

Question Exploration *Addition to Content Enhancement Series*

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A new addition to the Content Enhancement Series developed at the Center for Research on Learning helps teachers and students use a “learning to walk” approach to understanding the big ideas of a class: Take small steps first before tackling a trek around the world.

The Question Exploration Guide is designed to help teachers guide students as they navigate through complex information to arrive at a clear, concise answer to a critical content question.

The guide is a one-page graphic device that helps students and teachers explore and answer a critical question through the development of smaller supporting questions and an exploration of details that provide foundational understandings related to those supporting questions.

Teachers and students develop the guide together using an interactive process that promotes collaboration.

The guide is divided into six sections:

Section 1: What is the Critical Question? provides space for students to write the big question on which the class will focus.

Section 2: What are the Key Terms and explanations? offers room for students to note unfamiliar terms or terms that are essential to understanding the Critical Question and its answer. This section also provides space for students to write explanations for each term they list.

Section 3: What are the Supporting Questions and answers? is an area in which

the class writes smaller questions that arise as they attempt to understand the Critical Question and its answer.

Section 4: What is the Main Idea Answer? contains the answer to the Critical Question once the class arrives at and agrees upon it.

Section 5: How can we use the Main Idea? provides a space for teachers to challenge students to apply the newly learned Main Idea to another aspect of their studies in the class.

Section 6: Is there an Overall Idea? Is there a real-world use? provides another challenge to students: Link the Main Idea Answer to something happening in the world today.

Teachers prepare a draft of the Question Exploration Guide before presenting it to students. During the planning process, it’s often helpful to think of the guide’s sections in three groups.

Group A encompasses Sections 1 and 4: The Critical Question and the Main Idea Answer. Thinking about the information in these two closely linked sections, before drafting the rest of the guide, allows the teacher to arrive at a clear question and answer, making it easier to develop the rest of the guide in support of the teacher’s instructional goals. In fact, it is OK to think deeply about these two sections and then set the draft aside for awhile before returning to think about the remaining sections.

Group B involves Sections 2 and 3: Key

Terms and Supporting Questions. These sections guide students toward a thorough understanding of the critical content. These sections break down the Critical Question and Main Idea Answer into a sequence of smaller questions for students to grasp more easily.

Group C encompasses Sections 5 and 6, the real-world extensions to the Main Idea Answer. These sections allow the class to go beyond the critical content and make connections to other content they are learning or to world events.

Understanding the relationships among sections of the guide is essential for constructing an effective, usable draft that can lead students to the Main Idea Answer. At the same time, the final version of the guide, developed interactively with students, may differ from the draft because of suggestions and questions raised by students. The interactive process followed to construct the final version involves the Cue-Do-Review instructional sequence (see the box above right) and the Linking Steps, which guide the student-teacher partnership. The instructional sequence and Linking Steps are detailed in the *Question Exploration Routine* guidebook.

The Linking Steps

The Linking Steps guide the teacher during in-class interactive development of the Question Exploration Guide in partnership with students. The discussion and exchange of information between students and teacher is an essential component of Content Enhance-

The Cue-Do-Review Sequence

This instructional sequence consists of three phases:

- In the first phase, “Cue,” the teacher cues students that the routine will be used and prompts them to attend to and participate in the construction of the Question Exploration Guide.
- In the “Do” phase, the Linking Steps are used to co-construct the Question Exploration Guide with students.
- Finally, in the “Review” phase, students’ understanding of both the information covered during the lesson and the process of finding an answer to a critical question is checked and bolstered as needed.

ment. The process helps students grasp the information—in this case, the answer to the Critical Question. More importantly, it strengthens their thinking processes, helping them learn how to devise an answer to any critical question in the future.

Step 1: Ask a Critical Question

In this step, the teacher and students write the important question—the one that will be explored and answered—in Section 1 of the guide. Typically, teachers will specify this question, but sometimes students may suggest a question as they read a book, conduct an experiment, or participate in a discussion. In Figure 1: Question Exploration Guide on page 3, the Critical Question is, “How does the destruction of the rain forest in South America contribute to the greenhouse effect?”

