Are Words the Problem in Word Problems?

The Importance of Literacy in Solving Word Problems Across Disciplines

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Goals for this Session

1. Define **metacognition** and discuss why it is critical in student learning.

2. Present the case for **active learning** as a way to enhance metacognitive skills.

3. Present some **examples** of effective strategies and assignments.

4. Introduce some **resources** to help promote metacognition and active learning.

Why do students struggle with solving word problems?

Self-confidence

Motivation

Why do students struggle with solving word problems?

Lack of understanding of the discipline's language

Limited ability to contextualize information

Inadequate student reading level

Limited verbal skills to express thinking and reasoning

Inability to assess the reasonableness of a solution

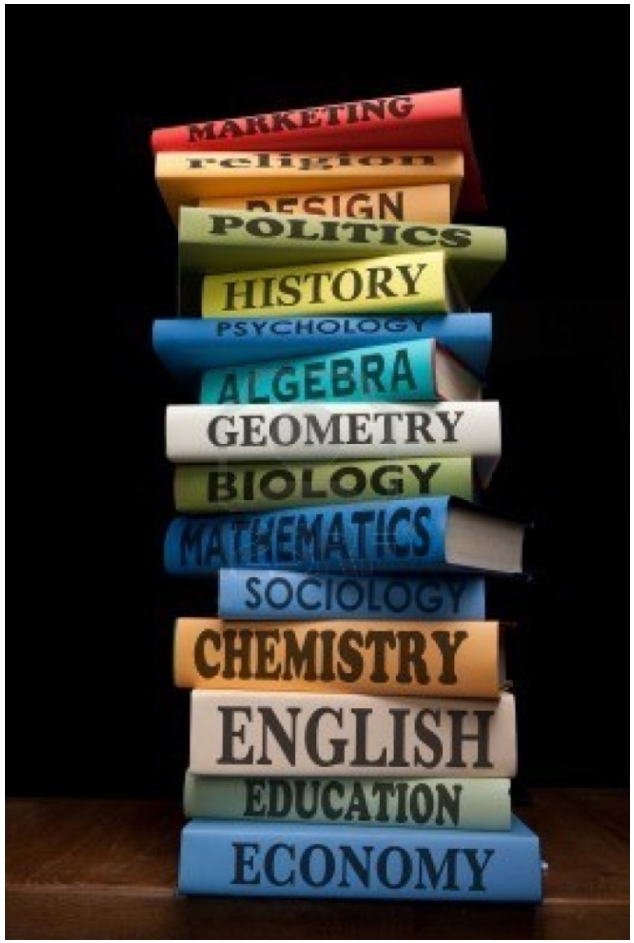
Inability to isolate important information

Literacy

The ability, in varying contexts, to . . .

- identify
- understand
- interpret
- create
- communicate
- compute
- use printed and written materials

Discipline-Specific Literacy



Apply knowledge in different content areas, analyze, reason, and communicate to solve, and interpret diverse real-life problems and to understand, critique, and use knowledge in content areas.

Discipline-Specific Literacy

Each discipline has specific:

- language and vocabulary
- types of text to comprehend
- ways of communicating and writing

What are the Requirements for Discipline-Specific Literacy?

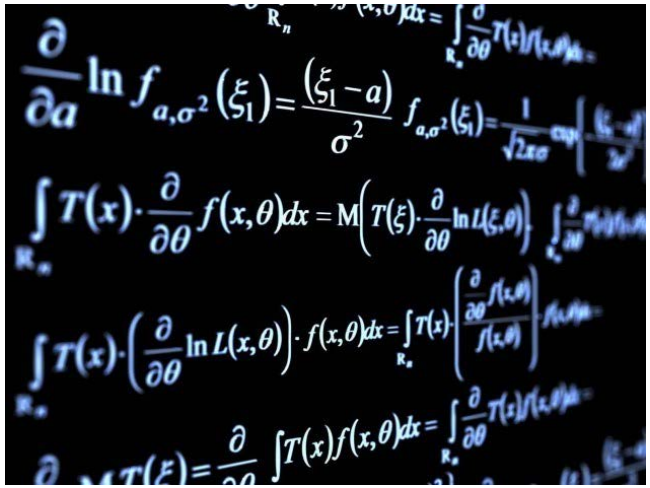
Literacy in any discipline depends on:

- Reading
- Writing
- Listening/Viewing
- Thinking critically and creatively
- Using language and vocabulary to read and comprehend text to support the learning of content

Why is content area literacy challenging for students?

