THE STUDY OF TEACHING

CREATING CONDITIONS FOR POWERFUL LEARNING

QUESTIONING FOR UNDERSTANDING

Creating Conditions for Powerful Learning
Facilitator's Manual

QUESTIONING FOR UNDERSTANDING
Time: (180 minutes)

PART I: WHY ASK QUESTIONS? (25 MINUTES)
EXERCISE 1: INTRODUCTION, OUTCOMES & AGENDA (10)
EXERCISE 2: PURPOSES FOR ASKING QUESTIONS (15)

PART II: QUESTIONING TO PROMOTE UNDERSTANDING (65 MINUTES)
EXERCISE 3: DEFINING UNDERSTANDING (5)
EXERCISE 4: FOUR TYPES OF QUESTIONS (25)
EXERCISE 5: QUESTIONS THAT PROMOTE UNDERSTANDING (20)
EXERCISE 6: ALIGNING QUESTIONS TO OUR OUTCOMES (15)

PART III: INCREASING THE QUALITY OF INTERACTION (35)
EXERCISE 7: PROMOTING DISCOURSE (5)
EXERCISE 8: INCREASING INTERACTION (30)

PART IV: ENCOURAGING STUDENTS TO ASK QUESTIONS (40)
EXERCISE 9: WHY HAVE STUDENTS LEARN TO ASK QUESTIONS? (10)
EXERCISE 10: WAYS TO TEACH STUDENTS TO ASK QUESTIONS (30)

PART V: CLOSURE (15)
EXERCISE 11: SELF-ASSESSING AND PEER OBSERVATION TOOLS (5)
EXERCISE 12: SUMMARY (10)

Outcomes for this Module:

Participants will:

- Identify purposes for asking questions and the types of questions that accomplish those purposes.
- Identify and generate questions that promote understanding and ask students to demonstrate understanding.
- Understand ways to increase the quality of interactions with and among students.
- Explore ways to teach students to ask questions.

EXERCISE 1: INTRODUCTIONS, OUTCOMES, & AGENDA (10 minutes)

1. Introduction of the facilitators. Develop norms.

2. Outcomes for this session
   Participants will:
   - Identify purposes for asking questions and the types of questions that accomplish those purposes.
   - Identify and generate questions that promote understanding and ask students to demonstrate understanding.
   - Understand ways to increase the quality of interactions with and among students
   - Explore ways to teach students to ask questions

Agenda for the Day
- Purposes of asking questions
- Types of questions
- Increasing the quality of discourse
- Teaching students to ask questions
- Self-assessing and peer observation tools
- Closure

Notes:

Facilitator Notes
1-CH: Title/Welcome
2-CH: Why CCPL?
3: CH: Norms
T-O Title
T: Outcomes and Agenda
T1a-Outcomes
4-CH
5
T1b-Agenda
6
CH
★ CH: Housekeeping

EXERCISE 2: PURPOSES FOR ASKING QUESTIONS (15 MINUTES)

1. During instruction, teachers frequently ask questions. What are the reasons teachers ask questions? What might be some of the purposes of asking questions? Invite participants to generate a list at their table. Then chart some of the answers (5 minutes)

2. Different purposes require different kinds of questions. Mark a few of the purposes that the group generated and ask each group to come up with a question that might accomplish that purpose. Share the answers (5 minutes)

   If the purpose were to _____, then an example of a question a teacher might ask to accomplish that purpose could be _____.

3. Process: Which questions were the most difficult to generate, if any? Why do you think that is so? Share some of the research on the kinds of questions teachers ask most frequently. (5 minutes)

4. All of these purposes you have generated suggest questioning plays an important role in instruction. Quite possibly teachers address multiple purposes within a particular lesson. This module is going to focus on how teachers use questioning to promote understanding and help students demonstrate understanding.

Notes:

_____
_____
_____
_____
_____
_____

Facilitator Notes

T-2 / CH-7
T: What are purposes for asking questions?
CH-8 - Ex. of purposes
T-3
T: Generating Questions

T-4
T: Some Research on Questioning

EXERCISE 3 – DEFINING UNDERSTANDING (5 MINUTES)

1. Share the definition of understanding we are using for our modules. For the purpose of this workshop, we have defined understanding this way:

   Understanding is insight into key ideas, as reflected in thoughtful and effective use of knowledge and skills in varied situations.

2. If a teacher's purpose were to promote and check for understanding, then that purpose would help determine the kinds of questions he/she would ask. Let's take a look at some different examples of questions and then try to determine what kind of thinking might be promoted by asking those questions.

Notes:

Facilitator Notes

T-5 / CH-9
T: Definition of Understanding

EXERCISE 4: FOUR CATEGORIES OF THINKING (25 MINUTES)

Facilitator Notes

In order to develop questions purposefully that promote understanding or allow students to demonstrate understanding, we felt it was helpful to examine some possible categories of thinking and the questions that lead to that thinking. We have developed four categories. We could have used some frameworks that already exist such as those developed by Bloom, Guilford, and Costa & Kallick, but we felt these four categories helped us focus on our intended goal of promoting understanding. We have grouped these examples by the different kinds of thinking we would want from students. You might want to create or refine your own categories that are more meaningful to you.

→ CH-10

1. Ask participants to look at the handout on examples of questions. With their group or a partner, identify what each of the examples in each box has in common in terms of the kind of thinking we are asking of the students. There may be more than one thing in common. (10)

★T
HO-1
T/HO: Examples of Questions

2. Share the descriptions for the categories of thinking. Share also that these four categories probably do not encompass all types of questions teachers would ask or ways students would think– just the ones that are to accomplish our purposes of accessing information, organizing information, transforming information, and thinking about thinking.

