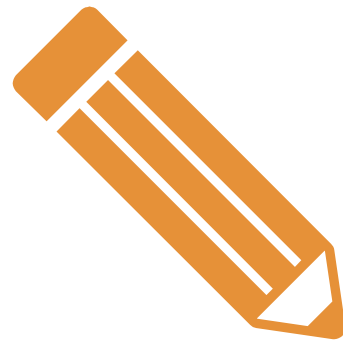
# VOCABULARY INSTRUCTION



# VOCABULARY INSTRUCTION



# MATHEMATICAL REASONING





295 students, 25 per bus

Marilyn Burns

# MODIFIED “THREE READS”

1

2

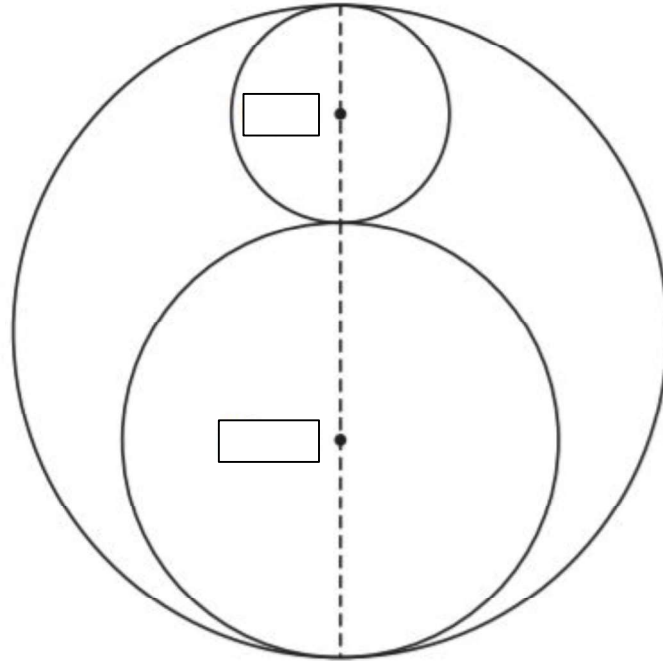
3

## RAW CONTEXT

Present the problem  
without any numbers  
and without a question.

# STAAR 2018 Released

- 23** A company's logo was designed using circles of different sizes. The diameters of **some** of the circles are shown.



# MODIFIED “THREE READS”

1

## RAW CONTEXT

Present the problem without any numbers and without a question.

2

## REVEAL THE QUESTION \*

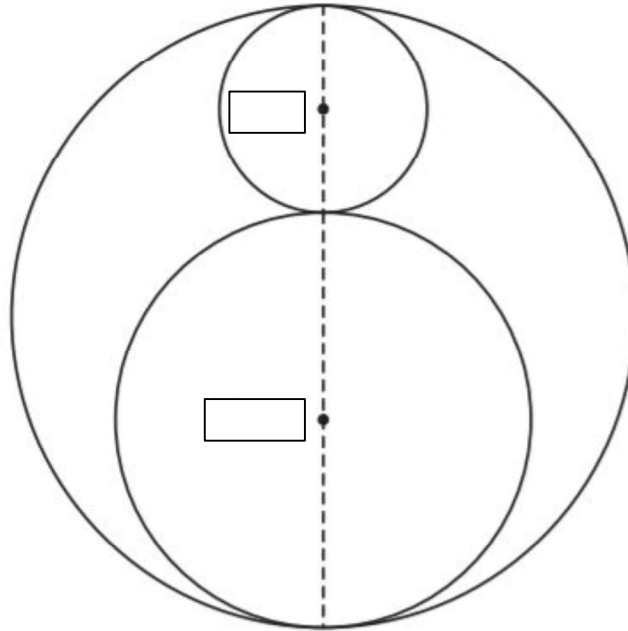
Focus on one question and discuss how we can make sense of it.

3



# STAAR 2018 Released

- 23 A company's logo was designed using circles of different sizes. The diameters of **some** of the circles are shown.



Which measurement is closest to the area of the largest circle in square centimeters?

# MODIFIED “THREE READS”

1

## RAW CONTEXT

Present the problem without any numbers and without a question.

2

## REVEAL THE QUESTION \*

Focus on one question and discuss how we can make sense of it.

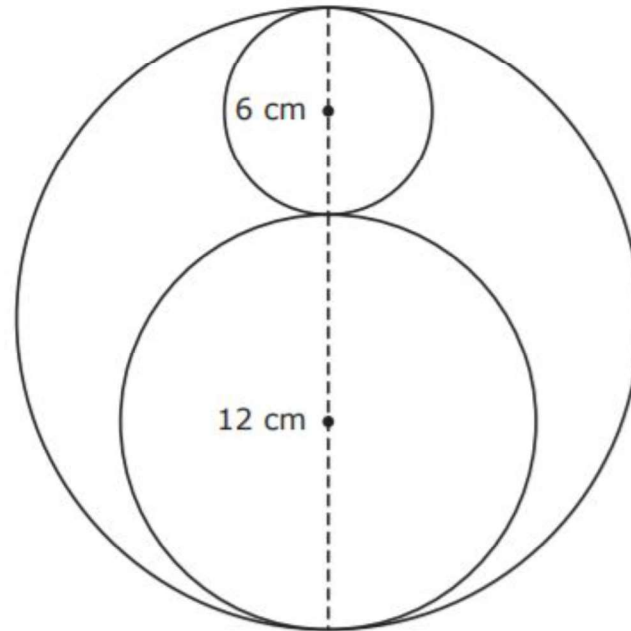
3

## DO THE MATH

Reveal all of the information and use the process we discussed during our second read.

# STAAR 2018 Released

- 23** A company's logo was designed using circles of 3 different sizes. The diameters of two of the circles are shown.



Which measurement is closest to the area of the largest circle in square centimeters?

# STAAR 2018 Released

- 34** The amount of water an electric dishwasher uses to wash dishes varies directly with the number of loads of dishes. The dishwasher uses  gallons of water to wash  loads of dishes.

# STAAR 2018 Released

- 34** The amount of water an electric dishwasher uses to wash dishes varies directly with the number of loads of dishes. The dishwasher uses 32 gallons of water to wash 4 loads of dishes.

## STAAR 2018 Released

- 34** The amount of water an electric dishwasher uses to wash dishes varies directly with the number of loads of dishes. The dishwasher uses 32 gallons of water to wash 4 loads of dishes.

How many gallons of water will the dishwasher use to wash 10 loads of dishes?



Making sense: 1

*Robert Kaplinsky*

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# Recall & Reasoning

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