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?