★T-
HO-2
T/HO: Categories of Thinking

3. Ask participants to read over the four descriptions and compare them to the commonalties they found. Check for any confusion. (5)

Notes:

_____

_____

_____

-"Quote"-
CH-11 careful considerations of asking questions

CH-12 4 categories of thinking

CH-13 Δ metacognition

CH-14 quality progress

4. All four of these categories of thinking are important but not all promote or help students demonstrate understanding. We are presenting all four because they all play an important part in learning. Organizing Information and Transforming Information promote understanding. By making that thinking visible, students are able to demonstrate what they understand. When students are Accessing Information, they are simply recalling or gathering information and do not necessarily have to understand anything. Thinking about Thinking allows students to self-assess their thinking strategies and increases the possibility that students will transfer those strategies to other situations.

5. Also, it is not necessary for teachers to be able to classify questions in the correct category. Sometimes the distinctions are unclear or minor. However, these four categories are introduced as a tool to help teachers define the kinds of thinking skills teachers expect from students and for helping to establish congruence between the instructor's goals and the questions he/she asks.

6. (Optional) Invite each group to generate one or two questions for each category. Share some of them with the entire group. (5)

Notes:

Facilitator Notes

EXERCISE 5: QUESTIONS THAT PROMOTE UNDERSTANDING (20 MINUTES)

Facilitator Notes

1. We know that Organizing Information and Transforming Information promote understanding and questions in these categories ask students to demonstrate understanding. We are going to see if we can identify these types of questions that promote these kinds of thinking.

2. Show a video clip of a teacher engaging students in questions. Ask the group to take notes by writing down the teacher's questions. (A secondary suggestion would be HS Chemistry – ASCD Professional Inquiry Kit – Teaching for Understanding or The Video Library of Teaching Episodes #17. (10)

Video clip of teaching episode

Egyptian Civilization

3. After viewing the tape, ask participants to identify the categories into which the questions fell.(5)

T-6
T: Discussion questions

4. Ask participants to compare their notes with their colleagues and discuss the following:
   - Which questions asked students to demonstrate understanding?
   - Which questions did not?
   - Did any patterns emerge?
   - Discuss any discrepancies in what you and your partner observed. (5)

5. Point out again that all kinds of questions may be important but that not all questions ask for thinking that leads to or demonstrates understanding.

→ CH-15

Notes:

EXERCISE 6: ALIGNING QUESTIONS TO OUR OUTCOMES (15)

1. If our purpose is to promote understanding, then we need to be deliberate in asking these types of questions that lead to promoting understanding and allowing students to demonstrate understanding.

2. Share quote about the amount of time spent asking recall questions. Point out that if we spend most of our time asking for recall thinking, then most learning will be at that level.

3. The issue is not so much being able to design a variety of questions, but being able to design sequenced questions that are planned to generate a kind of thinking and accomplish worthwhile goals of instruction. Share some ideas for deliberately planning questions.

4. Ask participants to think of a lesson that they are going to teach in the next week. What are the standards they are going to address? Think of any important concepts or key ideas they want students to understand. (Review the definition of understanding, if needed.) Decide how they are going to have students demonstrate that understanding. Write down some questions that they might ask during the lesson – especially questions that will engage students in thinking that will yield the understanding they seek. Think about how they might sequence the questions within the lesson. Share with a partner (10)

Notes:

Facilitator Notes

T- 7
T: Time spent on recall questions

HO-3/Guidelines
~~T: Ideas~~ for planning questions

EXERCISE 7: PROMOTING DISCOURSE (5 MINUTES)

1. Share quote: Higher order questions do not necessarily lead to higher order thinking or higher order responses.

2. Share quote: It appears the quality of the interaction is more important than the quality of the questions.

3. Ask participants to react at their tables.

Notes:

Facilitator Notes

T-8

T: Quotes

EXERCISE 8: INCREASING THE QUALITY OF THE INTERACTION (30 MINUTES)

Facilitator Notes

1. The literature identifies several ways to increase the quality of the interaction between the teacher and the students or students and students:
    1. Pace of Questioning
        - A. Wait Time I
        - B. Wait Time II
    2. Distribution of Questions
        - A. Volunteers/Non-volunteers
        - B. Equity and Expectations
        - C. Group/Individual Balance
    3. Use of Elaboration and Follow-up Questions
    4. Use of Redirecting Questions
    5. Creation of a Safe Environment

→ CH-16
CH-17 - Def. of Wait Time

2. Ask participants to read strategies 1-5 or direct teach them. Discuss with the whole group to clarify any questions.

T-9/HO-4-5-6
~~HO~~/T: Increasing the quality of the interactions

3. Spend some time on number 5. Ask participants to generate a list of conditions that make them willing to answer questions in workshops or conditions that they have experienced today that have created an environment that is safe for answering questions. Ask for specific examples. Chart. At their table groups, invite them to share how they create those conditions for their students.

→ CH-18

4. Number off from 1-5 at each table or ask participants to choose an area to observe. (Section 2 could be broken down for more than one person.) Talk about how you might collect data for that strategy during an observation.

→ CH-19
Directions for video/collecting evidence

5. View a video of a teaching episode and look for evidence of their strategy that increases the quality of the interaction. Collect data based on their strategy – for example, questions the teacher uses as follow-up or elaboration. Discuss at each table and then with the entire group.

→ Video:

EXERCISE 9: WHY SHOULD STUDENTS LEARN TO ASK QUESTIONS? (10)

1. React to the following statements: It is a complete error to equate asking questions of students to students asking us questions" plus other statements. (3)

2. Share some of the research on students asking questions. The literature indicates that teachers ask 93% of the questions asked in the classroom. As a result, teachers' own understanding increases as they think up meaningful questions, but students often wait for learning to occur until the questions are asked. Questions often emerge naturally when we are reading, exploring, and discussing. They don't just appear magically at the end of the chapter or are imposed from an external source, but rather, are generated from genuine curiosity and perplexity.

   The most common interaction pattern in classrooms at all grade levels is the IRE pattern, which consists of teacher-initiated interaction, student response, and teacher evaluation. The teacher usually initiates the interaction using a form of a question. This sends the message that teachers have the right to speak at any time but students must wait to be engaged or recognized by the teacher. It also communicates that the teacher decides what knowledge is valuable and at what pace the lesson should move; students are not allowed to raise related issues or personal concerns. The kinds of learning which lends itself to IRE patterns of instruction is limited to lower cognitive level processes which stress recall of information. Questions aimed at producing accurate recall or simple identification do little to promote any real thinking or understanding. Changing the IRE pattern and allowing students to initiate the interactions through their questions produces some different results.

