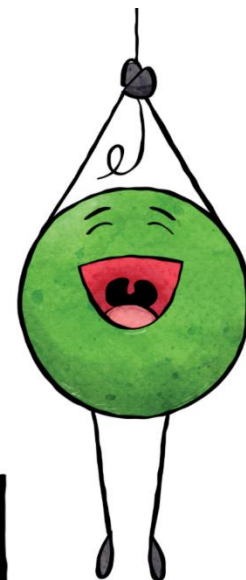
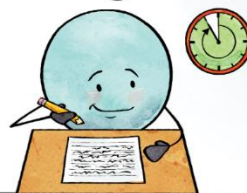


Making Sense of the Math Practices

We should use this practice ALL THE TIME!

MP1: Make sense of problems and persevere in solving them



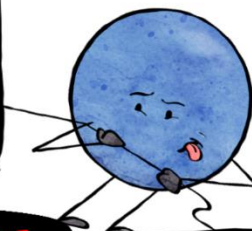
Use these practices to ENTER A PROBLEM

MP2: Reason abstractly & quantitatively



MP7: Look for and make use of structure

MP8: Look for and express regularity in repeated reasoning



Use these practices while WORKING THROUGH A PROBLEM

MP3: Construct viable arguments and critique the reasoning of others

MP4: Model with mathematics

MP5: Use appropriate tools strategically



MP6: Attend to precision

THINK LIKE A MATHEMATICIAN



Ask Yourself...

How is the situation behaving?
What kind of problem is this?
Does this problem remind me of another I've solved?
Will changing the form help?
How can I chunk this expression/number/visual?

What can I count?
What can I measure?
How are the quantities related?
How can I represent the quantities so I can see the relationships?

Is there a process that keeps repeating?
Am I counting/building/drawing in the same way each time?
Do I keep repeating the same set of calculations?
How can I use repetition to write a rule?



THINK STRUCTURE!

THINK QUANTITIES!

THINK REPETITION!

