

Children learning to question:

Summary of Main Points

Children learn their question-asking habits from teachers. If children are to be encouraged to raise questions that lead to investigation, this is one more reason (added to those given in Chapter 3) for teachers to make the effort to ask more productive questions and fewer unproductive ones. Some specific ways in which teachers can practice and improve question skills are:

Helping Children Raise Questions—and Answering Them

1. Provide a wide range of materials for children to respond to.
2. Practice and improve your questioning style so that it provides an example for the children.
3. Provide a climate of inquiry for children to work in.
4. Encourage children to form and to discuss their own questions.
5. Respond positively to children's spontaneous questions.
6. Turn children's unproductive questions into productive ones that promote investigation of real materials.

The atmosphere in the classroom must also be conducive to encouraging children to ask questions. Some ways of showing that questions are welcome are by adding questions to displays and collections, introducing a problem corner in the classroom, creating lists of "questions to investigate," and making sure any work cards or worksheets are framed in terms of **investigable** questions. Regular discussion of questions is also important. Children, like teachers, do not find it easy at first to change the emphasis in their questioning from unproductive to productive. Novel materials are not necessarily the best stimulus; often more familiar ones help children raise questions, especially with a lead from the teacher to the kind of productive questions that can be asked.

Once children begin to ask questions they will ask ones of all kinds; some will be difficult for teachers to handle, but it is important to find a way of doing so that does not make the child wish he or she had not asked. A strategy has been described for **analyzing** children's questions so that unproductive ones can be used productively.

Example:

Create an opportunity Corner in the room where BUGs are kept in cages. Students are encouraged to bring in bugs and put them in a cage in the corner to have possible solutions to get it out of the cage. There is a review time where thoughts are discussed about the bugs.

Questioning Strategies that Lead to Higher-Level Thinking Skills

Source: Caught in the Middle. Sacramento: California Department of Education, 1989, pp. 17,18.

The questioning techniques that follow are generally applicable to any questioning model and maximize the

potential for a meaningful discussion:

1. **Plan key questions to provide lesson structure and direction.** Write them into lesson plans, at least one for each objective—especially higher-level questions. Ask some spontaneous questions based on student responses.
2. **Phrase questions clearly and specifically.** Avoid vague or ambiguous questions such as “What did we learn yesterday?” or “What about the heroine of the story?” Ask single questions; avoid run-on questions that lead to student frustration and confusion. Clarity increases probability of accurate responses.
3. **Ask questions logically and sequentially.** Avoid random questions lacking clear focus and intent. Consider students’ intellectual ability, prior understanding of content, topic, and lesson objective(s). Asking questions in a planned sequence will enhance student thinking and learning.
4. **Ask questions at a variety of levels.** Use knowledge-level questions to determine basic understandings and to serve as a basis for higher-level thinking. Higher-level questions provide students opportunities to practice higher forms of thought.
5. **Follow up on student responses.** Develop a response repertoire that encourages students to clarify initial responses, lift thought to higher levels, and support a point of view or opinion. For example:
 - “Can you restate that?”
 - “Could you clarify that further?”
 - “What are some alternatives?”
 - “How can you defend your position?”

Encourage students to clarify, expand, or support initial responses to higher-level questions.

6. **Give students time to think when responding.** Increase wait time after asking a question to three to five seconds to increase number and length of student responses and to encourage higher-level thinking. Insisting upon instantaneous responses significantly decreases probability of meaningful interaction with and among students. Allow sufficient wait time before repeating or rephrasing questions to ensure student understanding.
7. **Use questions that encourage wide student participation.** Distribute questions to involve the majority of students in learning activities. For example, call on non-volunteers, using discretion for difficulty level of questions. Be alert for reticent students’ verbal and nonverbal cues, such as perplexed look or partially raised hand. Encourage student-to-student interaction. Use circular or semicircular seating to create environment conducive to increased student involvement.
8. **Encourage student’s questions.** This encourages active participation. Student questions at high cognitive levels stimulate higher levels of thought essential for the inquiry approach. Give students opportunities to formulate questions and carry out follow-up investigations of interest. Facilitate group and independent inquiry with a supportive social-emotional climate, using praise and encouragement, accepting and applying student ideas, responding to student feelings, and actively promoting student involvement in all phases of learning.

