

Asking Questions

Asking the right questions is an art to be cultivated by all educators. Low-level Quizzes that ask for recall of simple computation are a dime a dozen, but a good high-level open ended question that gives students a chance to think is a treasure!

These questions might be used as teaching of “leading” questions as well as for assessment purposes. Both questions and responses will contribute to a climate of thoughtful reflective ness.

Some suggestion about assessment questioning:

- Prepare a list of possible questions ahead of time, but, unless the assessment is very formal, be flexible. You may learn more by asking additional or different questions.
- Use plenty of wait time; allow students to give thoughtful answers.
- For formal assessment, leading questions and feedback are not generally used, although some assessment techniques include teaching during the examination.
- Make a written record of your observations. A check list may or may not be appropriate.

This is a starter list. You will want to build a collection of you own good questions.

- What is the problem? What can you tell me about it?
- How would you interpret that?
- Would you please explain that in your own words?
- What do you know about this part?
- Do you need to define or set limits for the problem?
- Is there something that can be eliminated or that is missing?
- What assumptions do you have to make?

- Where could you find the needed information?
- What have you tried? What steps did you take?
- What did not work?
- How did you organize the information? Did you have a record?
- Did you have a system? A strategy? A design?
- Have you tried (tables, trees, lists, diagrams...)?
- What it help to draw a diagram of make a sketch?

Relationships

Do students see relationships and recognize the central idea? Do they relate the problem to similar problems previously done?

- How would it look if you used these materials?

- How would you research that?
- What is the relationship of this to that?
- What is the same? What is different?
- Is there a pattern?
- Let's see if we can break it down. What would be parts be?
- What is you moved this part?
- Can you write another problem related to the one?

Flexibility

Can students vary the approach of one is not working? Do they persist? Do they try something else?

- Have you tried making a guess?
- Would another recording method work as well or better?
- What else have you tried?
- Give me another related problem. Is there an easier problem?
- Is there another way to (draw, explain, say,...) that?

Communication

Can students describe or depict the strategies they are using? Do they articulate their thought processes? Can they display or demonstrate the problem situation?

- Would you please reword that in simpler terms?
- Could you explain what you think you know right now?
- How would you explain this process to a younger child?
- Could you write an explanation for next year's students (or some other audience) of how to do this?
- Which words were most important?
- Why?

Curiosity and Hypotheses

Is there evidence of conjecturing, linking ahead, and checking back?

- Can you predict what will happen?
- What was your estimate or prediction?
- How do you feel about your answer?
- What do you think comes next?
- What else would you like to know?

Equality and Equity

Do all students participate to the same degree? Is the quality of participation opportunities the same?

- Did you work together? In what way?

- Have you discussed this with you group? With others?
- Where would you go for help?
- How could you help another student without telling the answer?
- Did everybody get a fair chance to talk?

Solutions

Do students reach a result? Do they consider other possibilities?

- Is that the only possible answer?
- How would you check the steps you have taken, or your answer?
- Other then retracing your steps, how can you determine if your answers are appropriate?
- Is there anything you have overlooked?
- Is the solution reasonable, considering the context?
- How did you know you were done?

Examining Results

Can students generalize, prove their answers? Do they connect the ideas to other similar problems or to the real world?

- What made you think that was what you should do?
- Is there a real-life situation where this could be used?
- Where else would this strategy be useful?
- What other problem does this seem to lead to?
- What question does this raise for you?

Mathematical Learning

Did students use or learn some mathematics form the activity? Are there indications of a comprehensive curriculum?

- What were the mathematical ideas in the problem?
- What was one thing you learned (or 2 or more)?
- What are the variables in the problem? What stays constant?
- How many kinds of mathematic in these two situations?
- Where would this problem fit in our mathematics chart?

Self-Assessment

Do students evaluate their own processing, actions, and progress?

- What do you need to do next?
- What are your strengths and weaknesses?
- What have you accomplished?
- Was your own group participation appropriate and helpful?
- What kinds of problem are still difficult for you?

Inquiry: Guiding Students to self-discovery

For students in collaborative learning groups, the text for inquiry may come from ideas/ notes in their learning logs or material from their math class. Questions already formulated. Guided by the teacher/ tutor, students exchange responses and collaborate in a search for understanding. The strength of the group process rests on the belief that the group can arrive together at some understanding that would not be arrived at independently. The following is a list of general questions that can be asked of students to help guide them to their own learning:

UNDERSTANDING THE PROBLEM

- What is the problem about?
- What can you tell me about it?
- Can you explain the problem in your own words?
- What do you know about this part?
- Is there something that can be eliminated or that is missing?
- What assumptions do you have to make?
- How would you explain what you know right now?

STRATEGIES (FIGURING OUT WHAT TO DO)

- What have you tried? What steps did you take?
- Do you have a system of strategy?
- What information do you have?
- How did you organize the information?
- What didn't work?
- Have you tried...(guess and check, list, diagrams, etc.)
- Where could we find out more information about that?
- Let's look at your notes?
- Let's see if we can break it down. What would the parts be?
- Have you tried making a guess?
- Can you think of an easier but similar problem?
- What do you think comes next?
- What do you need to do next?

CHECKING THE SOLUTION

- Is your solution reasonable?
- How could you check your answer?
- Is that the only possible answer?
- Is there another way to do this problem?
- How do you know you have completed the problem?

PRESENTING THE SOLUTION

- Is your explanation clear and concise?
- Is there a general rule?
- Did you include charts, graphs, or diagrams in your explanation?
- Can anyone explain it in a different way?
- Is there a real-life situation where this could be used?
- Could your method of solving the problem work for other problems/

- What were some things you learned from this problem?

The ideal situation is for students to learn how to ask these questions themselves. When working through problems, they may need to pull themselves through various stages of the problems by thinking about what questions would a teacher or tutor ask them.

1. When students “don’t get it,” they need to start by asking themselves questions to make sure they **UNDERSTAND THE PROBLEM**.
2. Once they understand the problem, they need to think about how to approach the problem by asking themselves questions that look at **STRATEGIES**.
3. Once a solution is reached, then students need to reflect on the process and results by asking the questions that will help to **CHECK THE SOLUTION**.
4. And finally, once the solution seems reasonable, the students must make sure they have justified their answer in **PRESENTING THE SOLUTION**.