Facilitator Notes

T-10
T: Statements about student questioning

T-11
T: 93% of the question . . .

★T-
~~Chart~~: IRE

3. Share quote on importance of learning to ask questions. Ask participants to generate a list using the following stem: *What might be the impact on students if we allowed them to initiate interactions through their own questions*? You might use the Place Mat Strategy: Place a large sheet of paper in the center of the table. Divide it into equal sections based on the number of participants at the table. Each participant generates their list individually and then they share the lists with the others at the table.

4. Ask groups to share ideas with the whole group. If they are not mentioned, then you might want to add the following:

a. **Develops Independence:** Our desire is to develop independent learners but as long as students are waiting for the teacher to ask a question, they are dependent on others for their learning. By teaching students to ask questions, they begin to develop lifelong skills of questioning. Students encounter a vast amount of information through technology (and from many other sources). They need to be able to focus their learning by asking questions about what that information means and what they should do with it. Teachers are not always available to guide them through that process.

b. **Increases Peer Interaction:** By shifting the control for interaction away from the teacher, students not only become more active participants in their own learning, they learn to listen to each other. In addition to learning to value their own contributions and knowledge, they learn to value each others' contributions. They increase their skills in genuine discourse.

c. **Increases Sense of Worth/Value:** In the IRE pattern, the teacher often evaluates the responses. By allowing students to initiate interactions, teachers' responses become less judgmental, leading students to feel that their thinking is interesting or important or related or novel and not just right or wrong.

Facilitator Notes

T-12
T: The ability to think . . .

CH-20

HO* - PLACEmat
- (need small post-its)

CH-21

Facilitator Notes

d. **Increases Interest & Motivation:** By generating their own questions, students' interest increases. Sometimes students fail to give more elaborate responses, not because they do not know the answer, but because they lack interest in the question the teacher asks. Having a greater sense of control over the direction of their learning increases student motivation.

Demonstration – Invite a participant to come up and share something about which they are very excited. As the participant is sharing, keep interrupting the story with questions that direct the sharing to where you want it to go. Ask the participant to share what they were thinking when you kept interrupting and controlling the conversation and how they felt about that. Questions can inhibit rather than facilitate dialogue and take the discussion in the direction of the question-asker. (5)

Notes:

EXERCISE 10: WAYS TO TEACH STUDENTS TO ASK QUESTIONS (30)

1. Swap Shop - Invite participants to scan the strategies to teach students to ask questions and choose one of the strategies they might use it in their classroom. Then invite participants to get up and find another person with whom to share their strategy and what that it would look like in their classroom.. After each person has shared, they go find someone new with whom to exchange their ideas. They may wish to adapt their idea as they talk to other participants. If time allows, participants may share one great idea they heard from someone else with their table group. (15)

Discussion Questions: (15)

- Do some disciplines lend themselves better than others to student-generated questions?
- How much guidance (or actual instruction) would you need to help students formulate interesting and effective questions?
- What effects would you predict student-generated questions would have on your students' motivation toward learning?
- What are obstacles to using student-generated questions? How might you address those obstacles?

Facilitator Notes

HO-7-8

HO: Ways to Teach Students to Ask Questions

T-13

T: Discussion Questions

(Optional) Watch the film clip of a student teacher discussing his attempt to engage students through questions. Discuss your reaction to the clip. Educational "experts" often advise teachers that the best way to encourage students to think and to express their ideas is to pose a problem in the form of a question. Dillon (1982) points out however, that teachers' questions are formulated from teachers' problems - not from students' problems. Students limit responses to teachers' questions not because students are unable to give richer answers, but because they are not sufficiently interested in the questions.(5)

Facilitator Notes

Video Clip from "Constructivism: Case Studies in Constructivist Classrooms" ASCD

OR...

Respond to Quote ——————— T-*

EXERCISE 11: SELF-ASSESSING AND OBSERVATION TOOLS (5)

1. Take a few minutes to examine the remaining observation tools. These tools could be used to self-analyze, possibly from a video or an audiotape of your teaching. They could also be used by peers to provide you with some feedback on questioning in your classroom. One tool will allow you to examine your teacher-made tests and textbook tests and assignments in order to analyze the types of questions you are asking and the type of thinking you are generating. This might be a good exercise for a study group or team meeting, analyzing a test a teacher brings to the meeting.

2. Students can also be a practical and reliable source of feedback on teacher questioning because they observe the teacher in action many hours each week.

Notes:

Facilitator Notes

HO-9-10

- analyze tests
- peer obs. form

EXERCISE 12: CLOSURE

1. Review the configuration map for questioning and self-assess your classroom.

2. Find a partner and share:
- Insights you have from the self-assessment
- Something you want to change in your classroom

Notes:

Facilitator Notes

HO 11-12 Rubric
HO: ~~Configuration Map~~

T-14
T: Questions for Discussion

(optional)
HO-13

Teaching for Understanding Modules

Questioning for Understanding: This module helps teachers identify the levels of thinking they would like to promote and the questions that generate that level of thinking. It also explores how to improve the quality of the interactions in the classroom. In addition to improving teacher questions, the module examines ways to encourage students to ask questions.

Providing Feedback to Promote Understanding: This module identifies components of effective feedback, including framing feedback with clear, public criteria for success, having multiple sources of feedback, teaching students to self-assess, and finding opportunities for students to refine and revise work based on feedback.

Assessing Understanding: Depending on their purpose for assessing, teachers will want to use different assessments. This module examines how assessment can be embedded in instruction to improve performance and allow students to develop and demonstrate understanding. Participants explore and develop performance tasks as a way of assessing student understanding.

