

Math Graphic Organizers

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 (Fountas & Pinnell, 2001, as cited in Baxendrall, 2003). Further, the content is organized with diagrams to help students maintain the information over time (Fountas & Pinnell, 2001, as cited in Baxendrall, 2003). Research indicates that use of GOs is effective for helping both middle school and secondary students, with and without disabilities, organize and remember content area information (Horton, Lovitt, & Bergerud, 1990). Additional research indicates use of GOs is also valuable for teaching this group of 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 (Jitendra, 2002).

What are the types of Graphic Resources?

Common GOs used in mathematics include hierarchical diagrams, sequence charts, and compare and contrast charts (Baxendrall, 2003). Below we provide a definition and example for each GO that is effective for teaching mathematics to middle school students with learning disabilities.

- *Hierarchical diagramming* involves having a main branch for the overall concept or information, followed by connected sub branches of supporting information or details. The main concept and sub branches are linked by arrows, lines, colors, numbers and/or phrases to show the connections of the hierarchically displayed information. For example, the algebra classroom example below shows a hierarchical graphic display that has the main branch (polynomials) and sub branches or types of polynomials (monomials in red, binomials in blue, and trinomials in green), as well as related examples under each category. Notice that *non-examples* are incorrect examples of a concept/term that are provided for clarification (e.g., binomial).

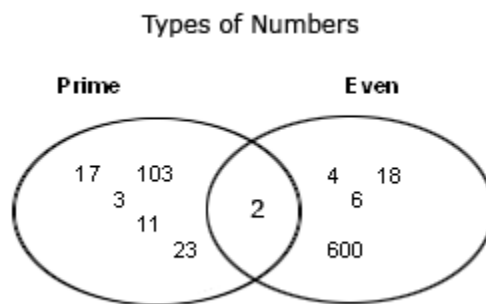
Sequence charts represent a sequence of events or procedures in a content area. To make the order of the sequence clear, arrows are used that typically flow in one direction (Baxendrall, 2003). It is also recommended that numbers be used for each step to show the flow of events or steps. An example would include diagramming a general problem-solving strategy.

Sequence Chart

Polya's Four Problem-Solving Steps
1. Understand the Problem (What is the goal? Draw a representation)
2. Devise a Plan (Is there a similar problem I can relate to this?)
3. Carry out the Plan (Carry out plan and check each step)
4. Look Back (Check answer)
Adapted from Polya, 1957

- *Compare and contrast* charts highlight differences and similarities across two or three ideas or sets of information. A common example in mathematics is the use of a Venn diagram. It is important to include ample space on blank diagrams for students to write in responses.

Compare and Contrast or Venn Diagram



Resouces:

http://www.k8accesscenter.org/documents/Handouts_01-03-07.pdf

<http://www.teachervision.fen.com/math/graphic-organizers/53511.html>

<http://www.eduplace.com/graphicorganizer/index.jsp>