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Reading Strategy of the Month

Determining Essential and Non-essential Information

April 2010

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Printable PDF Version

RATIONALE

Many students in secondary school content area classrooms are having difficulties not only with reading and comprehension of text but also with the literacy demands of the content areas or disciplines. Disciplinary literacy studies are calling for discipline-specific skills and strategies to best help students read specialized text and develop academic vocabulary and comprehension. While general literacy skills and strategies are needed for all content areas, there is a better fit between the structure and demands of the discipline and the skill or strategy at hand. Shanahan and Shanahan (2008) studied experts in certain disciplines (i.e., mathematicians, scientists, and historians) and how they read text in their discipline. They found was that there are differences among the disciplines in not only how text is written but also in how it is read and comprehended. Shanahan and Shanahan (2009) concluded that mathematicians need to make distinctions between information that is erroneous, such as analogies, and other material, and definitions and explanations that are important to the understanding of the problem or topic at hand. Students need to learn how to think and read like a mathematician; there is concern that some students are unable to make these needed distinctions in mathematics courses. In addition, Shanahan & Shanahan (2009) discovered that textbooks were modified to simplify this issue by way of deleting non-essential information from the problems. It is important that our students gain important skills for mathematical understanding, critical thinking and problem solving skills in the discipline of mathematics.

HOW TO TEACH THIS SKILL

Direct and Explicit Instruction

“Because text demands and purposes for reading are often specific to each discipline, adolescent learners need explicit teaching and guided practice in comprehension as it relates to each discipline” (Lee & Spratley, A., 2010, p. 78). Although with any new introduction to a skill, direct and explicit instructions are recommended explicit instruction is even more important in the content areas. Students need to learn what from the text qualifies for essential information and how to determine that is it essential to the text or the topic. By implementing a gradual release of responsibility instructional model, we can provide appropriate instruction for all students.

Explicit Instruction through Gradual Release of Responsibility

The gradual release of responsibility model (Fisher & Frey, 2006) is an appropriate instructional

model for assisting students with understanding what is involved with determining essential and non-essential information from mathematics text In this model there are four phases of instruction; for example: Phase 1: “I do it”; Phase 2: We do it”; Phase 3: “You do it together”; and, Phase 4: “You do it alone”. To view a visual representation of this model please visit: http://chalkdust101.files.wordpress.com/2009/03/grr.png?w=586&h=468.

As part of this instructional model, the collaborative learning that takes place between the students helps to better support understanding of a topic, skill, or text. Students will be given an opportunity to use reciprocal teaching or peer coaching. The following phases can be used to scaffold instruction on determining essential and non-essential information.

Phase 1 : When providing instruction to students, the “I do it” phrase will focus primary on establishing the purpose for finding essential information and providing modeling (Fisher and Frey, 2006). Modeling with a graphic organizer is a great way to visually show the students where the information was taken from and what fits as essential and non-essential; in addition, identifying important questions will help to show students the mental steps involved in determining the answer.

Phase 2: As instruction moves to the “We do it” phase, students should practice distinguishing the information with guidance from the teacher who should encourage or correct misconceptions the students are having. By now, students should also start feeling comfortable determining what information they have and what they will need to answer the question(s) at hand.

Phase 3: By the time students are ready for the “Do it together” phase there will be a range of understanding. Some students may have already mastered the skill, while others are still not confident with it. During this phase, the teacher will help those students who have mastered the skill with assisting others who are still working on it.

Phase 4: When at least most students feel comfortable and knowledgeable about this skill, they should be given the ability to try applying it on their own; this is the “Do it yourself” phase. Teachers should assess students after this phase to determine if they have successfully mastered the skill.

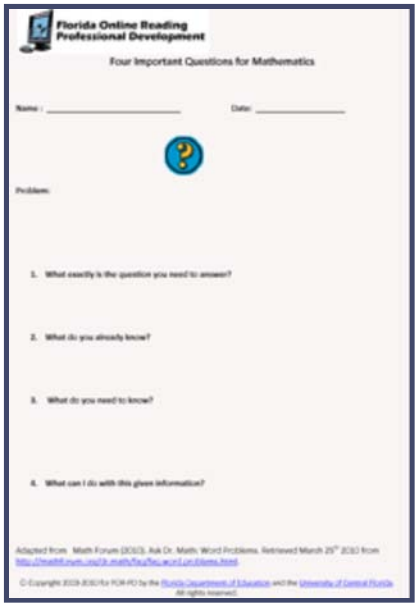
How to Use the Strategies

To teach students how to determine essential and non-essential information in Mathematics through the instructional model of gradual release of responsibility, we have developed (a) a template containing “Four Important Questions” to help guide students through the problem-solving process and (b) a graphic organizer to teach them how to develop the skill of determining essential and non-essential information in Mathematics.

The “Four Important Questions” can help students focus on the question at hand. When determining what is being asked, students can determine between what they already know and what they still need to know to find the answer to that question. These “Four Important Questions” include the following:

- What exactly is the question you need to answer?
- What do you already know?
- What do you need to know?
- What can I do with this given information?

Please see a template for the “Four Important Questions” and two examples for the intermediate and secondary grade levels.



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Four Important Questions for Mathematics

Name : _____ Date: _____

Problem:

1. What exactly is the question you need to answer?
2. What do you already know?
3. What do you need to know?
4. What can I do with this given information?

