1 Background

Middle School

What is included in the middle school science standards?

Science and Engineering Practices (SEP): Activities scientists use to generate knowledge, & solve problems.
Science Domains: Overlapping content areas that organize and classify scientific knowledge.
Crosscutting Concepts (CCC): Habits of mind used by all scientists that unite all science domains.

"The more students practice these habits of mind, the better prepared they will be to demonstrate knowledge and skills through various assessments, and to become scientifically literate individuals."

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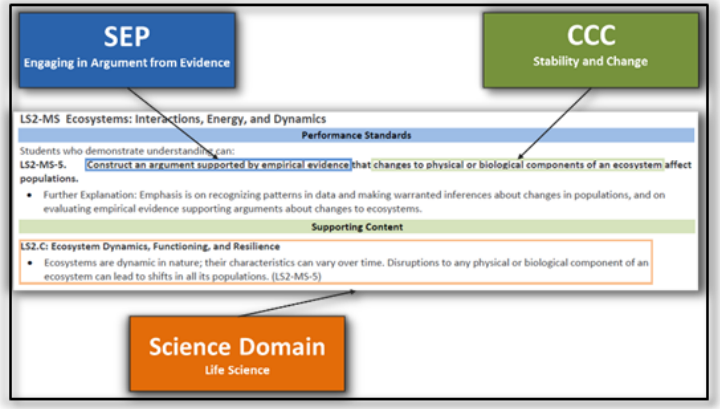
What are the SEPs, Domains, and CCCs?

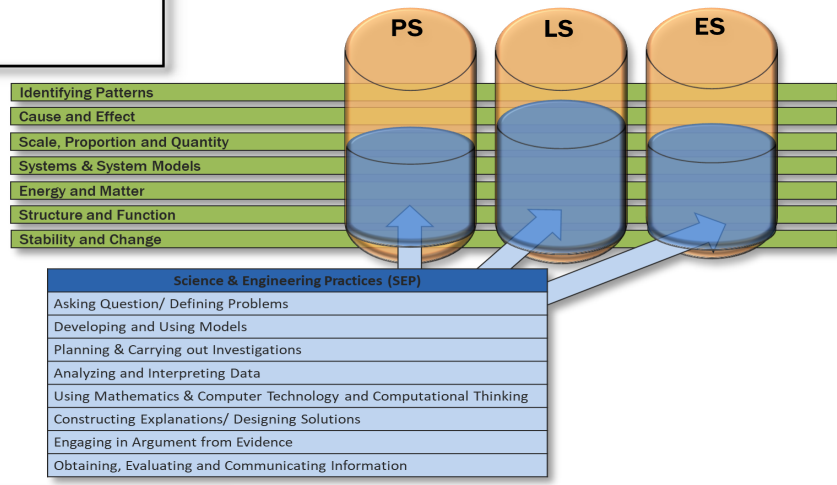
Science & Engineering Practices (SEP)	Science Domains	Crosscutting Concepts (CCC)
Asking Question/ Defining Problems	Life Science	Identifying Patterns
Developing and Using Models	Earth and Space Sciences	Cause and Effect
Planning & Carrying out Investigations	Physical Sciences	Scale, Proportion and Quantity
Analyzing and Interpreting Data		Systems & System Models
Using Mathematics & Computer Technology and Computational Thinking		Energy and Matter: Flows Cycles & Conservation
Constructing Explanations/ Designing Solutions		Structure and Function
Engaging in Argument from Evidence		Stability and Change
Obtaining, Evaluating and Communicating Information		

Where can the SEP, Domain, & CCC be found?



2 Model of ISSS

The orange **science domain** silos are filled with the blue **science and engineering practices**. The green **habits of mind** used by all scientists cut across and unite all of the science domains.



3 SEP x CCC Matrix

The SEP x CCC Matrix can show **patterns in the ISSS**.

	P	CandE	SPQ	Sys	EandM	SandF	SandC	Infl	N/A
Ask									
Ob									
Plan									
Dev									
Analyze									
Using									
Con									
Eng							LS2-MS-5		

Engaging in Argument from Evidence (Eng)
Stability and Change (SandC)
→ LS2-MS-5

4 Key Findings

The 54 ISSS in middle school cover all science domains.

