



## ***Using Graphic Organizers to Teach Science***

### **What is the evidence base?**

- This is an evidence-based practice for students with disabilities based on three methodologically sound group experimental studies with random assignment across 130 participants with disabilities and two methodologically sound single-subject studies across six participants with disabilities.
- This is an evidence-based practice for students with learning disabilities based on three methodologically sound group experimental studies with random assignment across 130 participants with learning disabilities.

### **Where is the best place to find out how to do this practice?**

The best place to find out how to implement graphic organizers to teach science is through the following research to practice lesson plan starters:

- [Using Graphic Organizers to Teach Science Vocabulary \(Anders & Bos, 1986\)](#)

### **With who was it implemented?**

- Students with
  - **Learning Disabilities (3 studies, n=130)**
  - Autism Spectrum Disorders (1 study, n=3)
  - ASD and Intellectual Disorders (1 study, n=3)
- Ages ranged from 11-18
- Males (n=84), females (n=44), Not reported (n=8)
- Ethnicity
  - African American (n=8)
  - American Indian (n=4)
  - Asian (n=8)
  - Hispanic (n=42)
  - Other (n=66)
  - None reported (n=8)

## What is the practice?

Graphic organizers have been defined as visual or spatial displays that make relationships between related facts and/or concepts more apparent (Gajria, Jitendra, Sood, & Sacks, 2007). Other related terms may include tree diagrams, thematic illustrations, structured overviews, semantic networks, episodic maps, concept maps, and flow maps (Horton, Lovitt, & Bergerud, 1990).

## Where has it been implemented?

- General education classroom (n=3 studies)
- Resource classroom (n=2 studies)

## How does this practice relate to Common Core Standards?

- CCSS.ELA-Literacy.SL.11-12.4
  - Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.
- CCSS.ELA-Literacy.SL.11-12.6
- Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate.
  - Key Ideas and Details, (Anchor Standards for Reading, Grades 6-12)
  - Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text
- Range of Reading and Level of Text Complexity, (Anchor Standards for Reading, Grades 6-12)
  - Read and comprehend literary and informational texts independently and proficiently
- Integration of Knowledge and Ideas, (Anchor Standards for Reading, Grades 6-12)
  - Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take
- Craft and Structure, (Anchor Standards for Reading, Grades 6-12)
  - Assess how point of view or purpose shapes the content and style of a text.
- Research to Build and Present Knowledge, (Anchor Standards for Writing, Grades 6- 12)
  - Draw evidence from literary or information texts to support analysis, reflection, and research
- English Language Arts Standard for Literacy for Science and Technical Subjects (Grade 9-10)

- Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics CCSS.ELA-LITERACY.RST.9-10.4
- Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words CCSS.ELA-LITERACY.RST.9-10.7

### **How does this practice relate to the Common Career Technical Core?**

- Environmental Service Systems Career Pathway (AG-ENV)
  - Use analytical procedures and instruments to manage environmental service systems.
  - Evaluate the impact of public policies and regulations on environmental service system operations.
  - Develop proposed solutions to environmental issues, problems and applications using scientific principles of meteorology, soil science, hydrology, microbiology, chemistry and ecology.
  - Demonstrate the operation of environmental service systems (e.g., pollution control, water treatment, wastewater treatment, solid waste management and energy conservation).
  - Use tools, equipment, machinery and technology common to tasks in environmental service systems.

### **References used to establish this evidence base:**

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- Horton, S. V., Lovitt, T. C., & Bergerud, D. (1990). The effectiveness of graphic organizers for three classifications of secondary students in content area classes. *Journal of Learning Disabilities*, 23, 12-22.
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