Developing Mathematics Thinking with HOTS (Higher Order Thinking Skills) Questions

To promote problem solving…

- What do you need to find out?
- What information do you have?
- What strategies are you going to use?
- Will you do it mentally? With pencil and paper? Using a number line?
- Will a calculator help?
- What tools will you need?
- What do you think the answer or result will be?

To help when students get stuck …

- How would you describe the problem in your own words?
- What do you know what is not stated in the problem?
- What facts do you have?
- How did you tackle similar problems?
- Could you try it with simpler number? Fewer numbers? Using a number line?
- What about putting things in order?
- Would it help to create a diagram? Make a table? Draw a picture?
- Can you guess and check?
- Have you compared your work with anyone else? What did other members of your group try?

To make connections among ideas and applications …

- How does this relate to…?
- What ideas that we have learned before were useful in solving this problem?
- What uses of mathematics did you find in the newspaper last night?
- Can you give me an example of…?

To encourage reflection …

- How did you get your answer?
- Does your answer seem reasonable? Why or why not?
- Can you describe your method to us all? Can you explain why it works?
- What if you had started with _____ rather than _____?
- What if you could only use…?
- What have you learned or found out today?
- Did you use or learn any new words today? What do they mean? How do you spell them?
- What are the key points or big ideas in this lesson?
- To help students build confidence and rely on their own understanding, ask…
- Why is that true?
- How did you reach that conclusion?

- Does that make sense?
- Can you make a model to show that?
- To help students learn to reason mathematically, ask…
- Is that true for all cases? Explain
- Can you think of a counterexample?
- How would you prove that?
- What assumptions are you making?

To check student progress …

- Can you explain what your have done so far? What else is there to do?
- Why did you decide to use this method?
- Can you think of another method that might have worked?
- Is there a more efficient strategy?
- What do you notice when…?
- Why did you decide to organize your results like that?
- Do you think this would work with other numbers?
- Have you thought of all the possibilities? How can you be sure?

To help students collectively make sense of mathematics …

- What do you think about what _____ said?
- Do you agree? Why or why not?
- Does anyone have the same answer, but a different way to explain it?
- Do you understand what _____ is saying?
- Can you convince the rest of us that your answer makes sense?

To encourage conjecturing …

- What would happen if…? What if not?
- Do you see a pattern? Can you explain the pattern?
- What are some possibilities here?
- Can you predict the next one? What about the last one?
- What decision do you think he /she should make?