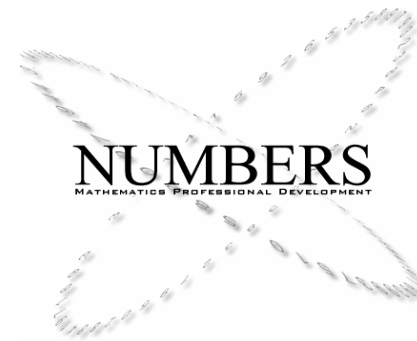


Getting to the Heart of the Mathematics: Using Graphic Organizers in the Secondary Mathematics Classrooms with ELLs

Presenter

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I. Why Use Graphic Organizers for Content Instruction?

Section I adapted from web posting by Judie Haynes, Everything ESL

- Graphic organizers make content area information more accessible to second language learners.
- They convert complex information into manageable chunks.
- This teaching technique makes content area information more accessible to second language learners.
- Content materials present text which is too dense for ELLs
- The use of graphic organizers such as webs, Venn diagrams, and charts to help them better comprehend these texts.
- These are visual tools that help ELLs understand and organize information.
- They are like mind maps which promote active learning.
- Graphic Organizers can also help students develop higher level thinking skills and promote creativity.
- The use of graphic organizers helps English language learners is to summarize and interpret text.

II. What is a Graphic Organizer?

Graphic organizers (GOs) are diagrammatic illustrations used to organize and highlight key content information and/or vocabulary (Lovitt, 1994).

Words and/or phrases are used to connect the content information in a meaningful way to help students gain a clearer understanding of the material.

Further, the content is organized with diagrams to help students maintain the information over time. Research indicates that use of GOs is effective for helping both middle school and secondary students organize and remember content area information.

Additional research indicates use of GOs is also valuable for teaching students, how to represent problem situations in diagrammatic form (i.e., schematic diagrams that address identifying and representing structures or type of word problem) and how to determine the necessary operation(s) needed to find a solution in a problem.

III. What Are the Components of Graphic Organizers?

To create **coherent** GOs, it is important that the displayed information be clear and free of irrelevant information and other distractions. Specific components of coherent GOs include—

- (a) clearly labeled branch (i.e., main idea) and sub branches (i.e., supporting detail or steps), and
- (b) numbers, arrows, or lines to show the connections or sequence of events/steps between and across ideas or steps.

Because many ELL students often have difficulty focusing on important and relevant information (Maccini & Hughes, 2000), it is particularly critical for teachers to provide direct instruction in how to develop a coherent GO and provide additional supports to students, as necessary. Direct instruction includes these key components:

- (a) review
- (b) presentation
- (c) guided practice
- (d) corrections and feedback
- (e) independent practice
- (f) weekly and monthly reviews

To support ELL students, teachers can also provide a GO that is partially completed and guide students in the process of adding key terms.

It is also important for teachers to find **creative** approaches that integrate GOs into instruction to heighten student interest. Examples include using small group activities in which group members (or learning pairs) are responsible for filling out parts of a GO and sharing with their group members. Use of cooperative groups or peer tutoring can improve the motivation of students and their attitudes toward mathematics.

IV. How do I Use Graphic Organizers in My Classes?

Best practice for utilizing GOs in classrooms includes both teacher-directed and student-directed arrangements. In fact,

both approaches are helpful for middle and high school students.

- **Teacher-Directed Approach:** The teacher-directed model includes (1) providing a partially incomplete GO for students (i.e., including the main structures/boxes and interconnecting lines/phrases and omitting information in subordinate areas), (2) having students read the instructional passage or information, (3) providing direct teacher instruction of the information read while referring to an identical teacher copy of the GO on an overhead, (4) filling out the GO with students, (5) reviewing the completed GO, and (6) assessing students using an incomplete copy of the GO.
- **Student-Directed Approach:** Another effective option is to have students assume more responsibility for completing the GO by using a cover sheet with prompts. Students can be given prompts at the bottom of the page to assist them in identifying key facts and concepts. During the student-directed activity, the teacher acts as facilitator (i.e., circulating the room and monitoring student performance). Prior to studying the completed GO for subsequent assessment, students check their answers with a teacher copy supplied on an overhead.

Teachers can decide to use either approach based on the lesson objectives and the needs of the learners. For instance, when using the teacher-directed approach, there is an opportunity for the teacher to (a) control the pace of instruction, (b) add more

factual or background information during instruction, and (c) encourage group discussions regarding the content. The benefits of a more student-directed approach include greater opportunity to provide (a) individualized teacher assistance to students, and (b) student practice using referential clues or prompts to locate information.

V. How do I Create a Graphic Organizer?

Some recommend a four-step process for developing a graphic organizer. The steps include the following:

- Choose content information that is difficult for students to understand and/or is poorly organized.
- Develop an outline of the key ideas/concepts in the target information.
- Select an appropriate graphic organizer format that will accurately represent the structure of the content information (e.g., hierarchical, compare and contrast, sequence).