Step 2: Note and explain Key Terms

In this step, the teacher asks students to review the Critical Question and identify any words

or phrases that they must understand to answer the Critical Question. Together, they list these words and phrases in Section 2 of the guide on the left side of the dotted line. In Figure 1, the words and phrases identified for further explanation are “rain forest,” “greenhouse,” and “greenhouse effect.”

The teacher then elicits from students a definition or explanation for each term. The class consults dictionaries or other resources when students don’t have the necessary background knowledge to develop accurate and complete explanations. Students write the explanation(s) to the right of the dotted line, as shown in Figure 1.

The class may add to the words and phrases in this section as it continues to work through the remaining sections of the Question Exploration Guide.

Step 3: Search for Supporting Questions and answers

In this step, the teacher asks, “What do we need to know to be able to answer this Critical

Question Exploration Guide

1. What is the Main Question?
 How does the destruction of the rain forest in South America contribute to the greenhouse effect?

2. What are the Supporting Questions?

Why is it so?	A shift towards growing the new crops.
Where does it happen?	Agriculture that produces crops with low yields.
When does it occur?	Agriculture that produces crops (20%) that are shipped to Europe & Asia instead of being sold locally.

3. What are the Other Informational Questions?

What happens on the ground?	They are being burned, so farmers have more land to grow crops.
What does the burning create?	1. The burning releases a new CO ₂ into the atmosphere, and 2. The CO ₂ gets carried from there around the world in the atmosphere.
What is the impact of the released CO ₂ ?	1. Increase in the amount of heat trapped by the atmosphere. 2. They lead to effects such as sea level rise and drought & burning water.

4. What is the Big Idea?
 Climate change is caused by the burning of fossil fuels, which releases CO₂ into the atmosphere.

5. How is it being explored?
 A series of questions that build up to the Main Question.

6. What Assessable items are included?
 2. Why is it so? & When does it occur? are assessable.
 4. What is the impact of the released CO₂? is assessable with different people asking different questions.

Figure 1: Question Exploration Guide

Question?” The resulting process is akin to unpacking a suitcase. The suitcase represents the Main Idea Answer, while each item in the suitcase represents a piece of information that combined will lead to a complete, deep understanding of the Main Idea Answer.

Students progress through the layers of information, first suggesting a smaller question that must be answered. In our example, the first Supporting Question is “What’s happening to the rain forests?” Understanding the answer to this question (“They are being burned so farmers have

more land to grow crops.”) is vital before students can formulate an answer to the Critical Question, “How does the destruction of the rain forest in South America contribute to the greenhouse effect?” The class follows up each answer with a “so what?” type of question: In other words, why

is it important that rain forests are being burned? Or, as listed in Figure 1, “What does the burning cause?”

The class continues to work through the layers, unpacking Supporting Questions and their answers and gaining deeper insight that will allow them eventually to develop the Main Idea Answer. They list each Supporting Question on the left side of the dotted line in Section 3. They write the corresponding answer on the right side of the dotted line.

An answer doesn’t have to consist of words or phrases. A graphic organizer, map, or sketch may be more appropriate and helpful in some cases.

For more information about this section, see “Keys to unpacking critical questions” on page 6.

Step 4: Work out the Main Idea Answer

In this step, the teacher asks the class to stand back and use the information they have learned so far to write a summarizing sentence that answers the Critical Question. Students work together as a class, in pairs, or in small groups.

If students work as a class, the teacher guides the discussion until a broad, accurate statement has been developed.

If students work in pairs or small groups, the teacher circulates among the groups to help them each create a statement answering the question. After

pairs or groups have generated their answers, the teacher leads the class in sharing and discussing these answers before choosing the best. The class also may revise one of the proposed answers to arrive at the best Main Idea Answer.

