



## Effective Questioning

Traxdine Effective Questions



## The Monotillation of Traxoline

It is very important that you learn about traxoline. Traxoline is a new form of zionter. It is monotilled in Ceristanna. The Ceristannians gristerlate large amounts of fevon and then bracter it to quasel traxoline. Traxoline may well be one of our most lukized snezlaus in the future because of our zionter lescelidge.

**DIRECTIONS:** Answer the following sentences in complete sentences. Be sure to use your best handwriting

1. What is traxoline?
2. Where is traxoline monotilled?
3. How is traxoline quaselled?
4. Why is it important to know about traxoline?

Almost everyone scores 100% on this test. However, no one knows a thing about traxoline, or for that matter, cares.



But, had this been a real quiz, each person would have received an "A."

This is one reason why care should be taken when using multiple-choice questions or questions that are simply rote memorization with no indication of understanding. Also, why you always want students to show their work and why you give partial credit when the correct process is there .

Studying for a test or quiz can be a game in many ways, and many students have learned to play it without actually absorbing any knowledge.



Like you, most students can answer these questions. Like the rest of us, they have a set of well-developed strategies for producing correct answers to questions that they do not understand.

While this is sometimes a useful skill, we aspire to more in our mathematics classes.

(Seizing Opportunities, AAAS 1997)

## Asking effective questions



What is an effective question?

- It is a questions that probes for deeper meaning and often sets the stage for further questioning.
- It fosters the development of critical thinking skills and higher order capabilities.
- It promotes problem-solving and understanding.
- A good question is the principle component of designing inquiry-based learning.

If you **only** ask for answers, you might get the **correct** response, but no assurance that the student understands the concept.

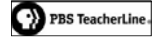
For example: What is  $2^2$  ?

The student says "4".

The student is **thinking**:  
"Exponent multiplies base"  
Answer is 4.



Of course, this student will also say that  $3^2 = 6$  !



### Developing Mathematical Thinking with Effective Questions

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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, ask...

- Can you explain what you 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, ask...

- 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, ask...

- 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?

To promote problem solving, ask...

- 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, ask...

- How would you describe the problem in your own words?
- What do you know that is not stated in the problem?
- What facts do you have?
- How did you tackle similar problems?
- Could you try it with simpler numbers? 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, ask...**

- 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, ask...**

- 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 did they mean? How do you spell them?
- What are the key points or big ideas in this lesson?

**Can you really answer questions correctly  
but have no clue as to what is really happening?**