Designing Standards-Based Units for Understanding: Participants continue to explore understanding by examining how to design units of study for students. The unit design uses a "backward design" process. The process identifies the standard to be addressed, the big understandings and essential questions for the unit, the evidence and process for assessing understanding, and then the selection of appropriate learning activities.

CONDITIONS FOR POWERFUL LEARNING

1. Students experience the curriculum in a way that promotes understanding.

Curriculum is:
- Aligned (Standards/Content/Instruction/Assessment)
- Holistic/Big Picture
- Deep
- Integrated/Interrelated/Connected
- Multicultural

2. Students construct knowledge.

Students:
- Access prior knowledge to make connections
- Organize information to make sense
- Transform information to demonstrate understanding
- Think about their thinking

3. Students' needs drive the design of learning experiences.

Learning experiences are:
- Challenging and rigorous
- Relevant and authentic
- Providing for choice
- Developmentally appropriate
- Attentive to learning styles

4. Students demonstrate understanding.

Students modify performance based on:
- Clear criteria for success
- Feedback
- A variety of assessments
- Self-assessment
- Questions

5. Students experience a learning environment that is safe and productive.

The environment is safe:
- Cognitively
- Physically
- Emotionally
- Socially

. . . supporting student productivity

QUESTIONING FOR UNDERSTANDING

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HANDOUTS

Examples of Questions

What is the capital of Argentina? Describe how Pippi Longstocking dresses. Who is prime minister of Canada? How do you say chair in German? Identify the three body parts of an insect. What happens to the fluid when we begin to heat it? List the first 10 presidents of the United States.	How are the 2 American Indian tribes alike and different? Summarize the key points of the chapter. Put the main events in sequential order. Organize the information into a descriptive graphic organizer. Categorize the buttons. What are the similarities between the two presidential candidate's points of view? What factors in world politics might be affecting the current price of gas?
What do these examples have in common?	What do these examples have in common?
What do you think will happen when we combine these two substances? Using what we have learned about aerodynamics, create a flying object out of these materials. Which of these portraits is the best example of cubism? Why? Develop a plan for recycling at our school. How well does the Scarsdale diet meet the criteria for a balanced diet? What might have been different if the dinosaurs had not become extinct?	How did you know to use that strategy? What were the steps you used in solving the problem? What was hard/easy for you in this process? Where do you think you became stuck? How did you know when you were finished? What were you trying to accomplish when you used that visual? What strategy did you use when you became confused? What were questions you asked yourself as you worked on this assignment?
What do these examples have in common?	What do these examples have in common?

Four Categories of Thinking

Accessing Information

Requires students to remember or recall information they have learned or to gather that information through a variety of resources. This information may be from prior knowledge and experiences or from knowledge gained in class.

Define	Match
Select	Recite
Name	Recall
List	Label
Observe	Locate
Identify	

Organizing Information

Requires students to take data or information and process it in order to make sense of it. This thinking often asks students to put information into a new pattern or make new connections. This thinking helps shape understanding.

Analyze	Classify
Compare	Contrast
Explain	Categorize
Group	Infer
Summarize	Restate
Defend	Paraphrase
Sequence	

Transforming Information

Requires students to take data or information and transform it into a novel or unique form. This category often requires creative and critical thinking and asks students to demonstrate understanding.

Predict	Demonstrate
Speculate	Envision
Evaluate	Generalize
Hypothesize	Imagine
Assess	Criticize
Construct	Design
Develop	Create

Thinking about Thinking

Requires students to become metacognitive—aware of their thought processes. These questions, in turn, allow students to manage and assess their own thinking strategies and transfer those strategies to new situations.

Guidelines for Planning Questions

1. Decide what standard you want to address.

2. Determine the important concepts or key ideas you want students to understand from the lesson.

3. Determine what task students will perform to demonstrate that they understand by applying the knowledge or skills.

4. Decide on your goal or purpose for asking questions.

5. Write down your main questions in advance, listing your questions in a logical sequence (specific to general, lower level to higher level, a sequence related to the delivery of the content).

6. Ask questions which focus on the salient elements of the lesson, avoiding questioning students about extraneous matters.

INCREASING THE QUALITY OF THE INTERACTIONS

1. Pace of Questioning

A. Wait Time I

According to researcher Mary Budd Rowe, the average teacher waits less than a second after asking a question before giving a cue or moving on to another student or answering the question. She found when teachers waited 3-5 seconds that responses increased from a mean of 7 words to 28 words. Students also answered at higher intellectual levels, demonstrated more confidence in their answers, and even asked more questions to clarify understanding.

B. Wait Time II

Usually, a teacher reacts immediately to a student's answer, sometimes interrupting the response. When a teacher waits 3-5 seconds after a student response, students answer more completely and correctly, consider responses and draw more conclusions, ask more questions, increase interactions with other students, and demonstrate more confidence in their responses. Teachers' questions also tend to become higher level and more focused on outcomes.

2. Distribution of Questions

A. Volunteer/Non-volunteer balance

Some students know that in some classrooms they do not have to participate if they choose not to volunteer. The advantage of calling on only volunteers is that it may be less threatening. A disadvantage is that a small number of students will be answering all of your questions. When calling on non-volunteers, it is best to ask the question first, provide wait time, and then call on a student by name. If you call the student's name first, the rest of the class may not listen to the question.

B. Equity and Expectations:

Studies show that teachers tend to call on high-achieving students more than on low-achieving students and give more wait time to high-achieving students. Some teachers also call on students differently based on gender and race.

C. Group/Individual Balance:

Most questions tend to be one-on-one between the teacher and one student. In a class of 30 students, that usually means the probable engagement is $1/30^{th}$ of the class at any one time, as students tend to disengage when they are not being addressed. Students can be engaged more actively by formulating questions in a way that allows for students to share their responses with one or more other students and then report out. The table below contrasts the two strategies.