To remember the Linking Steps, you can use the acronym ‘ANSWER.’ The letters correspond to the first letters of the Linking Steps.

At this point, everyone writes the best answer in Section 4 of the Question Exploration Guide. In our example, students draw on everything they learned while exploring the Supporting Questions to arrive at their Main Idea Answer: “When rain forests are burned, the resulting increase of CO₂ contributes to the greenhouse effect.”

Step 5: Explore the Main Idea within a related area

In this step, the teacher challenges students to apply their understanding of the Main Idea to the current course or subject area. The goal is to encourage such high-order thinking skills as comparing, applying, analyzing, relating, and evaluating. Teachers may approach this step in many ways:

- The teacher may prepare a question or topic that will allow students to apply the knowledge they have learned.
- The teacher may choose from a list of questions students have asked in the past.
- The teacher may choose a topic related to an area of interest that students have mentioned.
- The teacher might elicit questions from the students and

select one as the Challenge Question if it extends thinking about the Main Idea and is of high interest to the students.

The class writes the selected question in Section 5 of the guide. In our example lesson, students are to respond to the challenge, “How would cutting rather than burning rain forests affect the atmosphere?”

Students then have time, either in class or as homework, to respond to the Challenge Question. Once students have completed the assignment, the teacher returns to the guide and leads a discussion about the question and the students’ answers.

Step 6: Relate the idea to today’s world

In this step, the teacher challenges students to show a broad understanding of the Main Idea within the world at large. In our example, the class has developed an Overall Idea statement that relates the Main Idea Answer to life in a general way: “What happens in one part of the world can affect us all.” Students then respond to the challenge to describe an event that happened in one part of the world and explain how it affected people in other parts of the world.

Assignments such as this encourage high-order thinking skills such as evaluating real-life challenges.

Research Results

Field tests of the *Question Exploration Routine* have been conducted with several classes of secondary students. In general, the results show that teacher use

of the routine is associated with significantly higher student test scores than when the routine is not used. In one study, students in seven classes were randomly assigned to two groups and then were taught two lessons. Group A classes were taught about biological warfare through the use of the *Question Exploration Routine* and about chemical warfare through traditional instructional methods. Group B classes were taught about the same topics, but the methods were reversed. They learned about chemical warfare through the use of the *Question Exploration Routine* and about biological warfare through the use of traditional instructional methods.

Students who took part in instruction using the *Question Exploration Routine* earned significantly higher scores than when they took part in traditional instruction.

Biological Warfare Lesson

Group A (QEG)	70%
Group B (traditional)	48%

Chemical Warfare Lesson

Group A (traditional)	46%
Group B (QEG)	72%

Additionally, student groups who are at risk for failure as well as both typical and high achievers seemed to benefit from the use of the routine. When students with learning disabilities learned about biological warfare through the use of the routine, they earned a mean test score of 63 percent. Students with LD who learned about the same information through traditional methods earned a mean test score of 34 percent.

Building bridges for learning

A good question to ask about the Question Exploration Guide is “Where should it be used in instruction?” Using a Question Exploration Guide is how the teacher helps students answer critical questions wherever they occur. However, it is sometimes the case that a teacher formulates a good question, but does not provide the supports needed to help students answer the question. Therefore, Question Exploration Guides should be developed for questions found in a variety of places.

Specifically for the Content Enhancement series, a Question Exploration Guide is a bridge between other Content Enhancement Routines and student learning. A Question Exploration Guide should be developed for the following:

1. each question on a Course Organizer
2. each question on a Unit Organizer
3. each question on a Lesson Organizer
4. each extension question posed on a Comparison Table

In addition, a Question Exploration Guide will be useful for critical questions found in the following places:

1. questions at the end of chapters in a text
2. practice examples with the same types of question that you will put on assessments
3. practice examples of question types that will be included on district/state/national assessments
4. questions students formulate from on-line investigations
5. questions that reflect a student’s special interest in a topic
6. questions that will guide students in the progress of a project

You also may employ other routines to help develop information on the Question Exploration Guide. You may turn to the *Vocabulary LINCing Routine* or the *Recall Enhancement Routine*, for example, to work through Key Word and vocabulary term explanations.

