



# SCIENCE VOCABULARY

For students with a learning disability



# The Problem

---

“The Nation’s Report Card: Science 2005 reported that only 29% of all 8th-grade students performed at the proficient level in science (Grigg et al., 2006). According to National Assessment of Educational Progress (NAEP) data, students have shown a decrease in 12th-grade science performance from 1996 to 2005, with scores steadily declining from 150 to 147, where a score of 147–177 is basic, 178–209 is proficient, and  $\geq 210$  is advanced.” – *Grillo and Dieker 2013*

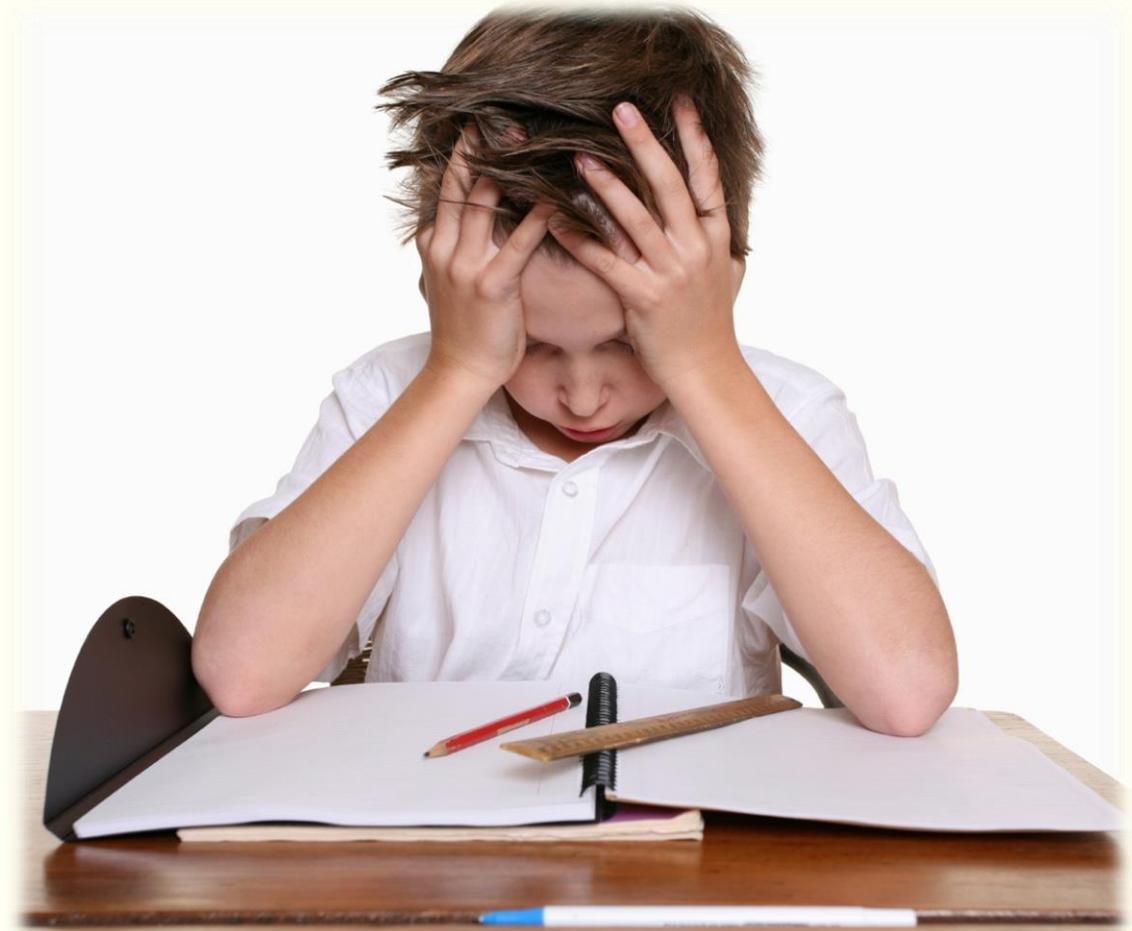


# Problems Unique to LD Students

---

---

- Very few research studies utilize science text as a base text
- The number of LD Students in the General Education classroom is growing and basic reading skills are not guaranteed in this learning group.
  - Science text complexity is often the most complex reading assigned to students.
  - Obtaining knowledge and information from this text is done gradually more independently after a student passes 3<sup>rd</sup> grade.
- There are four basic characteristics of science texts that make them difficult to students with learning disabilities:
  - Unfamiliar text structures
  - Conceptual design
  - Vocabulary complexity
  - Expectation of prior knowledge



# Four Basic Science Text Characteristics

---

---

## Structure

Text is primarily expository

Includes: Lists, compare-contrast, time-sequence, and other complex text formats

LD Students often have difficulty interpreting meaning and comprehending.