Individual Questioning	Group Questioning
• One student held accountable at a time	• All students are held accountable
• No peer feedback	• Peer feedback supports and proceeds teacher feedback
• Not always safe as answers are public	• Safer, more private engagement - opportunity for cognitive rehearsal before "going public"
• Discourse skills are not enhanced and exposure to diverse thinking is limited	• Opportunity to practice discourse skills and experience diversity
• Teacher guesses at total class needs based on one student's answer	• Teacher has broader picture of student needs

3. Use of Elaboration and Follow-up Questions

Asking follow-up questions that require students to elaborate promotes more thinking and helps shape understanding. Initial responses may be superficial. Asking students to elaborate gets students more involved in critical analysis of their own and other students' ideas. Examples: "Now that you have shared the facts, what are the implications for our planet?" "What do you mean by civilized?" "What makes you think that?" "What might be another way of looking at that?"

Use the student response to lead to the next follow-up question. While listening to the student, try to determine whether you understand her point. If you do not understand, probe for more information or clarification. Examples: "What details can you share to further define your thinking?" "Share an example to help us follow your thinking?"

Teachers may also ask for elaboration from other students by asking others to agree/disagree, add to, support, modify, or give evidence to the contrary. This places the burden on the rest of the class to listen to each response. Examples: "Please add to that." "Who has another way to say that?" "Please paraphrase what Mike said."

4. Use of Redirecting Questions

If students don't answer immediately, teachers typically answer their own questions. Asking other students instead of the teacher answering makes the whole class accountable for answering every question. It is also an effective strategy for allowing a student to correct another student's incorrect response.

When students ask a teacher a question, an effective strategy is to ask, "Who can answer that?" This strategy teaches students to provide responses to other students and not just the teacher. It also teaches students to listen more carefully to each other.

5. Creation of a Safe Environment

Students often perceive that they have more to lose in terms of being embarrassed by answering a question incorrectly than from not answering. Students do not like to look ignorant before their teacher or peers. Creating a climate that allows for risk-taking and making mistakes increases the chance that students will answer questions thoughtfully.

TEACHING STUDENTS TO ASK QUESTIONS

1. Teach students to categorize questions: If students know the names and purposes for different categories of thinking, they can learn to ask them of each other. It may be necessary to adapt the names of the categories we have used when teaching young children. Remember: It is as important to teach students the reason or purpose for asking each kind of question as it is for them to know the names of the categories. One way to use this strategy is to have students number off in their group from 1-4 and after a piece of content or reading, each student develops a a question to generate a kind of thinking. Another strategy is to ask students to brainstorm questions on a particular subject and then categorize the kinds of thinking the questions generate. The teacher may want to add any types of questions that students do not seem to be generating so they have all four categories of thinking.

2. Teach students the cognitive behaviors that go with the thinking embedded in the questions: Students often don't know how to answer our questions because they do not know what kind of thinking we are asking them to perform. A verb such as "infer" can have multiple meanings even for teachers. Teaching students what those kinds of thinking are will allow them to use the appropriate thinking in their questions.

3. Allow students to develop their own questions for learning: At the beginning of a lesson, ask students what they would like to learn about a subject. Strategies such as "What I Know, What I Want To Know, and What I Have Learned" (KWL) help elicit student-generated questions.

4. Use Junior Great Books questioning strategies: In the Junior Great Books instruction, teachers are expected to only ask questions about which they are genuinely curious and to which they do not have an answer. For more information, go to www.greatbooks.org

5. Teach students rules of effective discourse: If students do not have skills for talking with their peers, they will be unable to break out of the pattern of only responding to the teacher. Teach students how to listen, probe, paraphrase, check for understanding, stay on the point, take turns, etc. One study found that early adolescents interact with other students much more freely than with the teacher. Answers are longer and more elaborate to peers' questions than to teachers' questions. (Dillon, 1982)

6. Model effective questioning techniques: It is very difficult to do something that we have not seen someone do effectively. It is important that teachers use the skills for increasing the quality of interactions and ask a variety of types of questions. Explaining to students what you are doing and why allows them to process your behavior and increases the probability they will duplicate it in another context.

7. Use a declarative statement instead of a question: Throughout this module we have presented statements instead of posing a question and asked you to respond. Statements can be more ambiguous and generate a less predictable response. The statement leaves more room for students to ask their own questions, add their own interpretations, and elaborate. Students are freer to use their prior knowledge and experience in accepting or rejecting the statement. Statements also give the teacher more information about what students understand or do not understand than questions.

8. Ask students to create test questions: If students have been taught the categories of thinking and their purposes, they are able to develop test questions at a variety of levels. Teachers could also allow students to analyze tests or questions at the end of chapters using the four categories of thinking. Giving students the opportunity to develop questions for assessment helps to focus their study. Generally, students create more difficult questions than teachers do.

9. Use Reciprocal Teaching: See attached article.

10. Use Paired Problem Solving: In this strategy students are paired. The problem solver tells what he or she is thinking at every step as he or she proceeds to solve the problem. The listener checks continually for accuracy, points out errors (but doesn't correct them); insists on vocalization; encourages the problem solver to persist; and seeks clarity and precision of language. (Arthur Whimbey & Jack Lochhead)

ANALYZING TESTS FOR CATEGORIES OF THINKING

1. Analyze one of you own teacher-made tests. Classify the questions and/or thinking by the 4 categories we studied.

   a. Number of Accessing Questions _____
   b. Number of Organizing Questions _____
   c. Number of Transforming Questions _____
   d. Number of Thinking about Thinking Questions _____

2. Analyze a chapter test from a textbook or any commercially made content test using the same 4 categories we studied.

   a. Number of Accessing Questions _____
   b. Number of Organizing Questions _____
   c. Number of Transforming Questions _____
   d. Number of Thinking about Thinking Questions _____

3. How did either of the tests meet or not meet stated or intended outcomes?

4. What insights did you have as you did the analysis?

5. Compare and contrast your analysis of your teacher-made test with the commercially made test.

CONDITIONS FOR POWERFUL LEARNING

1. Students experience the curriculum in a way that promotes understanding.

Curriculum is:
- Aligned (Standards/Content/Instruction/Assessment)
- Holistic/Big Picture
- Deep
- Integrated/Interrelated/Connected
- Multicultural

