Inquiry Grades 4-6

Introduction

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Though adults read simply to enjoy a good story, an intriguing biography, or a beautifully crafted poem, more often they read to gain specific knowledge. Adults read to find information on a range of topics, from tax laws to lawn mower repair; from who won the state basketball championship to who won this year's Nobel Prize for Medicine. This ability to read to find out what one needs or wants to learn is a hallmark of scholarship. At a very practical level, this ability is critical to prepare students for the demands that will be placed on them when they enter high school, college, and the work world.

At the elementary school level, language arts instruction is traditionally isolated from the world of scholarship. Writing assignments often focus on simple read-and-report activities rather than on ways to help students gain information that they can use over time to construct an understanding of the world. In addition, instruction in reading, writing, speaking, and listening is often fragmented and lacks a coherent plan that encourages students to work with knowledge. For example, instruction often centers on themes, topics that may be covered in a hit-or-miss manner. The information about a theme that students acquire from reading one book or selection may not relate or connect to the information they find in reading the next book or selection.

This course highlights the procedure used in ***Open Court Reading*** and ***SRA Imagine It!*** to help students conduct research within their language arts instruction. The process involves students in inquiry and investigation and introduces them to the world of scholarship to prepare them for lifelong learning.

In this course, you will visit the classroom of Mrs. Ann Bunting and her sixth grade students as they explore ancient civilizations. Mrs. Bunting and her students will demonstrate how to lay the groundwork by developing working questions and conjectures and how to carry through with the investigation. Emphasizing the importance of each step in the Inquiry cycle, the teacher provides guidance and support as students work with each other to determine what they already know and what they want to find out.

Teaching Example 1

One of the primary goals of the Inquiry strand of ***Open Court Reading*** and ***SRA Imagine It!*** Program is to introduce the students to the way in which real researchers approach research. Research, or an investigation, starts with a problem or a question. In elementary school, students are often assigned topics and then they collect information about that topic. Topic selection generally means choosing from a list. The remainder of the investigation usually requires students to locate encyclopedia entries or articles easily found in a library or on the Internet and then write down information from them (Schack, 1993).

Although this procedure may result in the preparation of an adequate paper, it does not constitute research in any meaningful or useful sense. Although solving a problem or finding an answer is the catalyst for real research, the goal is to make progress toward that solution or answer. Definitive answers are rarely (and never easily) found for complex problems or questions. Ample evidence exists that elementary school students can do descriptive, historical, and experimental research that seeks answers to real questions or solutions to real problems (Schack, 1993). To do this kind of work, however, students need a better research procedure than the one historically used.

Identify a Research Question or Problem

In the inquiry/investigation process, students generate problems and questions after some discussion but before they have had a chance to consult encyclopedias and other reference materials. This approach tends to bring out ideas the students wonder about or wish to understand. It prevents students from simply writing down questions raised and answered in a reference source.

The students in Mrs. Bunting's class are engaged in the Level 6 ***Open Court Reading*** unit about ancient civilizations. Ancient civilizations is a broad topic—just the beginning of their inquiry. In Teaching Example 1, the students have been reading about and discussing different ancient civilizations and different aspects of these civilizations. There

have been many questions raised and put on the Concept/Question Board. The Concept/Question Board is used throughout the program as the place to make learning public. Here, students post questions, information they have found, and answers to their own or other students' questions. In this teaching example, Mrs. Bunting:

- Discusses the difference between topics and research problems and questions.
- Refers the students to the material on the Concept/Question Board.
- Models how to generate a researchable question relating to a broad topic.
- Leads a free-flowing discussion on many different aspects of ancient civilizations.
- Encourages her students to formulate questions based on their own wonderings.
- Helps students break into research groups based on their interests and questions.
- Circulates around the room helping students get started in formulating their research questions.

Teaching Example 2

Formulating good questions can be difficult for many students. The object is to have the students become truly interested enough to ask real questions and then pursue the answers to those questions, not just copy information about an already answered question found in a reference source. The primary question needs to be focused and help generate other questions that will direct the investigation. In addition, students should base their question on something they are really interested in or wondering about.