For more information about other routines in the Content Enhancement Series, visit CRL’s web site:

www.kucrl.org/iei/sim/

Similar types of differences were achieved regardless of whether the students were answering matching questions, multiple-choice questions, or short-answer questions and whether they were answering questions about main ideas or details.

The Question Exploration Routine, a guidebook written by Janis Bulgren, Keith Lenz, Don Deshler, and Jean Schumaker, is published by Edge Enterprises, Lawrence, Kan. It is available to teachers only through professional development sessions conducted by certified SIM Professional Developers.

—Question Exploration Guide Extras—

Keys to unpacking critical questions

Some authors have supported the idea that thinking—and by implication, student learning—is driven not by answers, but by questions (for example, Elder & Paul, 1998). The zigzag structure of the Supporting Questions section, in which one question leads to another, keeps pushing students to think beyond the initial answer or explanation. The process encourages them to follow up each answer with another question.

Teachers report that many students simply “freeze up” when confronted with a difficult question. The result is that often a student does not even attempt to answer an important question. The metaphor of “unpacking” the question is insightful. A large, difficult question can be like a suitcase. It is likely that there

are many small, useful items in the suitcase, but unless it can be opened, no one can use them on the journey. We need the keys to unpack the suitcase.

Similarly, students need a key to “unpack” a large, often difficult, but critical course question. The *Question Exploration Routine* gives the students three keys: key-term questions, signal-word questions, and connecting questions.

Key-term questions

The question often can be unpacked by simply beginning with a rephrasing of the critical question in Section 1 into a statement and providing the definitions of the key terms. Important words or phrases may either be explicit in the question or implicit. However, these definitions, facts,

or descriptions help students unpack a critical question. The “freeze” is often broken at that point and thoughts can flow freely.

Signal-word questions

A questioning strategy based on signal words—such as “who” or “what”—also can be useful. Students can unpack a critical question by asking “who,” “what,” “when,” and “where” questions about the main topic named in the critical question. Students then can start to develop the even more meaningful “why” and “how” questions that lead to deep understanding and explanations.

Connecting questions

Connections can be made from one question-and-answer set to the next. Information provided in one answer often contains a word or phrase that leads to a new question and answer set. This can go on until a complete explanation is achieved. This is a form of inferential thinking. Between each question-and-answer set, the student can learn to ask, “If this is the case, then what?” This “if-then” exploration can lead to a good main idea answer.

References

Elder, L., & Paul, R. (1998). The role of Socratic questioning in thinking, teaching, and learning. *The Clearing House*, 71(5).

Young, K.M. (1995). Explaining explanations: A conversation with NRCSL senior scientist Gaea Leinhardt. *Learning*, 3(1). University of Pittsburgh.

Which came first?

It’s a classic chicken-and-egg conundrum: Which came first, the question or the answer? In some cases, it may be that the answer should.

As you prepare a draft of the Question Exploration Guide, you may discover it is easier to start with the chicken and work back to the egg. That is, in good instructional lessons, a question must be as clear as the answer (Young, 1995). To get to that clear question, teachers with whom we have worked often find it is easier to first formulate the clear Main Idea Answer they want to elicit from students. With the answer in front of them, they then develop a Critical Question that will lead students in the direction intended.

Likewise, the discussion related to information contained in the Supporting Questions section may be more focused and productive if you first determine the explanations students will need to grasp, then work backwards to the questions that will lead to those explanations.

Successes with reading strategies

SIM Professional Developer **Paula Hamp Nelson** of Sioux City, Iowa, recently shared the following two wonderful success stories. Many thanks to Paula for sharing.