Construct both a completed teacher version of the GO and an incomplete copy of the student version of the GO to use during class instruction.

Group Activities:

| | |
|------------------------------|--------------------|
| Word Walls vs. Concept Walls | Academic Language |
| Multiple Meaning Words | Content Language |
| Symbolic Language | Sequence and Order |
| Mathematics Formulas | |

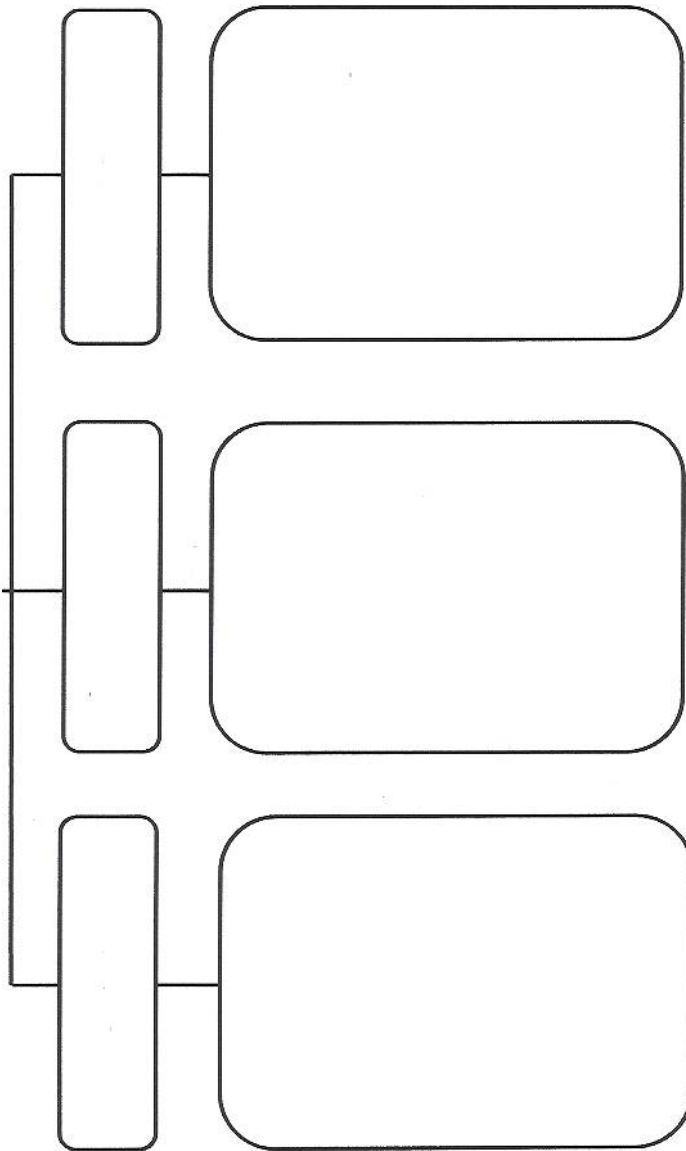
Notes



Building Concepts and Vocabulary (Symbolic and verbal)

| Concept | Definition in words | Provide the symbol | Give an example of how it is used/written |
|---------|---------------------|--------------------|---|
| | | | |
| | | | |
| | | | |
| | | | |

| Formula | Drawing with dimensions labeled | Verbal translation | Explain order of operations | Worked example |
|---------|---------------------------------|--------------------|-----------------------------|----------------|
| | | | | |



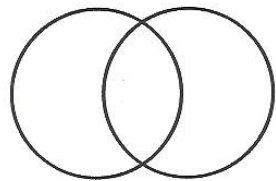
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Common Factors

Factors of _____

**Find Common Factors
of _____ and _____**

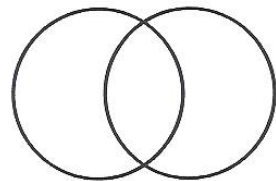
Factors of _____



Factors of _____

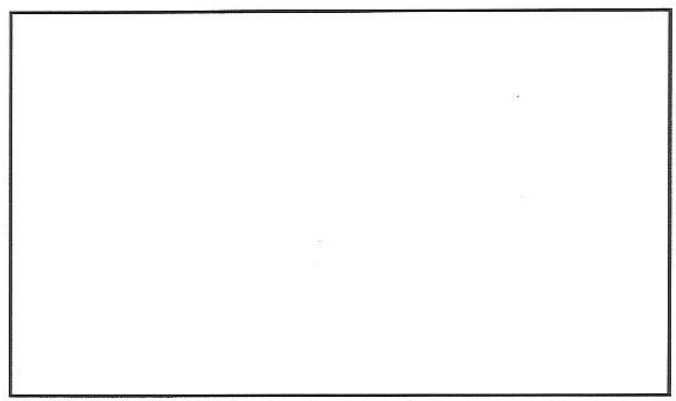
**Find Common Factors
of _____ and _____**

Factors of _____



Name: _____ Date: _____

This is a picture of _____



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