Adapted from Math Forum (2010). Ask Dr. Math: Word Problems. Retrieved March 25th 2010 from http://mathforum.org/dr.math/faq/faq.word.prob.html

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Four Important Questions Template

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Four Important Questions for Mathematics

Intermediate Grade Level Example (Grades 3-5)

Name: John Doe Date: April 2, 2010

Problem: You and a friend are going to play tennis at the courts near your house. You leave your house and walk 4 blocks north and then 2 blocks east to your friend's house. From your friend's house, you get to the courts by walking 1 block south and 3 blocks east. How many blocks do you have to walk to get back to your house from the tennis courts?

1. What exactly is the question you need to answer?
   How many blocks do I have to walk to get back to my house from the tennis courts?
2. What do you already know?
   I know how far the tennis courts are from my friend's house and I also know how far my friend's house is from my house.
3. What do you need to know?
   I need to find out the distance between my house and the tennis courts.
4. What can I do with this given information?
   I think the best way to find the answer is to draw a diagram with the information I have using graphing paper to map out the distance and direction.

Problem taken from McDougal Littell Middle School Math Notetaking Guide (2004).

Adapted from Math Forum (2010). Ask Dr. Math: Word Problems. Retrieved March 25th 2010 from http://mathforum.org/dr.math/faq/faq.word.prob.html

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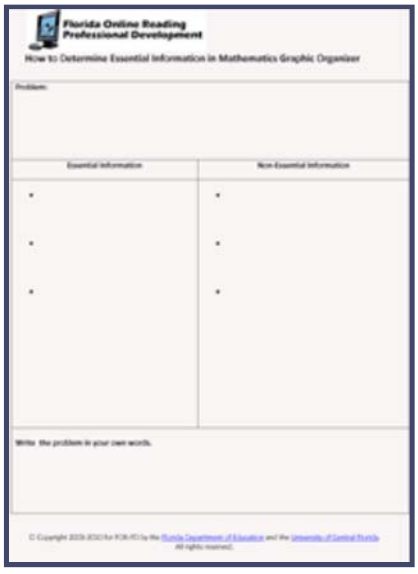
Four Important Questions Intermediate Example

Four Important Questions for Mathematics

Secondary Grade Level Example (Grades 6-12)

Four Important Questions Secondary Example

The “Four Important Questions” help to show the mental steps to take determine the answer, whereas the graphic organizer is a great way to visually show the students where the information was taken and what fits as essential and non-essential. The graphic organizer combines the skill of distinguishing what information is essential and what is not and rewriting the problem for clarity and understanding. The organizer separates the essential information for the non-essential information and has students rewriting the question by using the information in the essential column.



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How to Determine Essential Information in Mathematics Graphic Organizer

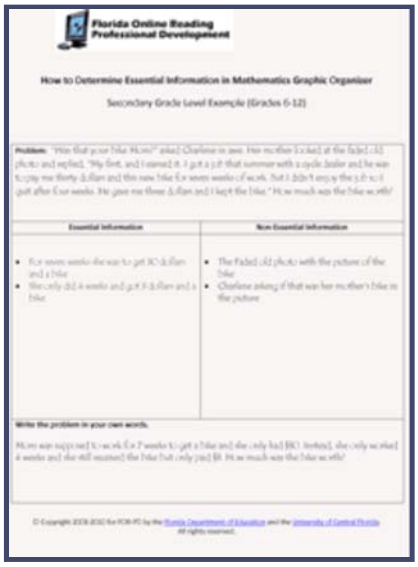
Problem:

Essential Information	Non-Essential Information
•	•
•	•
•	•

Write the problem in your own words.

Determining Essential Information in Math Template

Determining Essential Information in Math Intermediate Example



Determining Essential Information in Math Secondary Example

ASSESSMENT

The skill of determining essential versus non-essential information is important not only for helping students with thinking like mathematicians, but also for assisting them with critical thinking and problem solving skills. Assessment of this skill is needed to determine student mastery. Mastery of this skill can be seen through both the graphic organizer and the “Four Important Questions”.

The assessment for deriving essential and non-essential information can be completed by reviewing both the “How to Determine Essential and Non-Essential Information in Mathematics” graphic organizer and the “Four Important Questions” sheet. To determine mastery of this skill, there are

certain aspects to look for. For the graphic organize, students should correctly identify all essential and non-essential information and use only the essential information when rewriting the problem.

The “Four Important Questions” can be used as an assessment for not only determining what information is important, but also for assessing students’ thought process and their approach to solving the problem. Students should correctly identify the question or questions that need to be answered, distinguish between what they know and what they need to know, and explain what they will do to solve the problem.

RESOURCES

Lesson Plan for a Mathematics Class
http://www.lpb.org/education/classroom/itv/litlearn/lessons/lssn_2gist.pdf
This lesson plan provides examples on how to teach students to identify essential information.

Determining Essential vs. Non-Essential Information
http://www.cheltenham.org/webpages/mcooper/ifom.cfm?subpage=215364
This website is aimed to assist teachers with resources on determining essential and non-essential information and makes connections with mathematics.

Students Use Graphic Organizers to Improve Mathematical Problem-Solving Communications
http://www.nmsa.org/Publications/MiddleSchoolJournal/Articles/November2009/Article4/tabid/2083/Default.aspx
This article provides a rationale and describes the importance for using graphic organizers in mathematics instruction.

REFERENCES

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