2. Students construct knowledge.

Students:
- Access prior knowledge to make connections
- Organize information to make sense
- Transform information to demonstrate understanding
- Think about their thinking

3. Students' needs drive the design of learning experiences.

Learning experiences are:
- Challenging and rigorous
- Relevant and authentic
- Providing for choice
- Developmentally appropriate
- Attentive to learning styles

4. Students demonstrate understanding.

Students modify performance based on:
- Clear criteria for success
- Feedback
- A variety of assessments
- Self-assessment
- Questions

5. Students experience a learning environment that is safe and productive.

The environment is safe:
- Cognitively
- Physically
- Emotionally
- Socially

. . . supporting student productivity

Teaching for Understanding Modules

Questioning for Understanding: This module helps teachers identify the levels of thinking they would like to promote and the questions that generate that level of thinking. It also explores how to improve the quality of the interactions in the classroom. In addition to improving teacher questions, the module examines ways to encourage students to ask questions.

Providing Feedback to Promote Understanding: This module identifies components of effective feedback, including framing feedback with clear, public criteria for success, having multiple sources of feedback, teaching students to self-assess, and finding opportunities for students to refine and revise work based on feedback.

Assessing Understanding: Depending on their purpose for assessing, teachers will want to use different assessments. This module examines how assessment can be embedded in instruction to improve performance and allow students to develop and demonstrate understanding. Participants explore and develop performance tasks as a way of assessing student understanding.

Designing Standards-Based Units for Understanding: Participants continue to explore understanding by examining how to design units of study for students. The unit design uses a "backward design" process. The process identifies the standard to be addressed, the big understandings and essential questions for the unit, the evidence and process for assessing understanding, and then the selection of appropriate learning activities.

What is Reciprocal Teaching?

Reciprocal teaching is an instructional procedure designed to enhance students' comprehension of text. The procedure was designed by Anne Marie Palincsar, from Michigan State University and Anne Brown, from the University of Illinois. It is characterized by:

- a dialogue between students and teacher, each taking a turn in the role of dialogue leader;
- "reciprocal": interactions where one person acts in response to the other;
- structured dialogue using four strategies: questioning, summarizing, clarifying, predicting.

Why were these four strategies selected?

Each of these strategies helps students to construct meaning from text and monitor their reading to ensure that they are in fact understanding what they read. Students may find the set of cards developed by Kathie Babigian, helpful to guide their questioning process

Summarizing. This strategy provides the opportunity to identify, paraphrase, and integrate important information in the text.

Questioning. When students generate questions, they first identify the kind of information that is significant enough that it could provide the substance for a question. Then they pose this information in a question form and self--test to ascertain that they can indeed answer their own question.

Clarifying. When teaching students to clarify, their attention is called to the many reasons why text is difficult to understand; for example new vocabulary, unclear referent words, and unfamiliar or difficult concepts. Recognizing these blocks to understanding signals the reader to reread, read ahead, or ask for help.

Predicting. This strategy requires the reader to hypothesize about what the author might discuss next in the text. This provides a purpose for reading: to confirm or disapprove their hypotheses. An opportunity has been created for the students to link the new knowledge they will encounter in the text with the knowledge they already possess. It also facilitates the use of text structure as students learn that headings, subheadings, and questions imbedded in the text are useful means of anticipating what might occur next.

How are the four strategies used in a session?

The discussion leader generates questions to which the group responds. Additional questions are raised by other members of the group. The leader then summarizes the text and asks other members if they would like to elaborate upon or revise the summary. Clarifications are discussed. Then, in preparation for moving on to the next portion of text, the group generates predictions. The goal is flexible use of the strategies.

How are the four strategies introduced to students?

- During the initial phase of instruction the teacher assumes primary responsibility for leading the dialogues and implementing the strategies.
- Through modeling the teacher demonstrates how to use the strategies while reading text.
- During guided practice the teacher supports students by adjusting the demands of the task based on each student's level of proficiency.
- Evntually the students learn to conduct the dialogues with little or no teacher assistance.
- The teacher assumes the role of a coach/facilitator by providing students with evaluative information regarding their performance and prompting them to higher levels of participation.

How should students be grouped for instruction?

Students should be taught in small heterogeneous groups to ensure that each student has ample opportunity to practice using the strategies while receiving feedback from other group members. The optimal group size is between six to eight students. Frequent guided practice is essential in helping students become more proficient in their use of the strategies.

What criteria should be used to select appropriate instructional materials?

- Select materials on the basis of the student's reading/listening comprehension level.
- Identify materials that are sufficiently challenging.
- Incorporate text that is representative of the kinds of materials students are expected to read in school.
- Generally students have been taught the Reciprocal teaching procedure using expository or informational text. The story structure in narrative text lends itself quite well. also.

Students are taught to use the four strategies incorporating the elements of story grammar (e.g., the setting, characters, plot, problem, and solution).

How much time should be allocated for instruction?

The first days of instruction are spent introducing the students to the four strategies. The length of each session will depend upon the age and the attention of the students but will usually fall within the range of 20 to 40 minutes per session. It is recommended that the initial instruction take place on consecutive days. After this point, instruction can be provided on alternate days if necessary.

References

Palincsar, A.S. (1986, April). Interactive cognition to promote listening comprehension. Paper presented at the annual meeting of the American Educational Research Association, San Francisco.

Palincsar, A.S. & Brown, A. L. (1984). Reciprocal Teaching in Comprehension-fostering and Comprehension-monitoring Activities. Cognition and Instruction, 1 (2) 117-175

Palincsar, A.S. & David, Y.M. (1990, April). Learning Dialogues for Compreshion and Knowledge Acquisition. Paper presented at the annual meeting of the Council for Exceptional Children, Toronto.

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Self-evaluation on questioning

Following is a self-evaluation checklist on questioning techniques. Try it weekly. If your answers to every question aren't YES, there's room for improvement.

