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Mathematical Practices

These eight practices will help you use math thinking to solve problems.



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Mathematical Language Reference Tool

These sentence frames will help you talk and write about math.

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100 Mathematical Discourse Questions

These questions will help you share your ideas about math.

Mathematical Practices

There are eight math habits that will help make your math thinking grow stronger. We use our math thinking to figure out all kinds of problems, even hard ones from real life.

Habit 1 Solve Problems	Habit 2 Think and Reason	Habit 3 Show and Explain	Habit 4 Use Math in the Real World
Habit 5 Choose a Tool	Habit 6 Be Clear and Precise	Habit 7 Zoom In and Zoom Out	Habit 8 Use Patterns

Keep practicing!

You'll be learning to think like a math pro!

Then you'll be ready to take on any problem!



Habit 1 Solve problems.

Keep looking for clues until you solve the problem.

For some math problems, you may not know where to start. You may have to try more than one way to find the answer. But the answer you get should always make sense.

To solve problems ...

Ask yourself

- Can I say what the problem is asking for?
- Can I ask questions to understand it better?
- Can I try a different way if I need to?

MATHEMATICAL PRACTICES SMP 1 Make sense of problems

and persevere in solving them.

Then, discuss with a partner

- I made sure I understood the problem when I . . .
- I know my answer makes sense because . . .

Habit 2 Think and reason.

Make sense of the words and the numbers in a problem.

Reasoning is thinking about how ideas go together. If you know one thing, then you know another thing. Reasoning is using math rules and common sense together.

To use reasoning to solve a problem ...

Ask yourself

- Can I use addition to solve a subtraction problem?
- Can I write an equation to find the answer to a problem?
- Can I try out my answer to see if it makes sense in the story?

Then, discuss with a partner

- I turned the problem into numbers when I wrote ...
- I checked my answer by ...

PRACTICES SMP 2 Reason abstractly and quantitatively.

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Habit 3 Show and explain.

MATHEMATICAL PRACTICES SMP 3 Construct viable arguments and critique the reasoning of others.

Share your math ideas to help others understand you.

Explaining math ideas to others helps you understand them even better. And that helps you solve other problems later. It also helps to listen to other people. You can get new ideas too!

To help explain your ideas or listen to others ...

Ask yourself

- Can I use words to show how to solve the problem?
- Can I use pictures or act out the problem with objects?
- Can I ask questions to understand another person's ideas better?

Then, discuss with a partner

- I drew pictures to show ...
- I explained my ideas when I said . . .

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Habit 4 Use math in the real world.

Solve problems in real life.

One of the best ways to use your math thinking is to solve real problems. Words tell the story for the problem. Math can turn the words into a model, like a picture or numbers.

You can use models to solve problems about shopping, sports, or . . . almost anything!

To solve a real-life problem ...

Ask yourself

- Can I draw a picture or write an equation to show the math?
- Can I use my math model to solve the problem?
- Can I check that my answer makes sense?

Then, discuss with a partner

- I used a math model when I ...
- I know my answer makes sense because . . .

MATHEMATICAL PRACTICES SMP 4 Model with mathematics.

Habit 5 Choose a tool.

Decide when to use tools like counters, a pencil, or mental math.

There are many tools to use in math. You can use a pencil to do a lot of math. Sometimes you can use connecting cubes or base-ten blocks. Often you can just do the math in your head.

To choose the best tools ...

Ask yourself

- Can I do any part of the problem in my head?
- Can I write the problem on paper?
- Can I use base-ten blocks?

Then, discuss with a partner

- The tools I chose for this problem are . . .
- I chose these tools because . . .

PRACTICES SMP 5 Use appropriate tools strategically.

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Habit 6 Be clear and precise.

MATHEMATICAL PRACTICES SMP 6 Attend to precision.

Try to be exactly right in what you say and do.

Everybody likes to be right when they do math. But sometimes people make mistakes. So it's good to check your work. And it's good to say exactly what you mean when you talk about your math ideas.

To be exactly right ...

Ask yourself

- Can I use words that will help everyone understand my math ideas?
- Can I find different ways to check my work when I add or subtract?

added.

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Then, discuss with a partner

- I was careful to use the right words when I ...
- I checked my answer by . . .

Glossary/Glosario

 English
 Español
 Example/Ejemplo

 AQ
 AQ

 add
 sumar

 to put together groups
 juntar grupos para

 hallar el total.
 6+2=8

 oddend
 sumando

20 . . .

número que se suma.

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Habit 7 Zoom in and zoom out.

Look for what's the same and what's different.

Math has rules. Look at these problems:

2 + 0 = 23 + 0 = 3

Zoom out to see what's the same about

problems. Any number plus 0 is that number.

Zoom in to see what's *different* about problems. The numbers added to 0 are different.

To zoom in and zoom out ...

Ask yourself

- Can I see how different numbers are made from tens and ones?
- Can I see what happens when I add numbers in any order?

Then, discuss with a partner

- I zoomed out and used a math rule when I ...
- I zoomed in and found a difference when I looked at . . .

structure.



Use patterns. Look for patterns in math

to find shortcuts.

Habit 8

It's important in math to pay close attention. You might find a pattern or see a math idea.

Think about the pattern you can see when you count by tens:

10, 20, 30, 40, 50 . . .

You can use the pattern to make a good guess about what comes next.

To use patterns ...



- Can I find a pattern in a math problem?
- Can I use math words to describe my pattern?
- Can I figure out what is next?