Meta-Cognition/ Reflection

One area that has been much researched is that of problem solving (Fisher 1987). As Miller and his colleagues (1960) point out 'an ordinary person almost never approaches a problem systematically and exhaustively unless specifically educated to do so..'. Perhaps the most common reaction to a problem situation is a random hunt for solutions and sometimes this will result in success, but in school situations where there is usually a limited number of possible solutions frequent failure is likely. The need to avoid impulsivity and take time to consider options and alternatives has been identified as a key strategy in overcoming learning failure (Feuerstein 1980). In analyzing Schoenfield's success in developing student's mathematical problem-solving ability Perkins & Salomon note the importance of fostering a general level of control that they call 'problem management':

Students learn to monitor and direct their own progress, asking questions such as 'What am doing now?', 'Is it getting me anywhere?'. 'What else could I be doing instead?'. This general metacognitive level helps students avoid persevering in unproductive approaches, to remember to check ... and so on (Perkins & Salomon 1989 p21)

Donaldson (1978) quotes with approval Piaget's finding that children's reflection on problems and consideration of possibilities are important aspects of cognitive development: 'If the child is going to control and direct his own thinking, in the kind of way we have been considering, he must become conscious of it.' (p94). Feuerstein (1980) shows how adults can play a key role in encouraging this metacognitive awareness in children. The teacher can ask children about the successes and difficulties they have had with problems. Students can be encouraged to reflect on the kinds of thinking they have been engaged in, and to be conscious of those processes that have been helpful or have hindered their progress. This meta-discourse on the problem-solving process is an application of the way Vygotsky (1978) described language as the mediator of learning. As Adey & Shayer (1994) comment: 'The language of reasoning mediates meta-learning'.

There is in the literature however some confusion about the meaning of metacognition, and how it is to be identified. These are important matters for if we wish to identify metacognitive development as one of the goals of teaching thinking then it is as well to be as clear as we can about what metacognition is. Metacognition also has an important bearing on the issue of the transferability of thinking skills. So what does it refer to? Von Wright (1992) distinguishes two levels of meta-reflection. Low level reflection involves the thinker: '*reflecting on her means of coping in familiar contexts. However ... she is unlikely to be capable of reflecting about herself as the intentional subject of her own actions.*' (von Wright 1992 p60-61)

Higher level reflection is what we would generally call metacognition:

Meta-cognitive questioning: to raise levels of awareness

1. Describe what kind of thinking you did

- What kind of thinking did you do?
- What do you call this kind of thinking?
- Was this kind of thinking? (name a kind of thinking)

2. Describe how you did your thinking

- How did you do this thinking?
- What did you think about? Why?
- Did you have a plan (or strategy)?

3. Evaluate your thinking

- Was your thinking good? Why?
- Did you have a good plan (or strategy)?
- How could you improve your thinking next time?

adapted from Schwartz & Parks (1994)

Another way of introducing metacognitive language to children is through the use of 'think aloud, which model metacognitive processes. Here we raise awareness by using metacognitive language and self-questioning in the way we present explanations to pupils and model a particular problem solving process. We aid metacognition by bringing to conscious awareness our thoughts and feelings, and communicate them by thinking aloud. We need to help children do the same. Posting a list of metacognitive questions on the wall can help to remind children of the sorts of questions they can ask themselves, for example questions that assess awareness of learning (What have you learnt? What have you found out? What did you find hard? What did you do well? What do you need to learn/do next?), assessing attitudes and feelings (What do you like doing/learning? What do you feel good/not good about ...? What do you feel proud of?) and in setting targets (What do you need to do better? What would help you? What are your targets?)