...

My first story begins two years ago when I was contacted to tutor a student who was playing for a local United States Hockey League team. He was a very bright young man who was severely dyslexic and was still in need of completing two high school credits to graduate.

Once I started working with him, I realized that Zech could not read. He had the skills to sound out letters and letter combinations, but no skills to put it all together. Even though he needed his American Government and Economics credits, he first needed additional reading skills.

I spent time teaching him the *Word Identification* and *Self-Questioning* strategies. During the course of his hockey season, I was able to teach him to use the strategies independently, and he was able to complete his course work.

Days before he went home, his parents came into town from the East Coast and took me out to eat. Near the end of the dinner, his father touched my arm and said, "Paula I really can't thank you enough." There was a long pause at which time he began to cry. His wife asked, "What's this all about?"

He collected himself and continued. "I remember just last year, my son struggled to read 'The Little Yellow Duck,' and last week he called me and said 'Dad, listen to this!' and he read aloud from his American Government book. He

read words like judicial, legislative, and executive."

The whole time tears streamed down his face. "We then discussed current political issues that related to what he had just read. I never thought I'd see this day. Thank you."

I had to actually confess, "It's not me. It's Zech learning the KU strategies and applying them!"

Last week I received an e mail from Zech. He's currently playing hockey for an East Coast University, and earning a 2.98 GPA. WOW—what tremendous success, and he said he's still using the strategies!

...

Here's the second success story and it's still on going!

Three years ago, my principal approached me with some startling statistics: Forty-eight percent of our incoming freshmen were not reading at grade level; this staggering number did not include the incoming special education students, another 20 percent of our incoming ninth-graders. He

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Photo courtesy of the Orlando Sentinel

CRL director Don Deshler greets First Lady Laura Bush at Discovery Middle School in Orlando, Florida. In January, Mrs. Bush visited the school to see SIM in the classroom. SIM Professional Developers Jerri Neduchal, Elaine Brindley, and Jorge Vallin (pictured to the right of Mrs. Bush) participated.

Stratagem

Vol. 16: Issue number 2. Published six times per year by The University of Kansas Center for Research on Learning, Joseph R. Pearson Hall, 1122 West Campus Road Room 521, Lawrence, Kansas, 66045-3101. Subscription rate: \$15 per year. No part of this publication may be reproduced without written permission from the publisher, unless otherwise stated.

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Permit No. 65

Reading successes

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wanted to know what I was going to do to fix this problem.

Two weeks later, I presented the idea of doing an intensive summer program teaching three of the KU strategies: *Word Identification*, *Self-Questioning*, and *Visual Imagery*. My proposal was accepted, fully funded, and we undertook our first T.R.I.P. (Transitional Reading Improvement Program).

I had previously trained two other teachers; each of us taught one of the strategies. We ran the course for three weeks—three hours a day, five days a week. The students were tested the first day and placed into three groups, which rotated between classes each hour.

I could share with you so many

little success stories that took place throughout this program, but the end result is that every one of these students completed their freshman year with the needed number of credits. Not a single student failed a course during their freshman year, and the average student improved one year five months on the reading comprehension section of the ITEDS while the average freshman who did not take the summer program only improved an average of four months.

The second summer, we again ran the program with similar results. One exciting story I must share is of a boy who had failed almost every class in seventh and eighth grade. His mother signed him up for the summer program, and the boy reluc-

tantly came to class every day. By the end of the three weeks, he didn't want the class to end! He has now successfully completed the first semester of his freshman year and is proudly on the honor roll.

Our summer program will continue for a third summer and will be expanded to accept even more students. We're looking forward to seeing the continued success—thanks to KU strategies and the hard work of our students.

•••

Send your SIM success stories to jtollefson@ku.edu or mail them to us at the KU Center for Research on Learning, Joseph R. Pearson Hall, 1122 West Campus Road Room 521, Lawrence, KS 66045-3101, Attn: Strategram.