During the class period:

- ☐ 1. Do I call on females as well as males for the tough questions?
- ☐ 2. Do I pause before calling on a specific student?
- ☐ 3. Do I ask questions without including a specific student's name?
- ☐ 4. Do I pause before responding to a student's question?
- ☐ 5. Do I pause after a student gives a response to my question?
- ☐ 6. Do I call on a large number of students during the class period?
- ☐ 7. Do I allow all the students to consider the answers to high-level questions before I call on one student?
- ☐ 8. Do I use student pairs to arrive at solutions or discuss a student's response?
- ☐ 9. Do I direct all my questions to ALL students?
- ☐ 10. Do I field appropriate student questions back to the class?
- ☐ 11. Do I ask students to justify their answers so that their fellow students can learn from the response?
- ☐ 12. Do I allow students to complete their answer before jumping in?
- ☐ 13. Do I ask students to enhance their answer when it is not complete, or if I can't tell if they understood the concept?
- ☐ 14. Do I allow students to respond to another student's responses before I make a comment myself?
- ☐ 15. Do I avoid yes-and-no questions?
- ☐ 17. Do I avoid one-word-answer questions?
- ☐ 18. Do I avoid asking questions similar to "Do you have any questions?"
- ☐ 19. Do I avoid using questions as a disciplinary tool, or to capture attention?
- ☐ 20. Do I avoid group responses to questions?
- ☐ 21. Do I avoid asking and then immediately answering questions myself?
- ☐ 22. Do I help a student to enhance his or her answer?
- ☐ 23. Does my questioning give me meaningful input about the students' understanding of the concepts being taught?
- ☐ 24. Do I allow students to think and organize their ideas before asking them to respond in front of the entire class?
- ☐ 25. Do I create a classroom atmosphere that makes it safe for students to be wrong?
- ☐ 26. Are my students properly trained to act maturely when a student gives a wrong response?
- ☐ 27. Do I avoid asking only top students high-level questions?
- ☐ 28. Do my questions promote total student involvement, or do they inhibit student involvement?
- ☐ 29. Do my questioning techniques raise the level of concern (but not fear) in my class?
- ☐ 30. When there are only a few hands raised to respond to a question, do I provide alternative ways to respond in order to get more students to participate?
- ☐ 31. When only one student can answer a question, do I use this input and help others to understand and become involved in the question?
- ☐ 32. Do I allow students to discuss ideas with their partners before asking a particular student to share ideas with the entire class.

Student Evaluation of Questioning Skills

Using ICES Questionnaire Items to Assess Your Questioning Skills

The following set of ICES (Instructor and Course Evaluation System) questionnaire items can be used to assess your questioning skills. The items are presented with their original ICES catalogue number. You are encouraged to include one or more of the items on the ICES evaluation form in order to collect students' opinions of your questioning skills.

33--How much time was allotted to classroom questioning and discussion?
Too much - - - - - Too little

328--Did the instructor raise challenging questions in class?
Yes, Often - - - - - No, Seldom

329--Questions presented to the class to generate discussion were generally:.
Too specific Too vague

331--The instructor asked open-ended questions..
Almost always occurred - - - - - Almost never occurred

333--The instructor was receptive to differing viewpoints or opinions..
Yes, quite open - - - - - No, didn't want them

336--Did the instructor clarify student ideas by inflection (e.g., said "Do you mean...).
Almost always - - - - - Almost never

341--During presentations, did the instructor check on students' understanding?.
Almost always - - - - - Almost never

354--The instructor listened attentively to what class members had to say..
Always - - - - - Seldom

359--How often did the instructor understand your comments or questions?.
Almost always - - - - - Almost never

363--The instructor corrected student statements without further discussion..
Almost always occurred - - - - - Almost never occurred

366--The instructor thoroughly answered students' questions..
Almost always - - - - - Almost never

379--The instructor was condescending toward students.
Strongly agree - - - - - Strongly disagree

390--There was a positive interaction between students and instructor.
Almost always - - - - - Almost never

391--The atmosphere in the classroom seemed:
Relaxed and friendly - - - - - Tense and unfriendly

392--The instructor promoted an atmosphere conducive to work and learning.
Strongly agree - - - - - Strongly disagree

401--Students were free to interrupt presentations if points needed clarification..
Strongly agree - - - - - Strongly disagree

Survey on Questioning

The following survey can be used to provide you with quick and efficient systematic information concerning students' perceptions of the "questioning/interaction" atmosphere in your classroom.

SURVEY ON QUESTIONING

Directions: Respond to each of the statements below by circling the response which most closely corresponds to your observation.

1. How would you characterize communication in your class?

   a. As an uninterrupted lecture by the professor?
   b. As a lecture where members of the class sometimes raise questions about the material being presented?
   c. As a lecture where the professor and/or class members often stop to discuss the material being presented?
   d. Other: (Specify on back)

2. I feel free to ask questions when I do not understand a point the instructor is making.

   a. Usually
   b. Sometimes
   c. Seldom

3. The questions presented to the class are generally:

   a. Too difficult
   b. About right
   c. Too easy
   d. Other (Specify on back)