Another key factor in real research is peer review and feedback. Researchers rarely if ever work in a vacuum. They consult their peers and discuss the questions and problems. They work in teams to clarify and direct the research.

Refine the Question or Problem

Students often pose such broad questions that they have difficulty knowing where to start or which way to proceed with their investigations. In Teaching Example 2, Mrs. Bunting and her class engage in two very important activities: discussing possible research questions and attempting to refine the questions by asking for feedback. Mrs. Bunting:

- Directs each group to propose research questions.
- Encourages the other students to comment on the proposed questions and offer suggestions for making the questions better.
- Has her students write their initial questions and any questions generated during the discussion in their *Inquiry Journals*.

The *Inquiry Journal* is a unique component of the ***Open Court Reading*** Program. One of its primary purposes is to provide a place where students record their ongoing research questions, problems, findings, and conclusions. Real researchers carefully chronicle every aspect of their research. Through the use of the *Inquiry Journal*, the students are introduced to this process. Students using ***SRA Imagine It!*** can use their *Skills Practice* book to record similar information.

Teaching Example 3

The next step in the inquiry/exploration cycle is to formulate a *conjecture* about the research question. A conjecture is an inference or judgment based on incomplete evidence—a best guess based on your current understanding and knowledge. Improving conjectures is the purpose of research. It is difficult for students to judge their progress on the basis of being closer to an answer if they don't know what the answer is or even whether there is an answer. They are making progress, however, if they can say, "This is what I thought. But now after looking into this question and finding things I didn't know about, this is what I think. This is better than my original thought or conjecture because...."

Part of the inquiry process is introducing students to the vocabulary of research and investigation. Although the term *conjecture* may seem unduly difficult for young students, it is used throughout because it is the most precise term in context of the inquiry/investigation procedure. It has a respectable place in the philosophy of science, and it is

a good idea to use technical vocabulary with students when terms are going to be used frequently and everyday language does not offer entirely adequate substitutes. Scientists base their research on conjectures, which they refine and change until they are confident enough of their findings to use the term *hypothesis*. A hypothesis is a well-founded conjecture, and a theory is more formal and elaborate than both. One of the points of including inquiry/investigation in the language arts curriculum is to introduce the students to the ways real researchers proceed with investigations.

Formulate a Conjecture

In Teaching Example 3, Mrs. Bunting and her students discuss with understanding what a conjecture is and how it fits into the Inquiry cycle they are engaged in. They also discuss how to formulate their own conjectures based on the research questions they have raised and their understandings of the problems they are considering. Mrs. Bunting:

- Leads a discussion about conjectures to help the students better understand what a conjecture is.
- Models formulating a conjecture.
- Directs her students to explain their questions and conjectures.
- Circulates around the room helping students work on their conjectures.

Formulating conjectures is a difficult process. Students are used to being asked for "the correct answer." In formulating conjectures they are being asked to give an educated guess based on what they know. At first it is hard for them to understand that they won't be judged on whether a conjecture was right or wrong.

Teaching Example 4

Although much real research goes on for years, the reality of research in the classroom is that there is a limited amount of time to work on research questions. Helping students organize their time and efforts makes it easier for them to progress in their research and know when they need to move on. In addition, students learn that preplanning their time and efforts is, in fact, an efficient way to approach all of their schoolwork. But this is also important for another reason. Most students don't appreciate that real learning takes time and effort. Many are used to doing reports based on a single, available resource rather than disciplined learning over time.

Create a Planning Calendar

In Teaching Example 4, Mrs. Bunting and the class plan out the time line for their research on ancient civilizations.

- Mrs. Bunting has created a large calendar on which she puts some essential dates—planned visits to the computer lab and the school library, days she will meet with the groups, and days the students will be responsible for presenting different parts of their research.
- The students reproduce this calendar in their *Inquiry Journals*, augmenting it with information pertaining to their own or their group's efforts.