Science:

- technical, abstract, dense language
- turns processes into nouns
- knowledge, methods of inquiry, and criteria for evaluation of knowledge change rapidly
- requires ability to understand computational tables and figures



Why is content area literacy challenging for students?

Mathematics:

- texts present more concepts per word, sentence and paragraph than any other content-area text
- lexicon replete with symbolic language
- sequencing of symbolic language different from prose
- density of meaning of one word or phrase

What are the Challenges to Educators in Content Area Literacy?

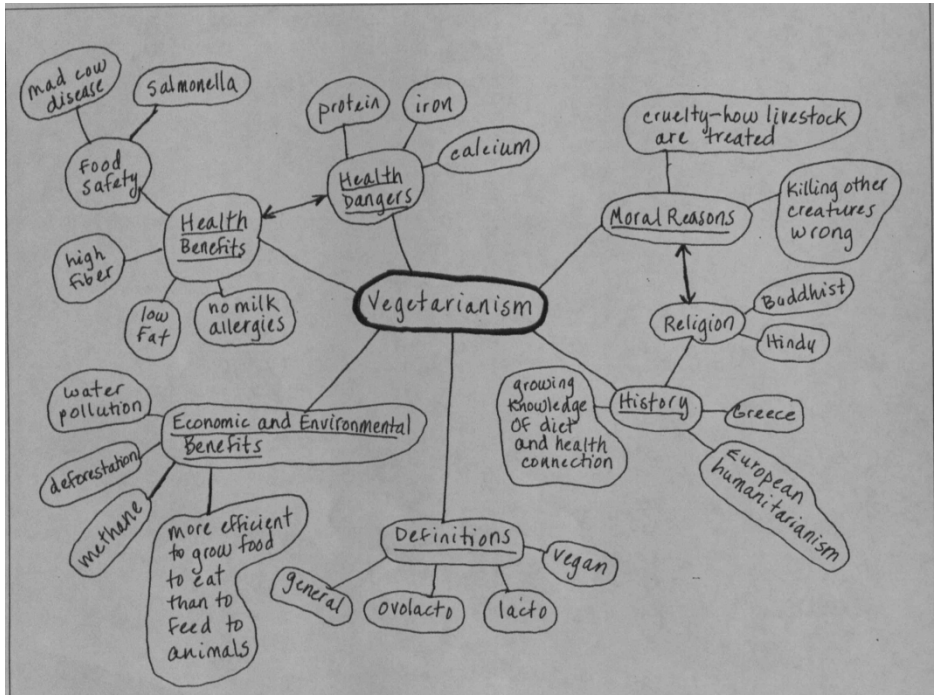
- underestimation of the literacy demands of a particular discipline
- specialized literacy expertise of educators
- lack of expertise to teach discipline-specific reading and writing (literacy)
- lack of time to teach discipline-specific reading and writing (literacy)

Practical Approaches

- Concept Maps
- RAN (Reading and Analyzing Nonfiction)
- Chunk and Chew
- Vocabulary Instruction

Concept Maps

- Facilitates graphic/pictorial organizing of content
- Connects individual concepts and illustrates how they relate to each other
- Facilitates understanding of how concepts fit into a larger knowledge framework



Reading and Analyzing Nonfiction (RAN)

1. Have students write what they know about the topic. List in the column "What I Know".
2. Read the text.
3. Students complete the next two sections "Confirmed and "Misconceptions"
4. Reread completing the "New Information" column
5. In the final column have students list their "wonderings"
6. Students summarize and reflect on their learning

RAN Chart

What I Think I Know	Confirmed (or Yes, You Were Right)	Misconceptions	New Information	Wonderings

Chunk and Chew

1. Students read or listen to a lecture for approximately 10 to 15 minutes.
2. Ask a probing question about the content.
3. Allow two minutes for students to process information/discuss their responses to the question (Think-Pair-Share).
4. Debrief as a whole class by asking a couple of groups to share.

Vocabulary Instruction

1. Introduce words in a context students know (if applicable)
2. Then introduce words in context of the information being learned.
3. Allow students to develop analogies, metaphors, & symbols for each word.
4. Students write a reflective journal entry appropriately using as many of the new words as possible.

Resources

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Resources

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