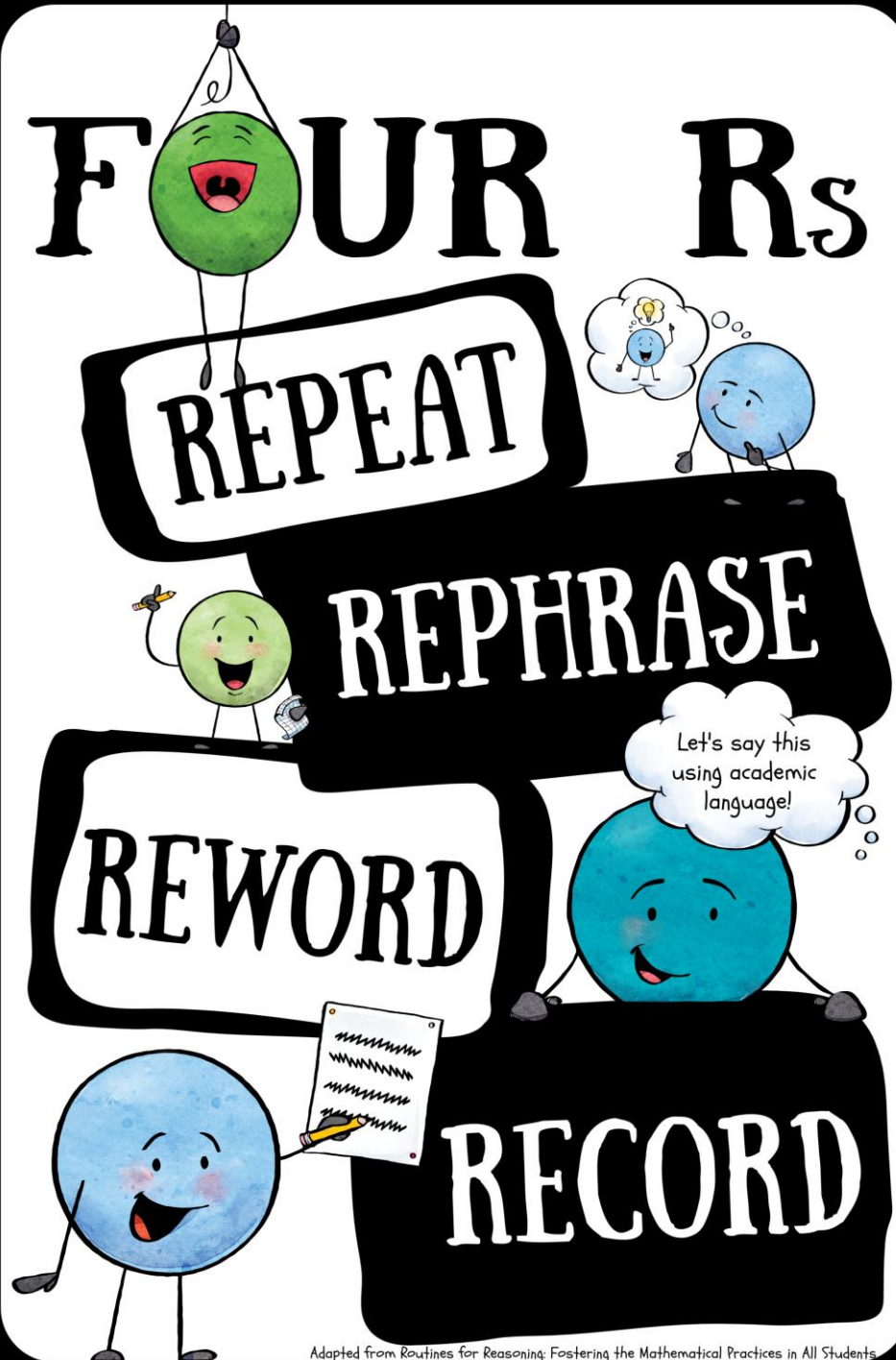
FOUR Rs

REPEAT

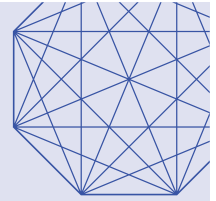
REPHRASE

REWORD

RECORD



3 Reads



1

**Launch
Routine**



THINKING GOAL
Read like a mathematician

2

**First Read:
Understand
the Context**

Individual Think Time



Share & Record



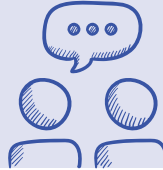
3

**Second Read:
Interpret the
Question**

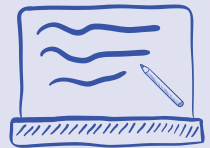
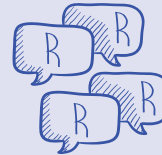
Individual Think Time