In addition, Mrs. Bunting discusses resources available for students in the school and discusses the students' responsibility to use outside sources of their own choosing to complete the investigation. Classrooms using ***SRA Imagine It!*** can also make use of eInquiry to help them with their investigation reads.

Teaching Example 5

At this point, students learn to ask the question, "What do I need to know?" They identify potential areas and resources they need to address their conjectures. Then they can make plans about how to obtain the needed knowledge, information, and understanding.

Identify Research Needs

Before beginning to discuss knowledge needs and resources, Mrs. Bunting and the class review the research questions and conjectures the different groups are working with. They discuss what they know and what they don't know. By doing this they are beginning to decide what they will need to find out and where they might find that information.

As with other steps in the process, the students record their ideas in their *Inquiry Journal*. In addition, they use resources available in the *Inquiry Journal* to start making decisions about the different types of reference material they might use as they progress with their investigations.

Teaching Example 6

Presenting findings is an integral part of research. Throughout any research project, information about the project, its progress, and its goals are presented many times. These interim presentations are generally informal and designed to generate criticism and feedback, which may or may not be incorporated into the ongoing investigation.

The final presentation represents the culmination of all the work done on an investigation. This, as with other steps in a research project, mimics the activities of researchers in the real world. The final presentation of research is generally more formal than any of the interim presentations and is designed to inform the audience of definitive outcomes and the evidence supporting those outcomes.

Select Presentation Methods

The students in Mrs. Bunting's class have been working hard on their research into ancient civilizations. Now, as a group, they discuss and consider how to present their findings. There are several factors that will drive their presentations:

- What kind of information they have gathered.
- The interests of the audience.
- The way in which their findings fit into the larger topic of ancient civilizations.
- The skills and abilities of the group members.
- Available resources.
- The time it takes to produce their final presentations.
- The time they have to present their final presentations.

As they discuss presentation modes and methods, many different possibilities are brought up and discussed. Among these are:

- Panel discussions.
- Plays.
- Models.
- Interview formats.
- PowerPoint® presentations.

Teaching Example 7

As the research continues, you should reevaluate to make sure that the conjectures are being researched in sufficient depth and revised in light of the information gathered by the groups. One way of doing this is through interim presentations. By presenting the research to date to a group of peers, a researcher may see whether he or she covered pertinent and important aspects of the research, get directions for additional areas, and consider the need to revise his or her conjecture.

In addition, through interim presentations, researchers can also tell whether their plans for a final presentation of the research are sound or not. How did the audience react? Were they confused? Did they ask questions? Did they understand the point of the presentation and how it accomplished its goal? Was there anything that should have been done that wasn't? All of these questions are considered as students collect more information and finalize research.

Finalize research and make preliminary presentations

One by one, the different research groups in Mrs. Bunting's class make preliminary presentations. The goals of these presentations are to:

- Make sure the reports of the research are comprehensive and complete.
- Get feedback to revise conjectures.
- Identify and address any remaining problems with the research.
- Finalize presentation plans.
- Rehearse to a group calmly and in a polished manner.

The students will continue to work on their final presentations, collecting more information, and so on.

As the school year progresses, the students become more adept at presenting their findings. At the beginning of the year they may be hesitant and giddy. By the end of the year they will be giving polished, thoughtful, and thought-provoking presentations.

Teaching Examples 8 and 9

Finally, the results of the research are presented. Typically, this will be the end of the research on any given topic. In the real world, this might not be the case. It is not unusual for researchers in the real world to spend an entire career researching one area.

Final Presentations

In Teaching Examples 8 and 9, Mrs. Bunting's class makes final presentations. Each group has chosen the method of presentation that they feel best suits the information gathered. Some of the groups found information that verified their conjectures. Other conjectures were refuted by the information found. These points are brought out in the presentations. Regardless of the outcome of the individual research, the students are becoming lifelong learners.

Please note: Mrs. Bunting is a sixth grade teacher and, therefore, is using Level 6 of ***Open Court Reading***. Although the content is different, the instructional methods learned in this course can be easily applied to the Inquiry as well as for classrooms using ***SRA Imagine It!*** lessons in Levels 4-5.