

SREB

Elementary Science

Equipping Students Through Inquiry and Integration

Stephen Pruitt, President

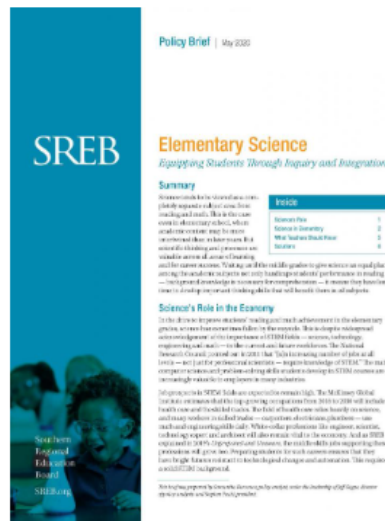
Samantha Durrance, Policy Analyst



ELEMENTARY SCIENCE

Equipping Students Through Inquiry and Integration

May 2020 | 8 pages



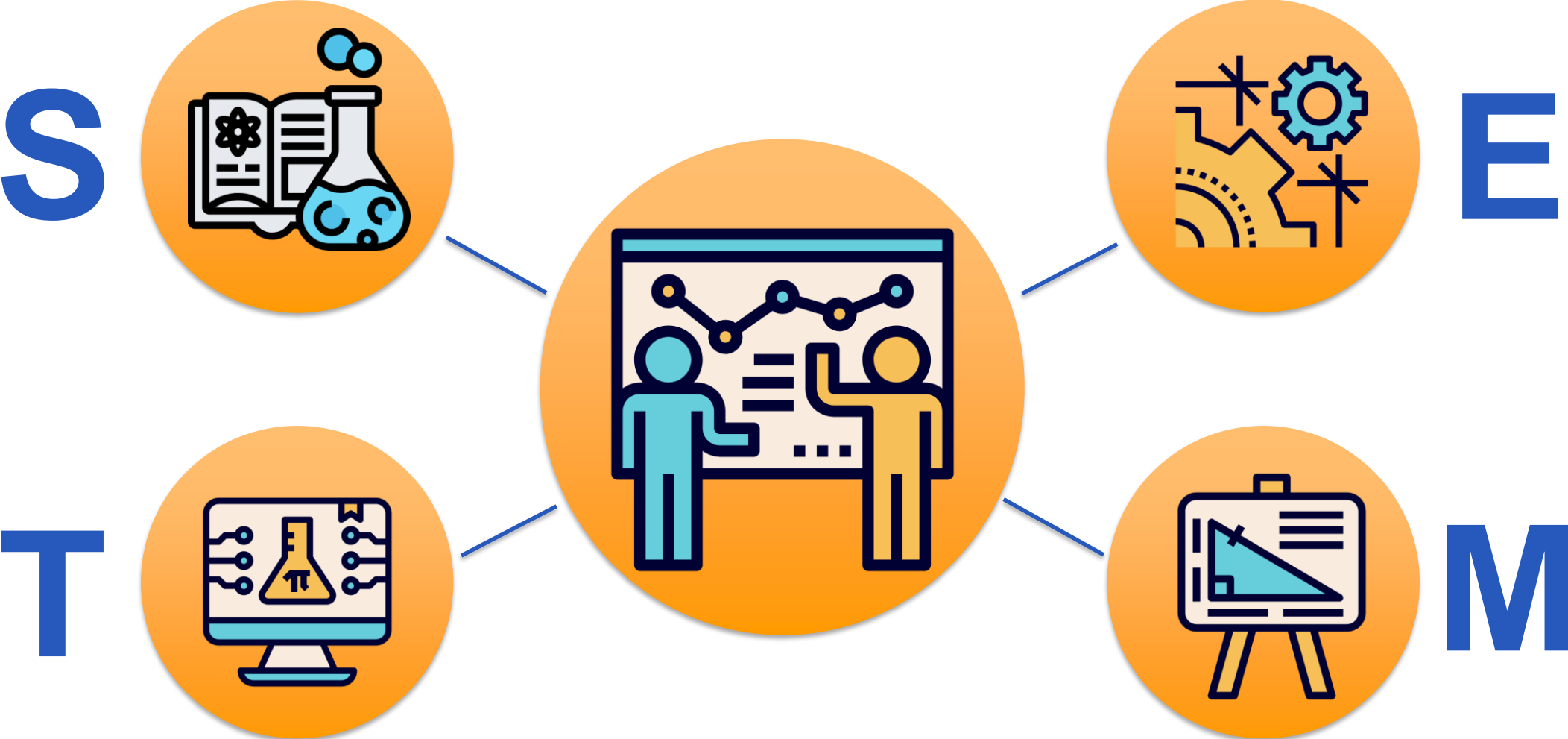
In the *Elementary Science* report, SREB examines how science instruction, typically taught separately from reading and math, may not be getting enough attention in elementary classrooms. The reports looks at how waiting until the middle grades to give science an equal place among the academic subjects can hinder students in developing important thinking skills that will benefit them in all subjects areas and for later career success.

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Summary

- Scientific thinking and processes are valuable ***across all areas of learning***.
- Science often receives ***inadequate attention*** in elementary school.
- Scientific learning in elementary school should be ***3D*** and ***integrated*** with other subjects.
- Elementary teachers need ***adequate preparation*** to teach science well.

The Value of Science



Many Fields Rely on STEM

Health Care



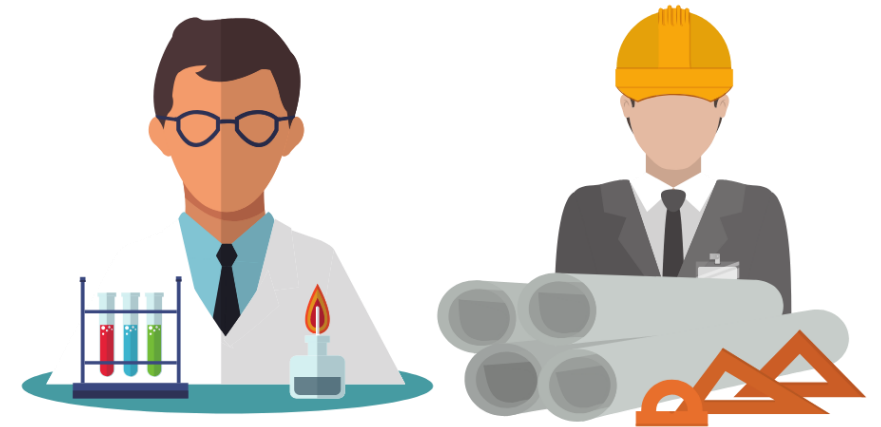
- Doctors
- Nurses
- Lab Techs
- Med Assts

Skilled Trades



- Plumbers
- Electricians
- Carpenters
- Mechanics

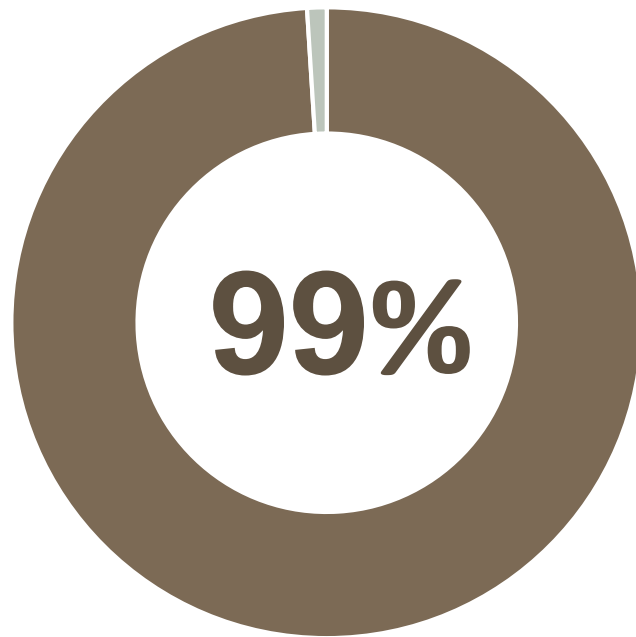
White Collar Professionals



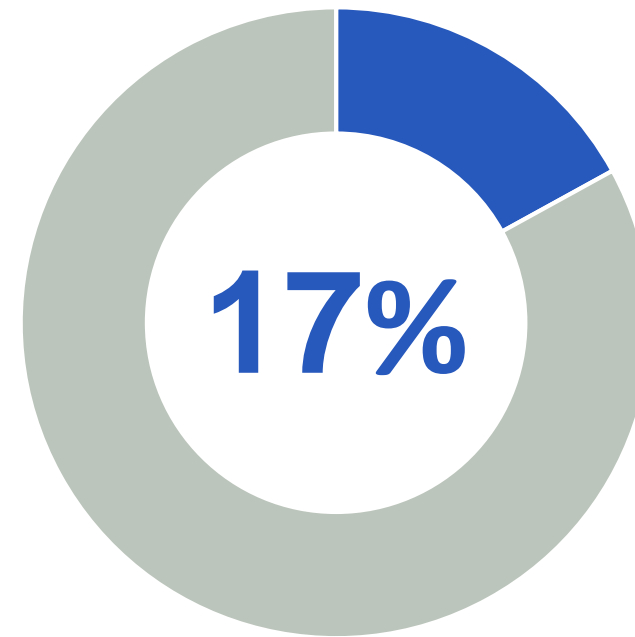
- Scientists
- Architects
- Engineers
- Psychologists

K-3 teachers who report teaching each subject all or most days each week:

Math



Science



Kindergarten

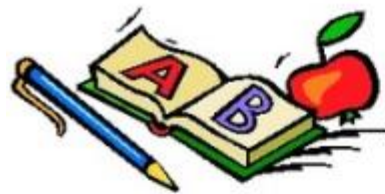
Monday	Tuesday	Wednesday	Thursday	Friday
8:00-10:00 Reader's Workshop	8:00-10:00 Reader's Workshop	8:00-10:00 Reader's Workshop	8:00-10:00 Reader's Workshop	8:00-10:00 Reader's Workshop
10:00-10:30 Writing	10:00-10:30 Writing	10:00-10:30 Writing	10:00-10:30 Writing	10:00-10:30 Writing
10:35-11:05 Lunch	10:35-11:05 Lunch	10:35-11:05 Lunch	10:35-11:05 Lunch	10:35-11:05 Lunch
11:05-11:35 Recess	11:05-11:35 Recess	11:05-11:35 Recess	11:05-11:35 Recess	11:05-12:10 Math Workshop
11:35-11:50 Science	11:35-11:50 Science	11:35-11:50 Science	11:35-11:50 Science	12:10-2:25 Enrichment
11:50-1:00 Math Workshop	11:50-1:00 Math Workshop	11:50-1:00 Math Workshop	11:50-1:00 Math Workshop	12:10-12:40 Music
1:00-1:45 Reading and Math Rime	1:00-1:45 Reading and Math Rime	1:00-1:45 Reading and Math Rime	1:00-1:45 Reading and Math Rime	12:45-1:15 Art
1:45-2:05 Social Studies	1:45-2:05 Social Studies	1:45-2:05 Social Studies	1:45-2:05 Social Studies	1:20-1:50 Media
2:05-2:35 KEA Centers	2:05-2:35 KEA Centers	2:05-2:35 KEA Centers	2:05-2:35 KEA Centers	1:55-2:25 PE
				2:20-2:35 Science

First Grade

- 8:30-8:55 Arrival/ Morning Work
- 8:55-9:15 Calendar
- 9:15-9:30 Social Studies
- 9:30-10:00 Reading Tier
- 10:00-11:00 Reading
- 11:01-11:26 Lunch
- 11:30-11:45 Recess
- 11:45-12:30 Math
- 12:30-1:00 P.E. (M/W) Music (T/TH)
- 1:00-1:30 Library (M/W) Science (T/TH)
- Alternate specials on Fridays
- 1:35-2:05 Math Tier
- 2:10-2:25 Encore
- 2:35-3:35 Literacy Centers
- 3:35-3:45 Stack up, pack up
- 3:45-3:54 Read Aloud/ Class Meeting
- 3:54-4:01 Head home

7:50-8:20	CALENDAR
8:20-9:05	READING
9:05-9:55	PHONICS
9:55-10:20	MATH SPARK
10:20-10:45	ELAR SPARK
10:45-11:05	RECESS
11:10-11:40	LUNCH
11:45-12:25	WRITER'S WORKSHOP
12:25- 1:10	ROTATION
1:20-2:05	MATH

2:05-2:50 SCIENCE/SOCIAL STUDIES



Daily Schedule 5th Grade

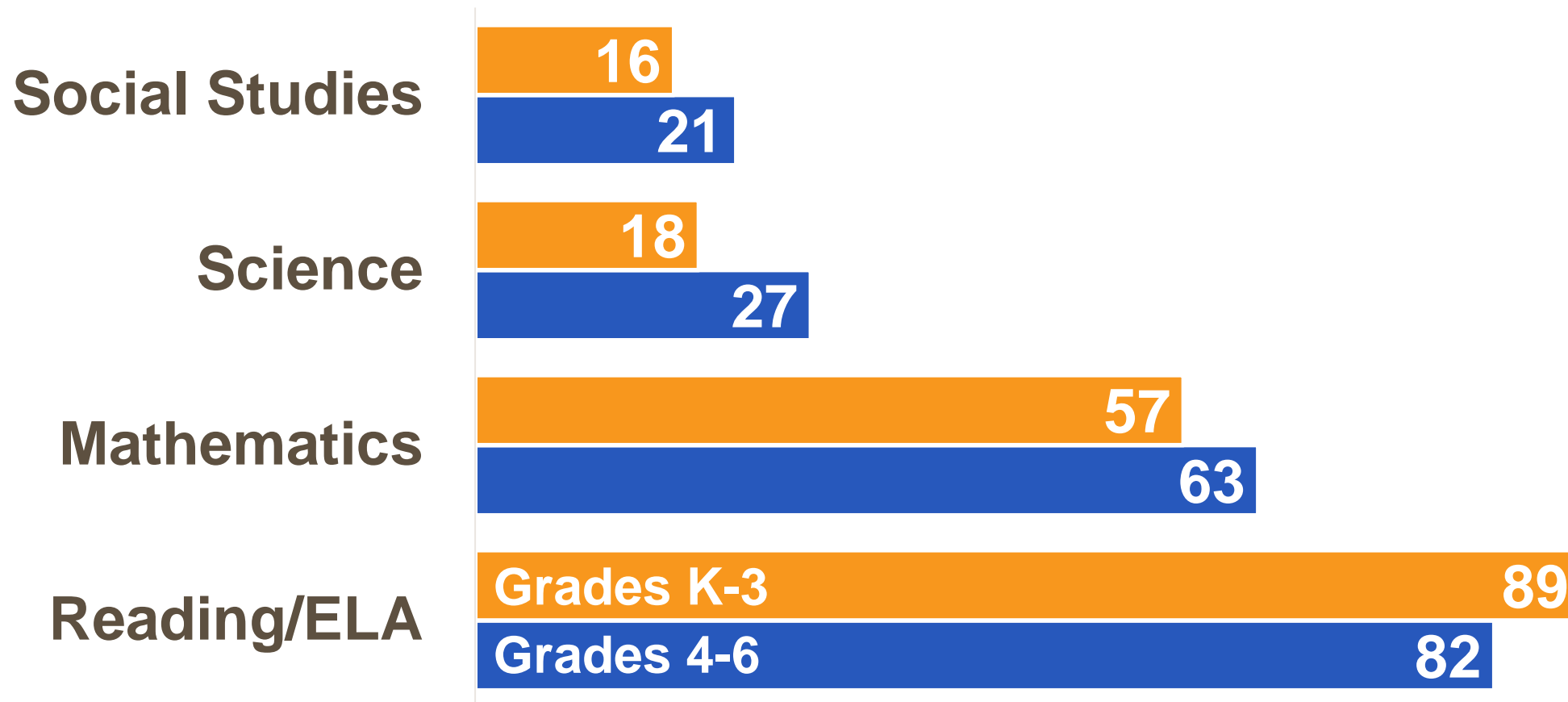
- 8:35 – 8:50 Arrive at school and prepare for the day (Breakfast, visit locker, sharpen pencils, etc)
- 8:50 Morning announcements
- 8:55 – 10:30 Reading/Language Arts
- 10:30 – 11:05 Social Studies
- 11:05 – 11:50 Specials
- 11:50 – 12:05 Silent Reading/Activity time
- 12:05 – 12:50 Lunch/Recess

12:55 – 1:30 Science

- 1:35 – 3:15 Math
- 3:15 – 3:20 Clean up and lockers
- 3:20 – 3:25 Dismissal



Average number of minutes per day spent teaching each subject:



Integrating Science in Elementary: Reading



**Background
Knowledge**



Vocabulary

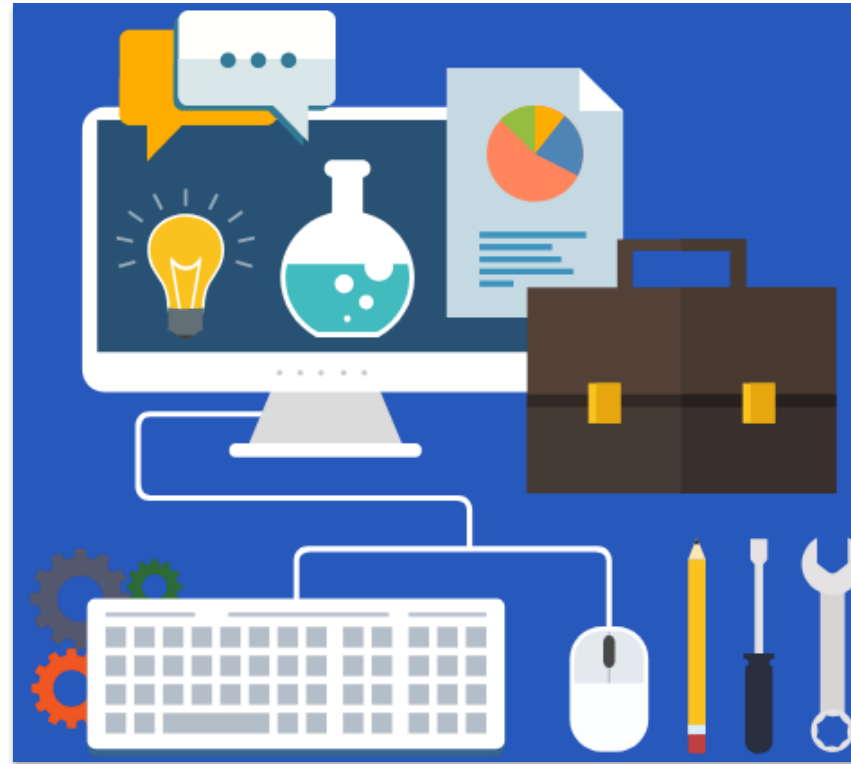
Integrating Science in Elementary: Reading

“Reading, interpreting, and producing text are **fundamental practices of science** in particular, and they constitute at least half of engineers’ and scientists’ total working time.”

- National Research Council

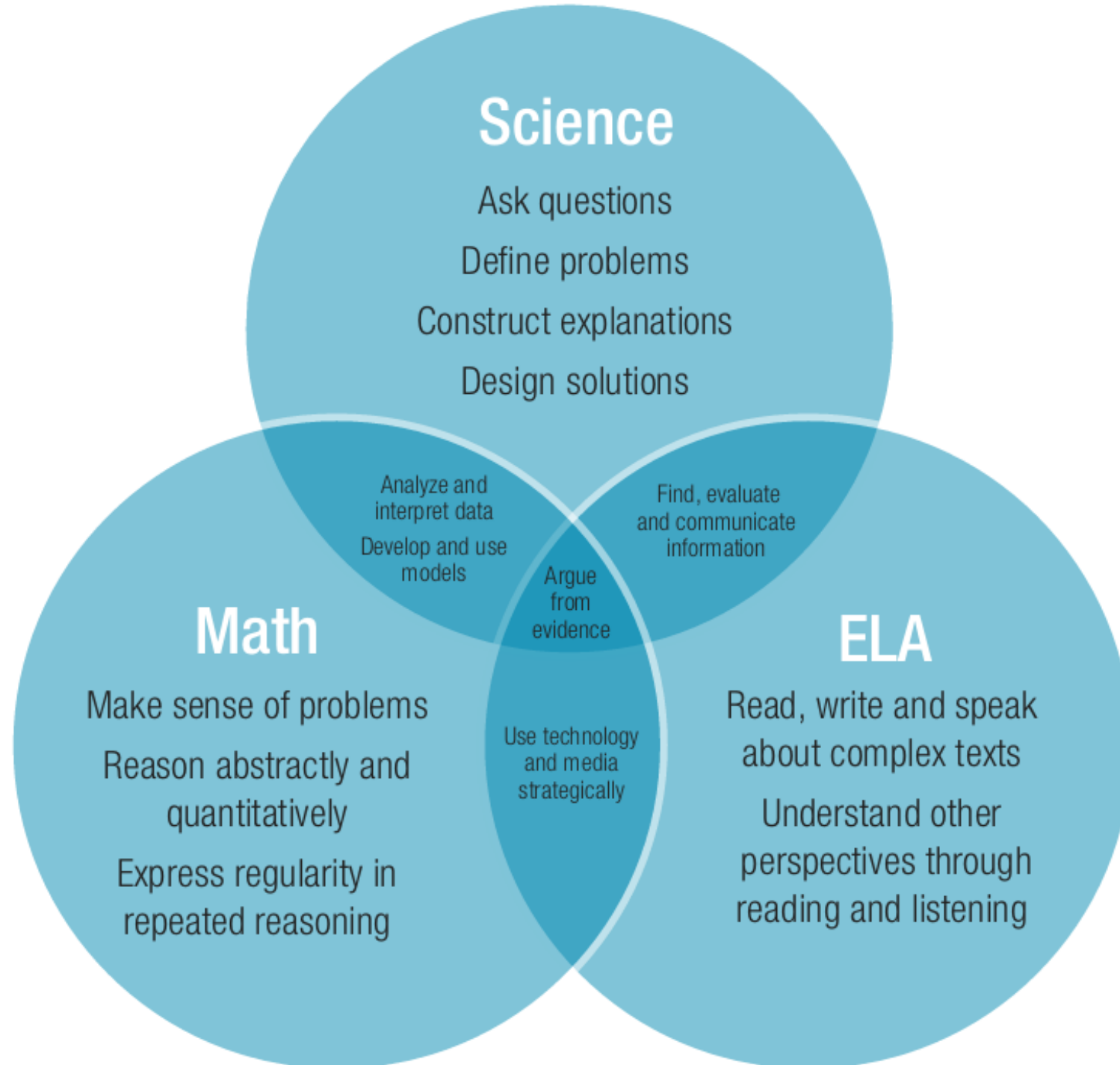
Integrating Science in Elementary: Math

Analyze and interpret data

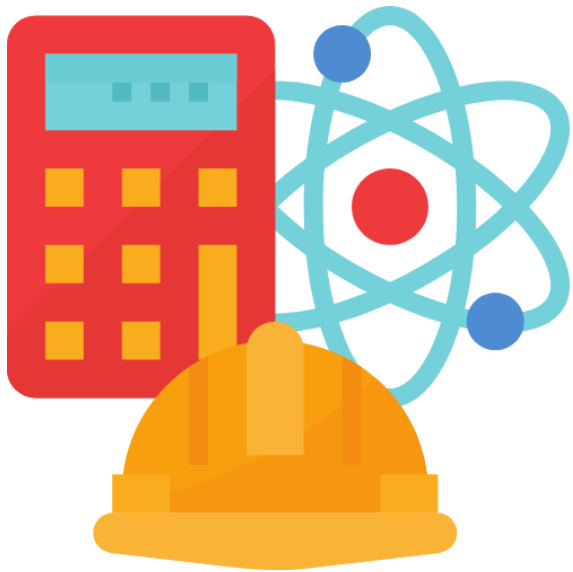


Find patterns in data

Develop models; make predictions



3-Dimensional Science



Scientific and
Engineering Practices



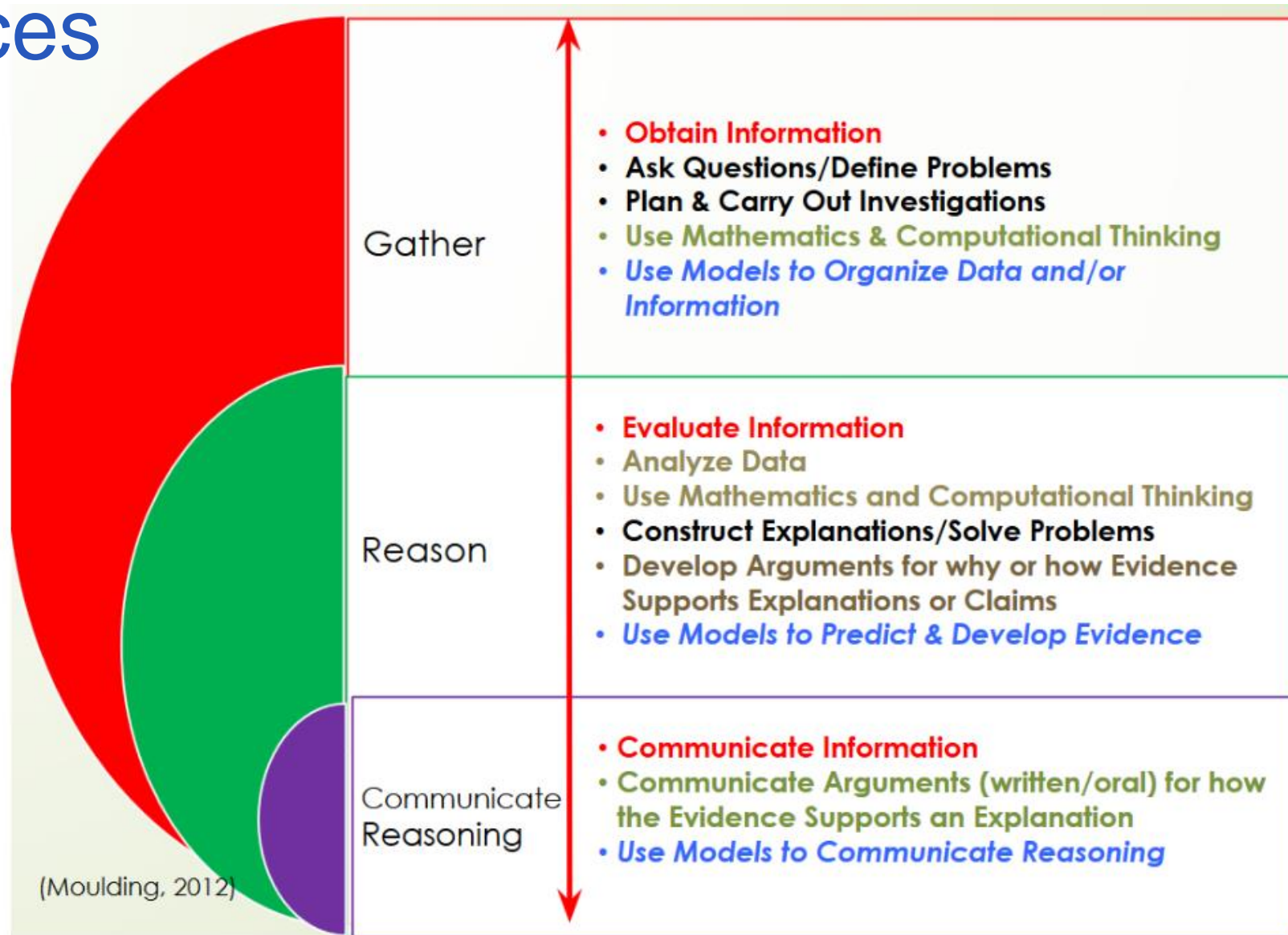
Cross-Cutting
Concepts



Disciplinary Core Ideas
in the Sciences

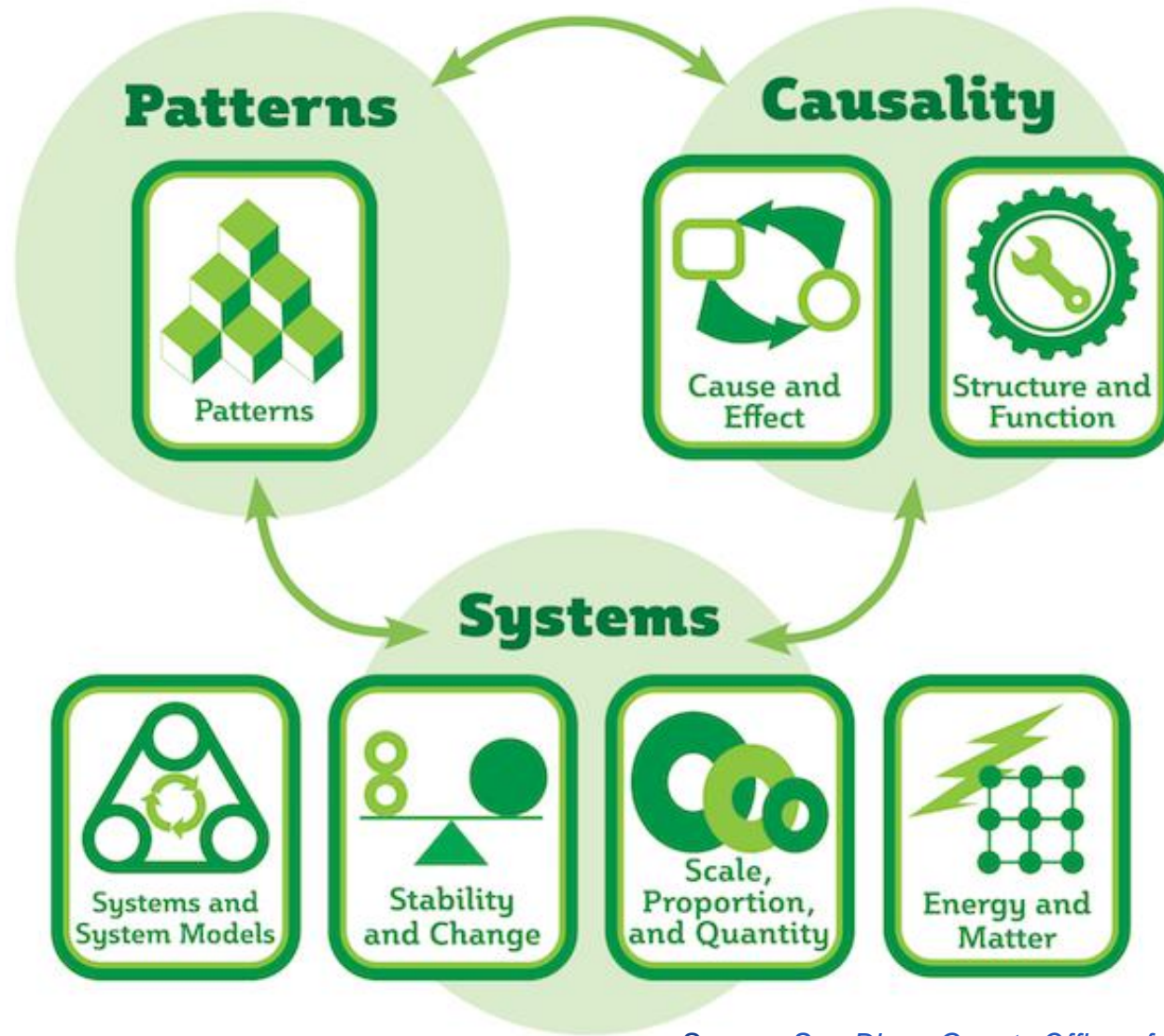


3D Science: Scientific and Engineering Practices





3D Science: Cross-Cutting Concepts





3D Science: Disciplinary Core Ideas



Life
Sciences



Engineering
& Technology



Earth & Space
Sciences



Physical
Sciences

Practices

- Asking **Questions**
Defining **Problems**
- Using **Models**
- Conducting **Investigations**
- Analyzing **Data**
- Using **Mathematics**
- Constructing **Explanations**
Designing **Solutions**
- Arguing from **Evidence**
- Communicating **Information**

Core Ideas



Life
Sciences



Engineering
& Technology



Earth & Space
Sciences



Physical
Sciences




Patterns




Causation




Scale




Systems



Energy



Structure
& Function

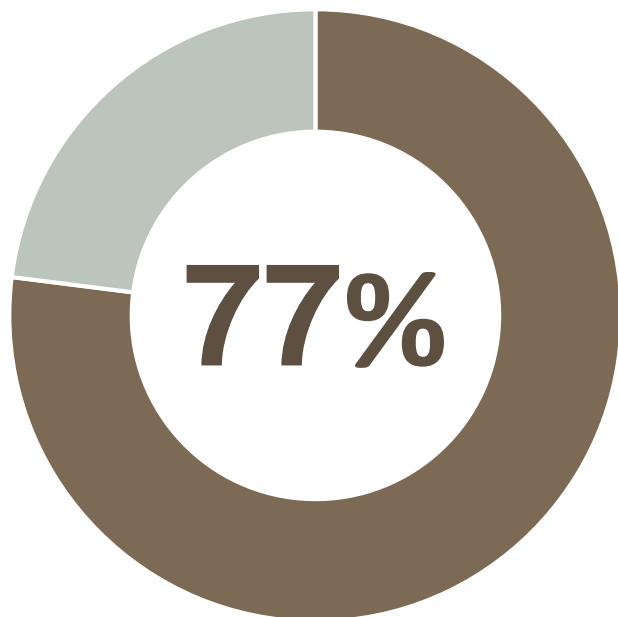


Stability
& Change

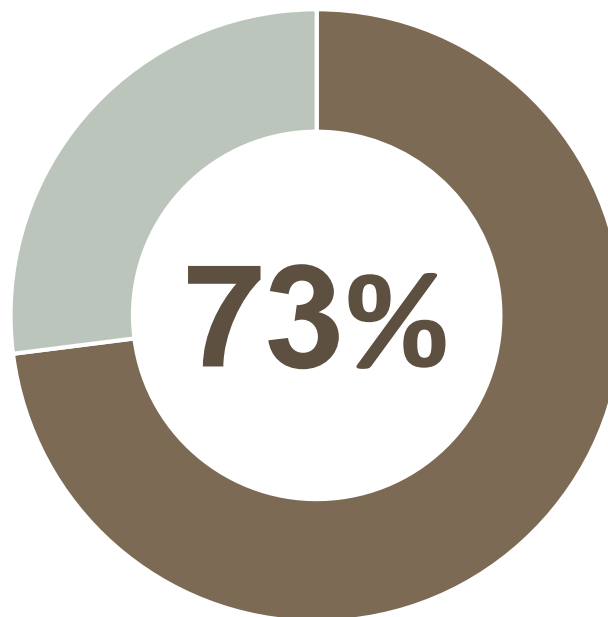
Crosscutting Concepts

Elementary teachers who felt very well-prepared to teach a subject:

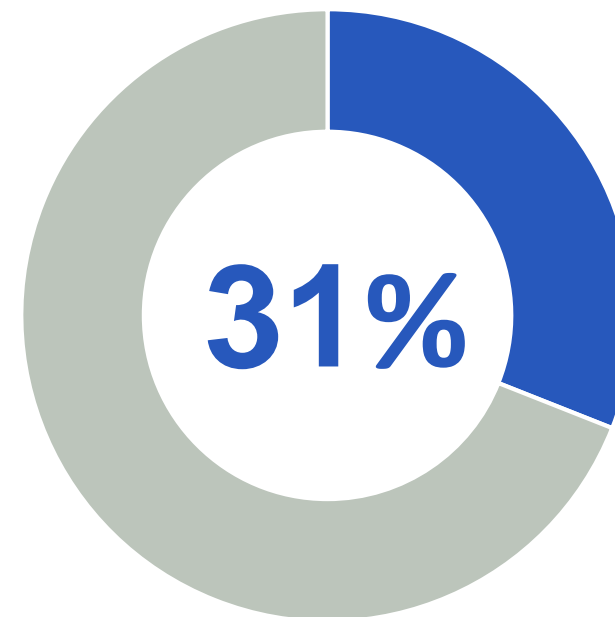
Reading/
Language Arts



Math



Science



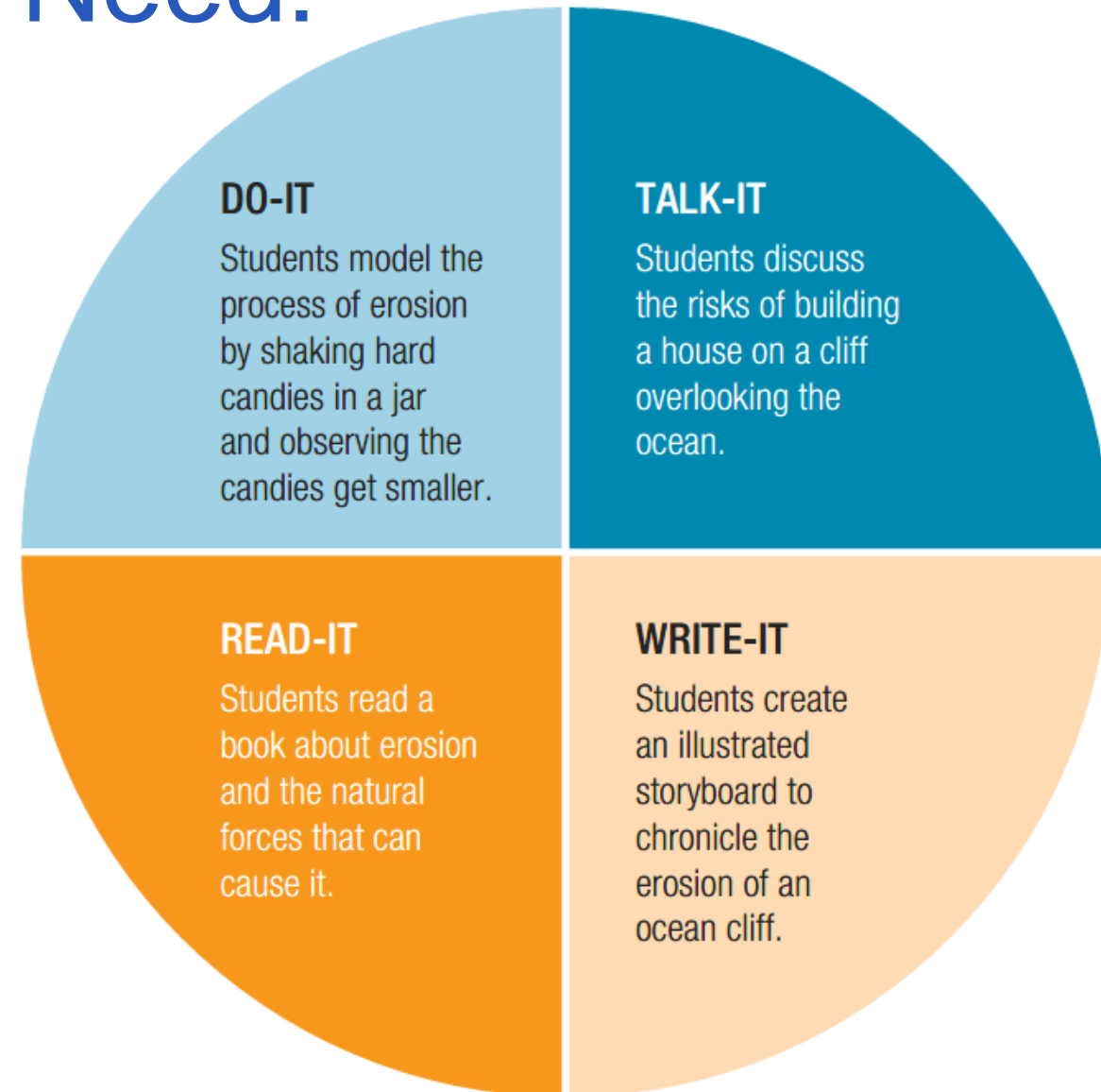
Elementary Teachers Need:

- Understanding of 3D science and what 3D performance looks like
 - Focus on student sense-making and higher-level, systems thinking
 - Students conduct investigations, engage in discussions about open-ended questions, and solve problems
- Know how to create “a need to learn” and make thinking visible



Elementary Teachers Need:

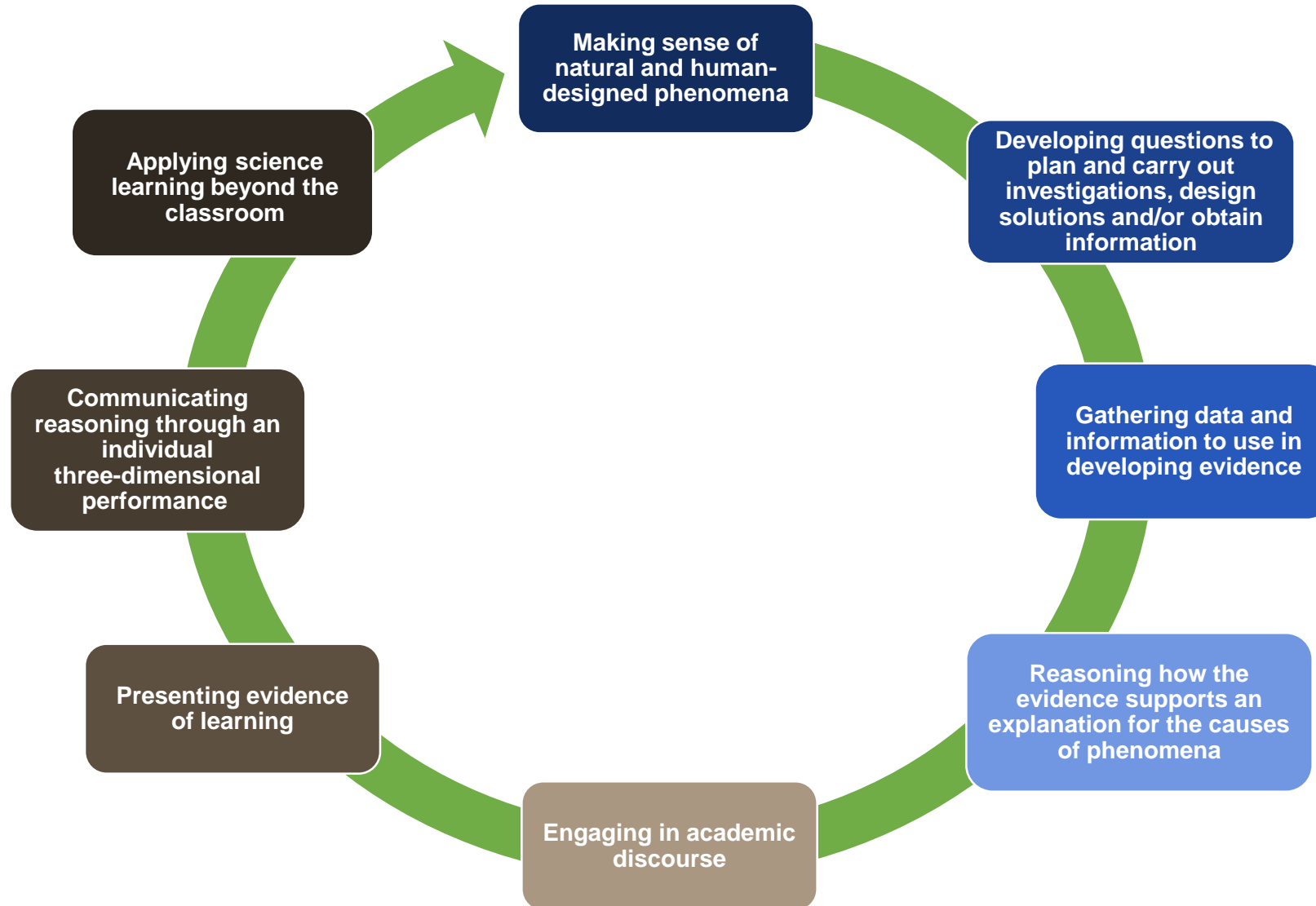
- Science content courses with a teaching-specific focus
 - Know how to use an “activity before content” approach
- Instruction in interdisciplinary teaching



Recommendations

- Ensure that science receives adequate time in the classroom.
- Encourage interdisciplinary instruction.
- Equip elementary teachers to use inquiry-based, three-dimensional learning.

SREB's Powerful Science Instructional Practices



SREB

Thank you for attending!

Please email Samantha Durrance at
Samantha.Durrance@SREB.org
with questions or comments.