Prior knowledge and reading has prepared LD students to focus on details, not these intense reading styles.

## Concept Density

Science Text Releases concepts and vocabulary at a very high rate

Science text often minimizes its use of examples leaving few opportunities for application.

Level of density makes application of past knowledge difficult for LD students

## Vocab Complexity

LD students begin seeing knowledge gaps early and the gaps widen quickly.

A vocabulary deficit makes application of known vocabulary words difficult.

Text includes a large amount of technical vocabulary and does not provide many opportunities for development.

## Prior knowledge

Many LD students are reading at a literal level. This means their self comprehension is left at a deficit.

Prior knowledge is much more critical in science than in narrative text

Stepping beyond this comprehension boundary can be detrimental to students as they will develop an expectation of poor comprehension.

# Common Core Science Standards

---

---

“The common core provides for an increased focus on reading, writing, and other communication skills, and offers a general outline providing a reduced set of focal competencies.”  
– Scruggs et al p. 49-50

The science standards will focus on three major dimensions:

1. Scientific and engineering processes
2. Crosscutting concepts that unify the study of science and engineering through commonalities.
3. Core ideas in: physical sciences; life sciences; earth and space sciences; and engineering, technology and applications of science.

## Advantages

- Science standards suggest mediating through hands-on, small group activities and reviews. This style is beneficial to LD students.

## Implications

- More advanced level science material can not be taught hands on. Leaving students to rely on text comprehension. This is difficult for LD students.
- Inclusions in classrooms means teachers have to implement specialized instruction.



# CORRECTIVE METHODS

# Study Stack

---

Study Stack is a method for vocabulary comprehension introduced by the National Association for Biology Teachers that focuses on utilizing flash cards. In a proficiency study, students used their assigned flash cards to learn targeted words. They would follow a 4 step procedure and track their success in their science notebook.

The study demonstrated that both the digital and paper flash cards were successful. However, the majority of the kids preferred using the digital cards over the paper cards. This will prove instrumental in student motivation.

1. Read the question currently displayed and think about what is on the other side of the card
2. Flip the card to evaluate whether you were correct
3. If you were correct, place the card in the correct pile; if you were incorrect, examine the “help” portion of the card and place it in the incorrect pile.
4. Move to the next card repeating until you have reached 5 minutes or reviewed each of the assigned cards.

Home | Unfinished | Phase II Terms (517082)

SHARE

help

RNA

Correct Cards (6)

Translation

Incorrect Cards (4)

Answer:

The sequence of growth and division of a cell (mitosis.)

Chromosome

Remaining Cards (5)

repeat show first Continue

# Progress Monitoring

---

Offered as an alternative to traditional pre/post tests, progress monitoring is a way of keeping track of development as opposed to knowledge. Progress monitoring leads to more frequent feedback and error correction and is based on set intervals of data.

In vocabulary, Progress Monitoring often focuses on key words. Monitoring these key words provides an adequate understanding of student performance and progress.





# CONCLUSION

Science text is some of the most complicated and complex text students will see in their schools. This proves to be excessively challenging for students with a Learning Disability as they struggle with background knowledge, lack basic comprehension skills, and struggle with the design and rapid growth of complexity.

To combat this overwhelming challenge, teachers can utilize tools to help prepare students with learning disabilities for future independent learning. Teachers can utilize technology in the classroom to further comprehension and base knowledge. States can adopt the proposed science standards to ensure the material they deliver to their youth is unified, interdisciplinary, and meaningful to the child in their future classrooms and workplaces.

# References

---

---

- Grillo, K. J., & Dieker, L. A. (2013). A New Twist on Vocabulary Instruction for Students with Learning Disabilities in Biology. *American Biology Teacher (University Of California Press)*, 75(4), 264-267. doi:10.1525/abt.2013.75.4.7
- Mason, L. H., & Hedin, L. R. (2011). Reading Science Text: Challenges for Students with Learning Disabilities and Considerations for Teachers. *Learning Disabilities Research & Practice (Wiley-Blackwell)*, 26(4), 214-222. doi:10.1111/j.1540-5826.2011.00342.x
- Scruggs, T. E., Brigham, F. J., & Mastropieri, M. A. (2013). Common Core Science Standards: Implications for Students with Learning Disabilities. *Learning Disabilities Research & Practice (Wiley-Blackwell)*, 28(1), 49-57. doi:10.1111/ldrp.12002
- Vannest, K. J., Soares, D. A., Smith, S. L., & Williams, L. E. (2012). Progress Monitoring to Support Science Learning for All Students. *Teaching Exceptional Children*, 44(6), 66-72.