Then, discuss with a partner

- I saw a pattern in this problem when I looked at . . .
- I used the pattern to make a good guess when I...

MATHEMATICAL PRACTICES SMP 8 Look for and express regularity in repeated reasoning.



Mathematical Language Reference Tool

Use the following sentence frames throughout the units when speaking and writing about the math concepts you are learning.

Unit 1

- When I add (or subtract), it is important to _____.
- 2 The strategy I used to add (or subtract) is _____.
- 3 Let's discuss _____ to learn about _____.
- Create your own sentence frame.

Unit 2

- The addition (subtraction) strategy I can choose is _____.
- I can sort the ____ by ____.
- 3 Before I can solve a problem, I need to _____.
- Create your own sentence frame.

Unit 3

- I discovered that _____.
- I can explain _____ to a friend by _____.
- When I read an analog clock, I first _____ then

Create your own sentence frame.

Unit 4

- When I compare two numbers, I always _____.
- I can make a ten by _____.
- When I prepare to solve the problem, I _____.
- 4 The model shows the total _____.
- **5** Create your own sentence frame.



Unit 6

- is used to describe a _____.
- 2 Shapes like ____ and ____ all have corners.
- I noticed that something _____ and ____ have in common is _____.
- The reason I think _____ is _____.
- **S** Create your own sentence frame.

100 Mathematical Discourse Questions

Make sense of the problem.

- What is this problem about? What can you tell me about it?
- What numbers are you using?
- What do you think that means?
- What is **another way** to say that?
- What do you need to know? Is anything missing from the problem?
- What is the problem asking you?
- What do you know about this part?

- Are there any words you don't know?
- Which words are most important? Why?

Persevere in problem solving.

- Have you tried making a guess? What would be a good guess?
- What other ways have you tried?
- What do you think would work best? Why?
- What else can you do to show that? Can you draw a picture or tell me what you would do?

- Can you think of another problem like this one?
- Is there an **easier way** to do the problem?
- What do you know about this right now?

Reason mathematically.

- How did you start to think about this problem?
- What is another way you could do this problem?
- How could you teach me about ____?
- Is your answer the same or different from another student's answer?
- How did you get your answer?
- 22 Can you tell me more about this part?

- 23 Does that strategy always work?
- Can you think of a problem where that strategy wouldn't work?
- What was the first thing you did? Then what did you do?

Explain and critique.

- What would happen if
- What patterns do you see? Explain them.
- What are some ways to do
- What else do you need to know? How would you find out?
- How would you check your steps or your answer?
- What did not work?

Explain and critique. *continued*

- What did you do that was the **same** as another student?
- What did you do that was different from another student?
- How can you know if your answer makes sense?
- What number would be too big? What number would be too small?
- How could you use pictures, words, or numbers to show what you did?
- How would you show your thinking another way?
- Did anything make you think really hard? What?

- Is there another answer that will work?
- Can you show me how
 another student did the
 problem?
- What model did another student use to do the problem?
- Is there anything you forgot to do?
- 43 How did you think about the problem?
- Is the correct answer the same as what you found? If not, how is it different?
- Do you think your answer is correct? Why or why not?
- What else would you like to know about what another student did?
- What do you think comes **next**?

- Does your answer make
 sense for this problem?
 Why or why not?
- 49 How would you tell another student what you did to find the answer?
- How could you find the answer using tools?
- I How many different pictures can you draw to show the problem?

Decide if something is mathematically correct.

- Does your answer make sense?
- Did your partner show you how he or she did the problem? Does it make sense?

- **Tell why** you think that. How do you know?
- What would you say to have someone change their thinking?
- **50 How** did you decide that?
- Does anyone want to revise his or her answer?
- 58 Does anyone want to revise his or her thinking?

Share your thinking.

- 9 What **did** you do?
- Do you **agree**?
- O you disagree?
- How would you answer another student's question?
- Does anyone need another student to ask his or her question again?

Share your thinking. *continued*

- Gould you tell the class what you did?
- What part of what another student said makes sense to you?
- What can you tell me about ____?
- What can you say to someone to make them want to change their answer?
- What do others think about what another student said? Do you agree?
- Gan you tell us what another student did to get his or her answer?

- Did you work together? How?
- Can you add to what was said?
- Pave you talked about this with your partner? With others?
- 73 Did anyone get a different answer?
- Where would you go for help?
- Did everybody get a chance to talk?
- 76 How could you help another student without telling him or her the answer?
- What would you say about this problem to someone who missed class today?

Make Connections.

- 78 What is the relationship between _____ and _____?
- 79 How is this problem like one you solved before? How is it different?
- What is the same about your strategy and your partner's?
- What is different about your strategy and your partner's?
- Which skills or concepts did you use?
- What ideas have we explored before that were useful in solving this problem?

- How would you tell what another student said in another way?
- What other problems could be **done this way**?
- ⁸⁶ How is this like ____?
- 87 How is this different from _____?
- 88 Can you tell a story problem with a question like this one? What would your story problem be about?
- What other **questions** do you have?

Evaluate.

- What do you need to do next?
- 🤨 What did you do **well**?
- What do you still need to practice?
- How well did you listen to your partner?

Reflect.

- What tools did you use?
- 95 What did you **learn**?
- Would you do the problem the same way next time? Why or why not?
- What math did you use?
- Why did you do the problem the way you did?
- What is different about this problem from others you have done?
- Which way of doing the problem is your favorite? Why?