4. During the class, the instructor asks questions to determine if we understand the presentation.

   a. Usually
   b. Sometimes
   c. Seldom
   d. Not applicable

5. The instructor adjusts the presentation based upon student feedback during the lesson.

   a. Usually
   b. Sometimes
   c. Seldom
   d. Not applicable

6. The instructor misunderstands student questions.

   a. Usually
   b. Sometimes
   c. Seldom

7. The instructor answers questions clearly and concisely.

   a. Usually
   b. Sometimes
   c. Seldom

8. The instructor is patient with students who ask questions.

   a. Usually
   b. Sometimes
   c. Seldom

9. Do you feel comfortable responding to questions in this class?

   a. Usually
   b. Sometimes
   c. Seldom
   d. Not applicable

QUESTIONING FOR UNDERSTANDING

	4	3	2	1
Wait Time I	Students are always allowed 3 seconds or more of Wait Time I.	Most of the time students are allowed 3 seconds or more of Wait Time I.	Rarely are students allowed 3 seconds or more of Wait Time I.	Never are students are allowed 3 seconds or more of Wait Time I.
Wait Time II	Students are always allowed 3 seconds or more of Wait Time II.	Most of the time students are allowed 3 seconds or more of Wait Time II.	Rarely are students allowed 3 seconds or more of Wait Time II.	Students are never allowed 3 seconds or more of Wait Time II.
Volunteer/Non-Volunteers	There is always an equal amount of volunteers and non-volunteers that are called upon throughout the lesson.	Most of the time there is an equal amount of volunteers and non-volunteers that are called upon throughout the lesson.	Rarely is there an equal amount of volunteers and non-volunteers that are called upon throughout the lesson.	Never is there an equal amount of volunteers and non-volunteers that are called upon throughout the lesson.
Group/Individual Balance	Most of the time all students are simultaneously engaged in questioning .	Some of the time all students are simultaneously engaged in questioning.	Rarely are all students simultaneously engaged in questioning.	Never are all students simultaneously engaged in questioning.
Equity & Expectations	Always during the class period, all types of performing students are called upon equally.	Sometimes during the class period all types of performing students are called upon.	Rarely during the class period are all types of performing students are called upon.	Never during the class period are all types of performing students called upon .
Follow-up & Elaboration Questions	Most often students' questions are used as follow-up or elaboration points.	Sometimes students' questions are used as follow-up or elaboration points.	Rarely are students' questions are used as follow-up or elaboration points.	Students' questions are never used as follow-up or elaboration points.
Redirection of Questions & Responses	Students are always recipients of redirected responses or questions that emanate from other students.	Often students are recipients of redirected responses or questions that emanate from other students.	Occasionally students are recipients of redirected responses or question that emanate from other students.	Students are recipients of no redirected questions or responses from each other.
Safe, Risk-taking Environment	Students always feel safe in the classroom environment and feel they are supported in risk-taking by the teacher.	Students sometimes feel safe in the classroom environment and feel they are supported in risk-taking by the teacher.	Students rarely feel safe in the classroom environment and rarely feel supported in risk-taking by the teacher.	Students never feel safe in the classroom environment and do not feel supported in risk-taking by the teacher.

	4	3	2	1
Questions that generate thinking for understanding	Posed questions always generate thinking for understanding.	Posed questions sometimes generate thinking for understanding.	Posed questions rarely generate thinking for understanding.	Posed questions never generate thinking for understanding.
Questions that are congruent with outcomes of understanding	All questions are congruent with outcomes of understanding.	Some questions are congruent with outcomes of understanding.	Rarely are questions congruent with outcomes of understanding.	Never are questions congruent with outcomes of understanding.
Student-Generated Questions	Most students ask questions that are at the "Thinking about Thinking" or "Transforming" level.	Some students ask questions that are at the "Thinking about Thinking" or "Transforming" level.	Most students asks questions that are at the "Organizing Information" or "Accessing Information" level.	Most students ask questions only at the "Accessing Information" level.

QUESTIONING FOR UNDERSTANDING

STRUCTURES	STRATEGIES	SKILLS
Models of Teaching: • Problem Based Learning • Resource Based Learning • Cooperative Learning • Inductive Thinking (Taba) • Inquiry Teaching (Suchman) • Discovery Learning (Bruner) • Cognitive Apprenticeship (Collings, Brown, Newman) Other: • Whole Faculty Study Groups • Interested Peer Study Groups • Peer Coaching • Socratic Seminars for Students	• The learning structure is emphasized and the question process is de-emphasized. • Wait Time I and Wait Time II • Plans are made to redirects, prompts, and probes • Knows the desired outcomes of a learning episode, plans for higher level questions that could possibly be used in class. • Purposely designs a learner interactive environment • Deliberately plans questions that allow students to demonstrate understanding. Questions are purposely geared toward the analysis, synthesis, and evaluation levels of thinking. (divergent thinking) • Teaches students questioning techniques (ala Socratic questioning, etc.) • Teacher strategically moves from main deliverer of knowledge to mentor/facilitator role. • Teacher engages in reflective practioning via: taped sessions with students-self review, peer observation with value neutral feedback, self-survey on questioning, student evaluation of questioning skills.	Teachers assure questioning for understanding by: • Incorporating higher level thinking, both critical and creative, into the lesson • Providing opportunities for creative thinking and creative products • Providing every student with opportunities for active involvement and creative thinking • Eliciting responses from volunteers and non-volunteers • Asking carefully and clearly formulated questions, providing wait time, before calling on students to respond • Using a variety of questioning and clarification techniques (e.g., factual, opinion, supportive, evidence, rephrasing) for all students • Anticipating and appropriately responding to student misconceptions • Using information gained to adjust teaching • Assessing learner progress on a continuous basis • Demonstrating sensitivity and responsiveness to the personal ideas, needs, interests, and feelings of students • Creating a courteous, respectful classroom climate • Promoting positive student-student, student-teacher relationships

Name _____

INQUIRY PLAN

Of the topics studied today, what area(s) are you interested in studying further or experimenting with in your classroom? (Check as many as you want.)

_____ Types of questions to get different kinds of thinking

_____ Wait Time I/II _____ Calling on Volunteers/Non-volunteers

_____ Calling on students equitably _____ Soliciting Group/Individual Responses

_____ Asking follow-up & elaboration questions _____ Redirecting questions

_____ Creating a safe environment _____ Getting students to ask questions

Other: _____

Steps I will take to accomplish the above:

_____

_____

_____

_____

_____

_____

How I would like to study/learn with others: (Check as many as you want.)

_____ Study Group _____ Video Group _____ Looking at Study Work

_____ Team Meetings _____ Peer Observations _____ Read & Discuss Articles

_____ Co-Teach _____ Faculty Meetings

Other: _____

Feedback on the Day

What I found most useful or significant to my teaching today was:

Something I still have a question about is:

How what I learned today will help me with my SIP strategy: