

# THINKING ABOUT THINKING

What Makes a Good Question?

*By Ruth Sunda*

**Subject:** Language arts, critical thinking

**Audience:** Teachers, teacher educators

**Grade Level:** 4–5 (Ages 9–10), adaptable for higher grades

**Technology:** Internet/Web; word processing, quiz creation, file compression, and presentation software; CD-ROM

**Standards:** *NETS-S* 3, 4; *NETS-T* II ([www.iste.org/standards](http://www.iste.org/standards)). *ELA* 3, 4, 11, 12 ([www.ncte.org/standards/standards.shtml](http://www.ncte.org/standards/standards.shtml)).

**W**hy do some questions ignite exciting classroom discussions while others fizzle? What's a "fat" question? And what's a "skinny" one?

Those are just a few of the intriguing topics gifted students ponder in my language arts class at Kyrene de las Brisas Elementary School (Chandler, Arizona). In fact, much of my class time could be described as "thinking about thinking."

My students come to my class daily for 90 minutes of instruction in language arts. We are fortunate to have nine classroom computers with Internet access. Our school also has a computer lab with 28 computers available for our projects. We have a classroom scanner, color printer, digital camera, CD writer, and an electronic whiteboard. Yet all of this wonderful technology would be wasted if we didn't use it for its intended function of helping students become better thinkers. Thinking implies purpose, and curriculum-based computer applications establish a clear purpose for communicating ideas and sharing knowledge.

But for students to be responsible for critical thought, they must first learn how to be aware of and to think about

their own thinking processes (metacognition) as well as that of others. In our language arts classes, we look for opportunities to practice critical thinking skills through literature studies, writing, and research. A good way to introduce thinking is to post and discuss a "Thinking Vocabulary" so that all have a common understanding of terms such as: *assumption*, *bias*, *criteria*, *generalization*, and *inference*. To practice using these skills, we incorporate learning tools and strategies used to develop creative and critical thinking, such as graphic organizers, Edward de Bono's Six Thinking Hats, and Tony Ryan's Thinkers Keys. (*Editor's note:* Find information about these tools and strategies as well as project-related and study guide URLs under Resources on p. 15.)

### Introducing Thinking

One research project that stretches students' critical-thinking skills is one we call Unsolved Mysteries. Students take on the roles of Internet sleuths as they uncover the facts and fiction about a variety of unsolved mysteries or unusual occurrences. During the research, the groups evaluate the reliability of the sources of information they find on the Internet. Working in groups, students

examine the facts and opinions of the mysteries and use critical thinking skills to form their own reasoned judgments as to whether they believe the explanations of the mysteries are valid. The culmination of the research is a PowerPoint slide show presented to the class that highlights the various theories, the groups' conclusions about the mysteries, and the credibility of the sources of their information.

I believe that one of the most effective ways to enhance students' thinking skills is to challenge their understanding through the use of open-ended, probing, and stimulating questions. Socratic Questioning is one method of inquiry that poses questions of clarification and perspectives, and probes assumptions, reasons, implications, and consequences. To further students' ability to think about their thinking, they need to be taught how to answer thought-provoking questions, and equally important, how to ask them. A classroom poster in our room reads, "Have you asked a good question today?" Students are further reminded of the importance of questioning skills with a quote from Albert Einstein, also posted in the room, which says, "The important thing is not to stop questioning."

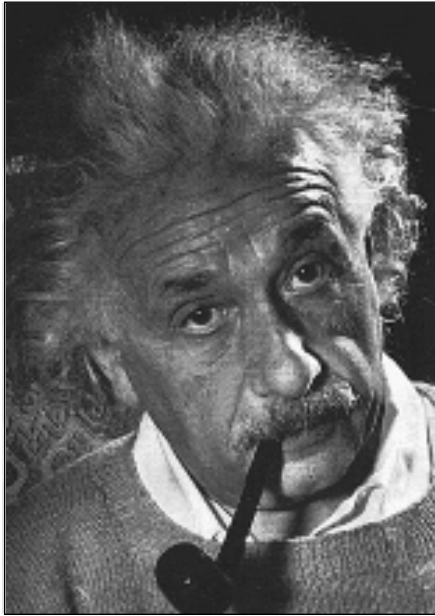
## YOUR OWN ODYSSEY

This article was adapted from one by Suzie Boss that ran online as part of the Intel Innovation Odyssey project, launched in January 2002 ([www97.intel.com/odyssey/index.asp](http://www97.intel.com/odyssey/index.asp)). The Odyssey project is soliciting stories that involve student learning in K–12 settings and in which technology use clearly enhances the learning. The site features a new story every school day, and as of press time, was on Day 200. That's 200 ideas for integrating technology into your curriculum! Ruth Sunda's story, Thinking about Thinking, ran on Day 73.

Teachers are not expected to write their own stories. Instead, they complete and submit a project description using an online form that's used for story development by the Intel team. Teachers also submit digital photos they take in their own classrooms. As an acknowledgment of their time, teachers who complete the submission process receive their choice of a digital camera or a handheld microscope. (Not every submission will be featured on the site.)

—The L&L Editors





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not to stop questioning.

—Albert Einstein

### Taking Thinking to the Next Level

In my Literature Units to Foster Critical Thinking project, I introduce students to the concept of higher-order thinking skills. We begin with a discussion of what is the essential question of this unit: “What do you need to know in order to really *understand* something?” I follow up with several other questions that pertain to this particular unit, such as:

- What kinds of thinking are “deeper” or more meaningful than other kinds of thinking?
- How does understanding the parts of a story help you understand the meaning of the story?
- What kinds of questions are worth discussing about a story?

All of these questions lead into my introduction of the project. I explain that students will divide into groups of two or three to read a primary-level novel and to develop a literature unit for use by capable Grade 1–3 students. Each unit will contain:

- a vocabulary list
- questions and prompts targeting literary elements
- questions and prompts requiring critical thinking
- writing activities

- at least one “fun sheet” (e.g., crossword puzzle, interactive multiple choice test, word search)
- Internet Connection activity with supporting questions or suggested activities

### Conducting the Literature Project

**Session One.** In the first class session, we review the concept of skinny and fat questions. A skinny question is one that can be answered with a short answer or uses basic recall of factual, literal information. On the other hand, a fat question is open-ended; there is no one right answer. The answer requires deeper thought through analysis, interpretation, or evaluation. To practice this skill we view some online literature units. I like the *A Wrinkle in Time* and *Island of the Blue Dolphins* online study guides for this purpose. We discuss why some types of questions and prompts require more thinking than others and make for better discussion questions (a prompt is different from a question in that it isn’t an inquiry, but it asks the reader to perform a certain type of thinking or action).

The students sort the questions from the study guides into fat and skinny categories. Skinny ones can be answered with a word or two, often the

simple recall of a specific detail mentioned in the text. Students discover that the fat questions require more mental processing, such as performing a certain thinking skill or task. A skinny question for *A Wrinkle in Time* would be “What does Aunt Beast look like?” Fat questions encourage interaction with the text and provoke more interesting discussions. A fat question for *Island of the Blue Dolphins* would be “Would you say the author is supportive or critical of the ways the Aleuts hunted? Support your views with evidence from the text.”

**Session Two.** Here, I introduce Benjamin Bloom and his levels of higher-order thinking by showing a PowerPoint presentation I developed called Bloom’s Critical Thinking Questioning Strategies. As a group, we answer the practice questions contained in the presentation, which involves classifying three types of questions from “Little Red Riding Hood.” Then I distribute copies of the instructional handout on the questioning strategies. As a group, we read and discuss the levels, pointing out that the levels of analysis, synthesis, and evaluation are the most important levels for critical thought.

Next, we discuss the difference between a question that asks for a response to a specific query and a prompt that asks the student to think, act, or perform a certain thinking skill or task. In small groups, I direct the students to select a book or story known by all, and together we brainstorm questions or prompts for each of the six levels listed at the end of the strategies sheet (Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation).

**Session Three.** Now, I divide students into small groups of two or three, who then select a primary-level novel to read for their literature unit. I distribute the literature unit requirements handout, which lists the components of the project, and the Literature Packet Plan-

ning Sheet, where the groups determine roles and responsibilities and keep track of their progress.

Each group divides their novel into three sections and agrees on a timetable of when to have each section read. Students begin by reading the first section together in class. While they read, they keep a list of vocabulary words with page references and possible questions or prompts about each section.

After students finish reading their novel, we review the strategies for writing summaries. Each group visits the East Muskingum (New Concord, Ohio) School District Web page on Summary Writing, and together the group members read through the information. After the review, each student independently writes a summary of the novel he or she read. I assess each student on his or her summary writing skills, but each group has the choice of either using an individual's summary or jointly rewriting one to include as an optional part of their unit.

**Session Four:** Next, it is time for the students to practice their new knowledge of higher-order thinking skills. Each group goes online to review and practice the thinking skills using the Covington City (Tennessee) Schools Web page on higher-order thinking skills. Using the first link at this site, students review the definitions of each of the six thinking skills. With the second link, labeled "Try these prompts!" the groups use the question stems and generate questions based on their novel. These questions will become part of a question bank they can pull from when developing their literature unit.

The third link, labeled "More ideas for activities!" provides ideas for the required Literary Section or End-of-Book section. I also direct the students to evaluate more online study units at Schools of California Online Resources for Education (SCORE) CyberGuides for ideas for questions, prompts, and activities for their own literature units.

**Session Five:** I distribute and discuss all rubrics and assessments used in this unit:

- Critical Thinking Scoring Rubric
- Evaluation Rubric
- Collaboration Rubric
- Self-Evaluation Rubric

Once the students have collaborated on the questions and prompts for their units, they must individually answer their questions and respond to the prompts. I explain that I will use the Critical Thinking Scoring Rubric to score the general quality of the answers and responses by the students in their unit. The students will use the Literature Packet Self-Evaluation to reflect on their achievement, and I will use the corresponding Literature Unit Evaluation Rubric to assess the project as a whole. Students will use the Collaboration Rubric to appraise the quality of their group's teamwork.

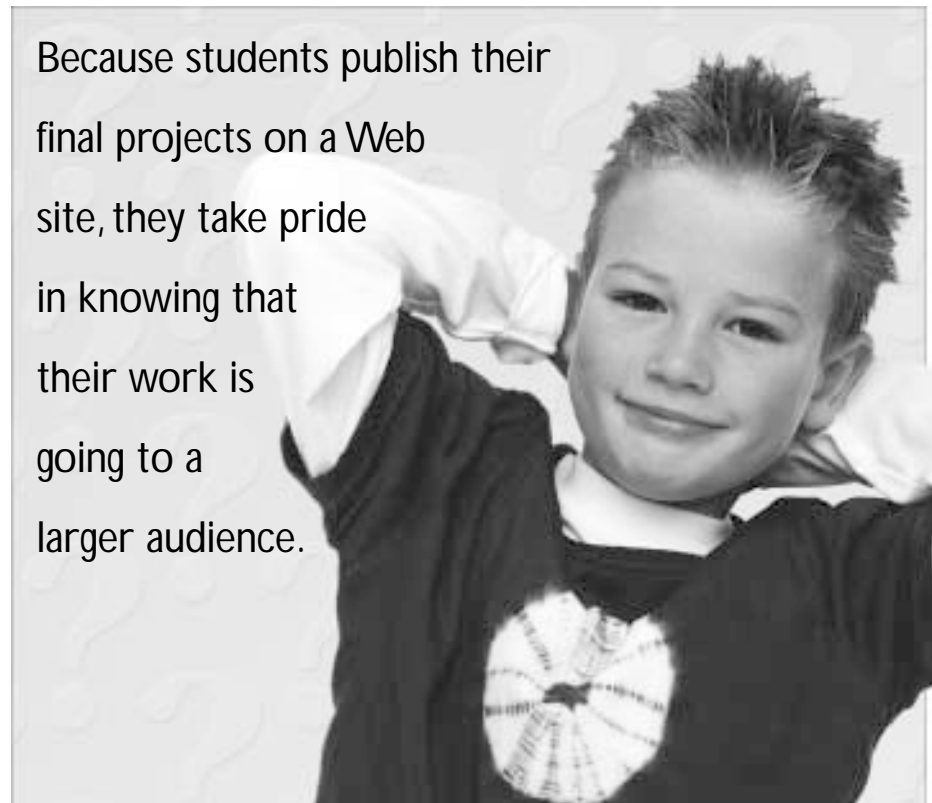
**Sessions 6–15.** In the next approximately 8–10 class sessions, students collaborate to create the various com-

ponents of the literature units, which include:

- Title page
- Vocabulary list (including a definitions page)
- Literary Section
- Thinking Cap Section
- Possible Answers or Responses for the Thinking Cap Section
- Fun Sheet (crossword puzzle, word search, or interactive quiz)
- Internet Connection with questions or activities

Using Discovery School's Puzzle-maker, I demonstrate procedures for creating puzzles. This site makes creating a variety of puzzle formats easy for both student and teacher. I also demonstrate use of Hot Potatoes software to create interactive quizzes. It allows you to create multiple-choice, short-answer, jumbled-sentence, crossword, matching/ordering and gap-fill exercises for the Web. Hot Potatoes software is free of charge for nonprofit educational users who make their pages available on the Web.

Because students publish their final projects on a Web site, they take pride in knowing that their work is going to a larger audience.



I encourage students to put on their own “thinking caps” to make the units graphically interesting, as well as having high-quality content. We strive for readability and a balance of text and graphics. I encourage students to use custom graphics they created in their word processing program, hand-drawn and scanned images, and clip art to add graphic interest to the pages.

I check off the students’ progress on the planning sheet and continue to monitor the level of critical thought being demonstrated in the units.

### Completing the Project

When the projects are finished, I complete the Critical Thinking Scoring Rubric and the Literature Unit Evaluation Rubric for each student. Students complete the Literature Packet Self-Evaluation for their own project and the Collaboration Rubric for their group partner(s).

The students print their finished literature units and put them in a folder along with a digital copy of the unit on a CD-ROM that I create from their files containing the unit. I put the unit folders in the professional section of our school library for checkout by teachers. The final task is to post the project on the Internet. I use file compression software to compress, or zip, the units and create the main page of the Web site. The student groups are responsible for taking a selection of their questions and creating a simple Web page to be displayed as a “sample” of the unit. I do all of the uploading of the Web pages and zipped files to our school Web server.

### Assessing the Results

Because my students publish their final projects on a Web site, they take pride in knowing that their work is going to a larger audience. Recently, we received e-mail from a mother of a third-grade child who was having difficulties in reading. This woman congratulated us on posting our literature units. She was excited to see a resource for her daughter



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ter who needed some motivation to increase her reading comprehension. Another e-mail message we received was from a teacher stating that she had just discovered our site and was using one of the units with her students. She commented that the unit was “wonderful and better than most” offered through teacher resource companies. When my students read these messages, they knew they had accomplished a goal. It was so rewarding to hear that people had seen their work, and that their literature units were being used. This really validated their efforts and gave new meaning to real-world applications we teachers often strive for.

Subsequent to learning about Bloom’s levels of questions, students have exhibited marked improvement in the quality of questions they ask in our Literature Circles. (Visit the Literature Circles Web site for a definition.) One of the roles in the Literature Circle is that of discussion director. Now that the students have learned about how to ask effective, higher-order questions, the discussion director’s questions are richer, and the discussions are much more lively and interesting.

In spring 2002, Teacher’s Video Company in Scottsdale, Arizona, con-

tacted me about our class being part of an instructional video they were preparing called “Constructing Effective Questions.” The director of the company had discovered our literature units on the Web. A small crew came to our school to interview me and to videotape about 45 minutes of my fourth and fifth graders having a discussion from the Junior Great Books series. We know that probably only a small amount of the discussion ended up in the final cut of the video, but it was an exciting experience for all of us. I was very proud of my students and their skills as effective questioners and discussion participants. (The video was released in April 2002.)

### Adapting the Project

This project could be adapted for students in higher grades in a regular classroom setting with some minor modifications. One adaptation would be to limit the number of sections to the Thinking Cap (the higher-level thinking questions and prompts), Suggested Answer, and Literary Appreciation sections. Also, the teacher could work closely with larger groups of students, providing them with question stems. The groups could each decide on ap-

appropriate endings for the stems that would comprise unit questions. More capable students could take on the role of word processing the unit, while the artistic members could design the images to be used as graphics, and others could create a crossword puzzle or complete a vocabulary section.

**Resources**

**Project-Related Sites**

- Discovery School's Puzzlemaker: <http://puzzlemaker.school.discovery.com>
- Hot Potatoes: <http://Web.uvic.ca/hrd/halfbaked>
- Junior Great Books: [www.greatbooks.org/programs/junior/index.shtml](http://www.greatbooks.org/programs/junior/index.shtml)
- Lesson Plan: [www.kyrene.org/schools/brisas/sunda/litpack/Lit\\_unit\\_plan.htm](http://www.kyrene.org/schools/brisas/sunda/litpack/Lit_unit_plan.htm)
- Literature Circles: [www.literaturecircles.com](http://www.literaturecircles.com)
- Literature Units to Foster Critical Thinking Project: [www.kyrene.org/schools/brisas/sunda/litpack/litstudy.htm](http://www.kyrene.org/schools/brisas/sunda/litpack/litstudy.htm)
- Planning Sheet: [www.kyrene.org/schools/brisas/sunda/litpack/plan\\_sheet.htm](http://www.kyrene.org/schools/brisas/sunda/litpack/plan_sheet.htm)
- Primary Level Literature Packet: [www.kyrene.org/schools/brisas/sunda/litpack/unit\\_requirements.htm](http://www.kyrene.org/schools/brisas/sunda/litpack/unit_requirements.htm)
- Summary Writing (from the East Muskingum School District in New Concord, Ohio): [www.east-muskingum.k12.oh.us/AT&T%20%20Grant/Att&t/summary\\_writing.htm](http://www.east-muskingum.k12.oh.us/AT&T%20%20Grant/Att&t/summary_writing.htm)
- Unsolved Mysteries: [www.kyrene.org/schools/brisas/sunda/mystery/index.htm](http://www.kyrene.org/schools/brisas/sunda/mystery/index.htm)

**Assessment Tools**

- Collaboration Rubric: [www.kyrene.org/schools/brisas/sunda/litpack/collaboration\\_rubric.htm](http://www.kyrene.org/schools/brisas/sunda/litpack/collaboration_rubric.htm)
- Critical Thinking Scoring Rubric: [www.kyrene.org/schools/brisas/sunda/litpack/critical\\_thinking\\_rubric.htm](http://www.kyrene.org/schools/brisas/sunda/litpack/critical_thinking_rubric.htm)
- Evaluation Rubric: [www.kyrene.org/schools/brisas/sunda/litpack/evaluation\\_rubric.htm](http://www.kyrene.org/schools/brisas/sunda/litpack/evaluation_rubric.htm)
- Self-Evaluation: [www.kyrene.org/schools/brisas/sunda/litpack/self\\_evaluation.htm](http://www.kyrene.org/schools/brisas/sunda/litpack/self_evaluation.htm)

**Thinking Tools**

**Book**  
de Bono, E. (1985). *Six thinking hats*. New York: Little, Brown and Company.

**Video**  
Constructing Effective Questions: [www.teachersvideo.com](http://www.teachersvideo.com)

**Web Sites**  
Bloom's Critical Thinking Questioning Strategies: [www.kyrene.org/schools/brisas/sunda/litpack/bloom\\_handout.htm](http://www.kyrene.org/schools/brisas/sunda/litpack/bloom_handout.htm)  
Graphic Organizers Index: [www.graphic.org/goindex.html](http://www.graphic.org/goindex.html)  
Higher-Order Thinking Skills (Covington City Schools, Tennessee): [www.covington.k12.tn.us/resources/world/hots1.htm](http://www.covington.k12.tn.us/resources/world/hots1.htm)  
Taxonomy of Socratic Questioning: [www.ed.fnal.gov/trc/tutorial/taxonomy.html](http://www.ed.fnal.gov/trc/tutorial/taxonomy.html)  
Tony Ryan's Thinking Keys: [www.lea.co.nz/citesc/ciinpractice/tools/thinkerskeys.htm](http://www.lea.co.nz/citesc/ciinpractice/tools/thinkerskeys.htm)

**Study Guides**  
CyberGuides (from Schools of California Online Resources for Education, SCORE): [www.sdcoe.k12.ca.us/score/cyberguide.html](http://www.sdcoe.k12.ca.us/score/cyberguide.html)  
*Island of the Blue Dolphins* Online Study Guide: [www.mcps.org/ces/resources/ney/novels/island.pdf](http://www.mcps.org/ces/resources/ney/novels/island.pdf)  
*Wrinkle in Time* Online Study Guide: [www.lausd.k12.ca.us/Lincoln\\_HS/Burleson/Lessons/Wrinkle/guides\\_index.htm](http://www.lausd.k12.ca.us/Lincoln_HS/Burleson/Lessons/Wrinkle/guides_index.htm)



*Ruth Sunda is a master teacher for the Intel Teach to the Future Program, which assists teachers with technology integration. She facilitates online courses through the PBS TeacherLine program. She gained an interest in technology after attending an educational technology conference in 1995. Her school had no Web authoring software, so she taught herself and her students HTML, and they posted their first Web project in 1996. Each year, her classes learn more about Web publishing and post several new projects.*

How are you using technology to teach your students to think critically? Share your innovative project ideas. Send a letter to L&L's editor, Kate Conley, at [letters@iste.org](mailto:letters@iste.org).



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