Pairs



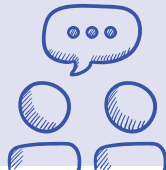
Share, Discuss, & Record



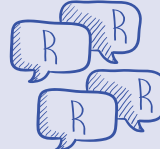
4

**Third Read:
Identify
Important
Information**

Pairs



Share, Discuss, & Record



5

**Reflect
on Your
Thinking**

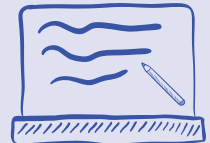
Individual Write Time



Pairs

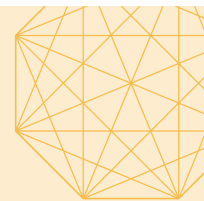


Share & Record



**FOSTERING
MATH
PRACTICES**

Capturing Quantities



1

**Launch
Routine**



THINKING GOAL
Reasoning quantitatively

2

**Identify
Quantities &
Relationships**

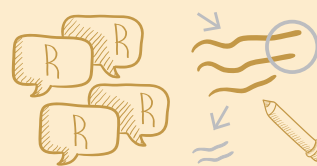
Individual Think Time



Pairs



Share, Discuss, & Annotate



3

**Create
Diagrams**

Individual Think Time



Pairs



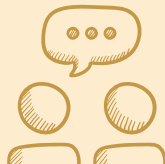
4

**Discuss
Diagrams**

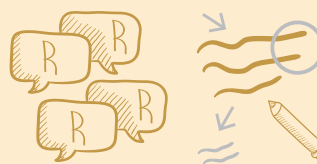
Individual Think Time



Pairs



Share, Discuss, & Annotate



5

**Reflect
on Your
Thinking**

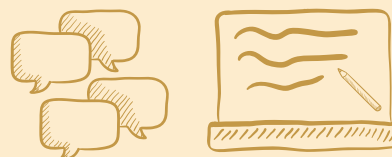
Individual Write Time



Pairs

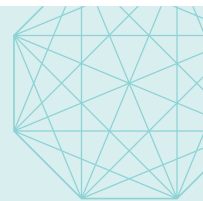


Share & Record



**FOSTERING
MATH
PRACTICES**

Connecting Representations



1

**Launch
Routine**



THINKING GOAL
Reasoning structurally

2

**Make
Connections**



3

**Share and
Study
Connections**

Partner Share



Share, Discuss, & Annotate



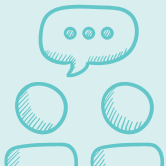
4

**Create
Representations**

Individual Think Time



Pairs



Share, Discuss, & Annotate



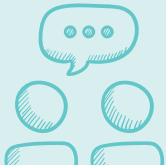
5

**Reflect
on Your
Thinking**

Individual Write Time



Pairs

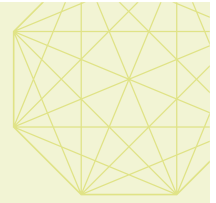


Share & Record



**FOSTERING
MATH
PRACTICES**

Recognizing Repetition



1

**Launch
Routine**



THINKING GOAL
Reason with repetition

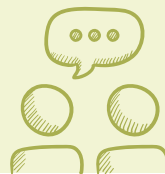
2

**Notice
Repetition**

Individual Think Time



Pairs



Share



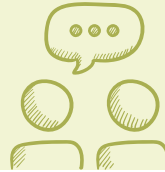
3

**Generalize
Repetition**

Individual Think Time



Pairs



4

**Discuss
Generalization**

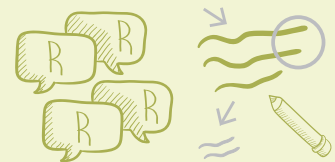
Individual Think Time



Pairs



Share, Discuss, & Annotate



5

**Reflect
on Your
Thinking**

Individual Write Time



Pairs

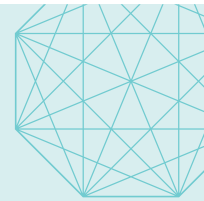


Share & Record



**FOSTERING
MATH
PRACTICES**

Contemplate Then Calculate



1

**Launch
Routine**



THINKING GOAL
Reason structurally

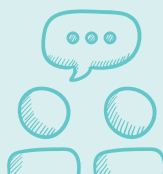
2

Notice

Individual Think Time



Pairs



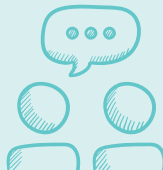
Share & Record



3

**Develop
Shortcut**

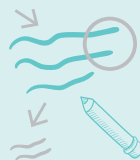
Pairs



4

**Discuss
Shortcuts**

Share, Discuss, & Annotate



5

**Reflect
on Your
Thinking**

Individual Write Time



Pairs

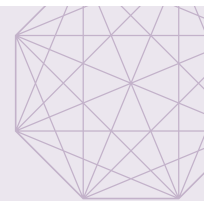


Share & Record



**FOSTERING
MATH
PRACTICES**

Decide and Defend



1

Launch Routine



THINKING GOAL
Critique and construct arguments

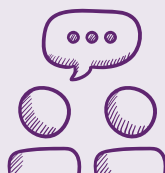
2

Interpret the Work

Individual Think Time



Pairs



Share, Discuss, & Record



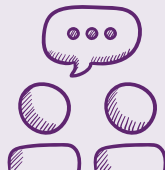
3

Decide if it is Correct

Individual Think Time



Pairs



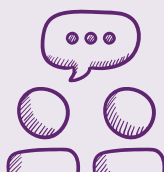
Annotate



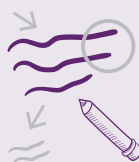
4

Draft Your Defense

Pairs



Annotate



5

Defend Your Decision

Partner Share



Think, Pair, Share



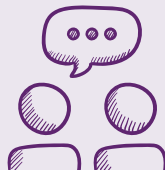
6

Reflect on Your Thinking

Individual Write Time



Pairs



Share & Record



**FOSTERING
MATH
PRACTICES**

Appendix A

Avenues of Thinking: A Framework for Making Sense of Several CCSS Standards for Mathematical Practice

Reason Abstractly and Quantitatively (MP2)	Look for and Make Use of Structure (MP7)	Look for and Express Regularity in Repeated Reasoning (MP8)
Attend to ... Quantities and relationships Ask Yourself • What can I count or measure? • What quantity or relationship does this number describe? • How do the quantities relate to each other? • How much bigger/smaller (how many times bigger/smaller) is one quantity than another? • How can I represent this situation so that I can see the quantities and relationships? • How can I show how much bigger/smaller (how many times bigger/smaller) one quantity is in my diagram? • What quantities or relationships do I see in the diagram? • Is there a “hidden” quantity or relationship that I can now see in the representation? • What does this (expression, variable, number, shaded region, etc.) represent in the problem context? Take Action • Determine which quantities/relationships are important. • Identify quantities explicitly mentioned in the problem situation. • Identify implied quantities. • Use representations to see quantities and relationships. • De-contextualize the problem situation. • Contextualize the problem.	Attend to ... The organization or behavior of number and space Ask Yourself • What type of problem is this? • Does this remind me of another problem situation? • How is this (situation, object, process, etc.) behaving? Can I connect it to something else I know? • What are the parts (chunks) of the process? • How can I get the answer without doing all the calculations? • How can I use properties to uncover structure? • How can I change the form of this (number, expression, shape) to surface the underlying structure? Take Action • Chunk complicated mathematical objects (expressions, shapes, etc.). • Connect representations. • Change the form of the number, expression, space, e.g., create equivalent expressions. • Recall and use properties, rules of operations, and geometric relationships.	Attend to ... Repetition in processes or calculations Ask Yourself • Is there something in this problem context that repeats or suggests some regularity? • How can I create or use a repeated process to help me figure out what's going on in this problem? • What was my process? Was it the same every time? • Am I counting/drawing/building/calculating in the same way each time? • What about this process is repeating? • How can I describe the repetition in words/variables, etc.? • What operations can I use to model this process? • How can I use the repetition to make my rule? Take Action • Try several numbers and observe the process. • Draw or build the next several figures in the series. • Record and track calculations. • Generalize the repetition.