	# ISSS w/ CCC	% of Middle ISSS
P	9	17%
CandE	12	22%
SPQ	7	13%
Sys	6	11%
EandM	9	17%
SandF	5	9%
SandC	5	9%
Infl	0	0%
N/A	1	2%

	# ISSS w/ SEP	% of Middle ISSS
Ask	2	4%
Ob	3	6%
Plan	5	9%
Dev	16	30%
Analyze	8	15%
Using	2	4%
Con	11	20%
Eng	7	13%

- SEP x CCC in a total of 10 ISSS (19%)
  - ⇒ Dev & EandM (5 ISSS)
  - ⇒ Analyze & P (5 ISSS)
- SEP x CCC in a total of 12 ISSS (22%)
  - ⇒ Dev & Sys (3 ISSS)
  - ⇒ Dev & SandF (3 ISSS)
  - ⇒ Con & CandE (3 ISSS)
  - ⇒ Con & EandM (3 ISSS)

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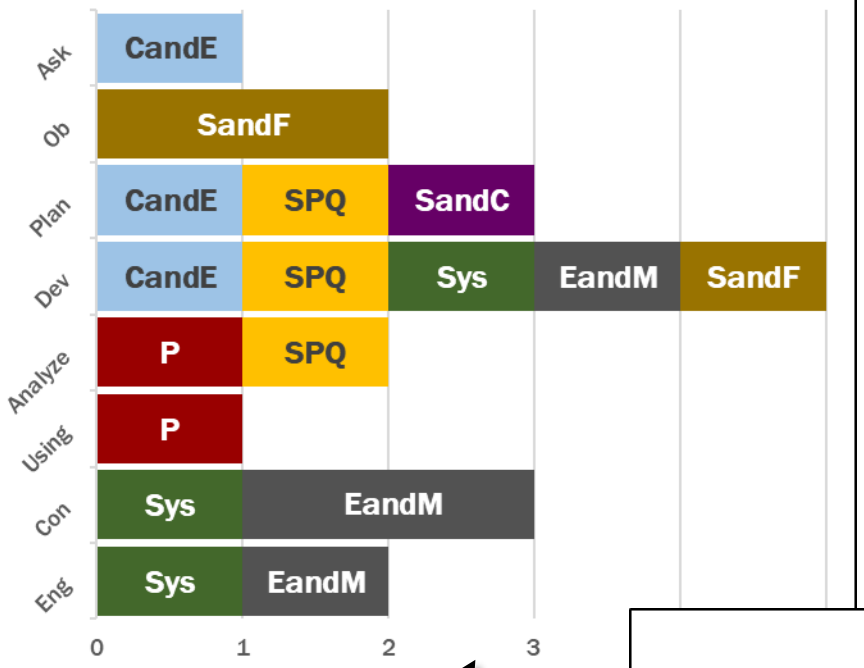
Summary

Middle School

The number and types of CCCs per SEP at each science domain shows how the three dimensions fit together.

Physical Science

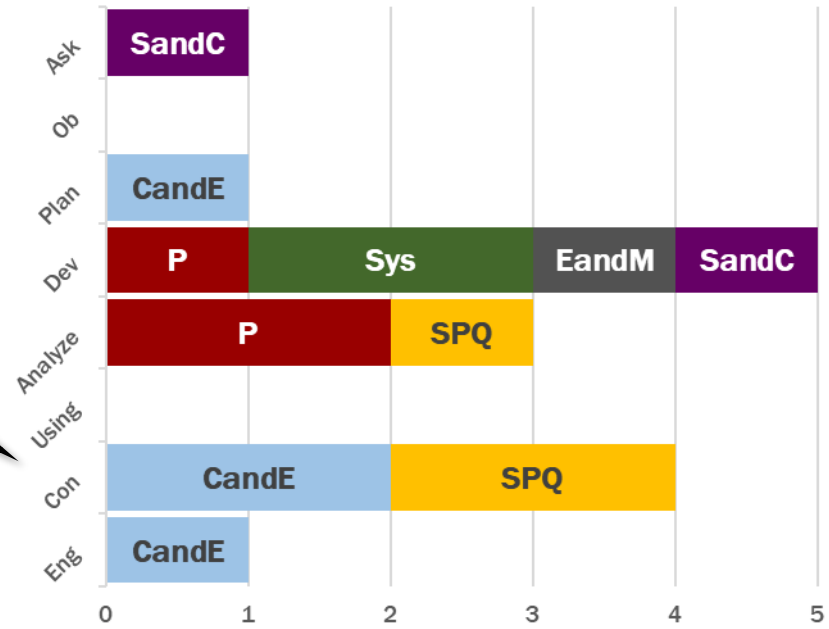


The physical science domain has a total of 19 middle school ISSS.

Students obtain and communicate information the relationship between structures and their functions.

What habits of mind do students engage when planning and conducting physical science investigations?

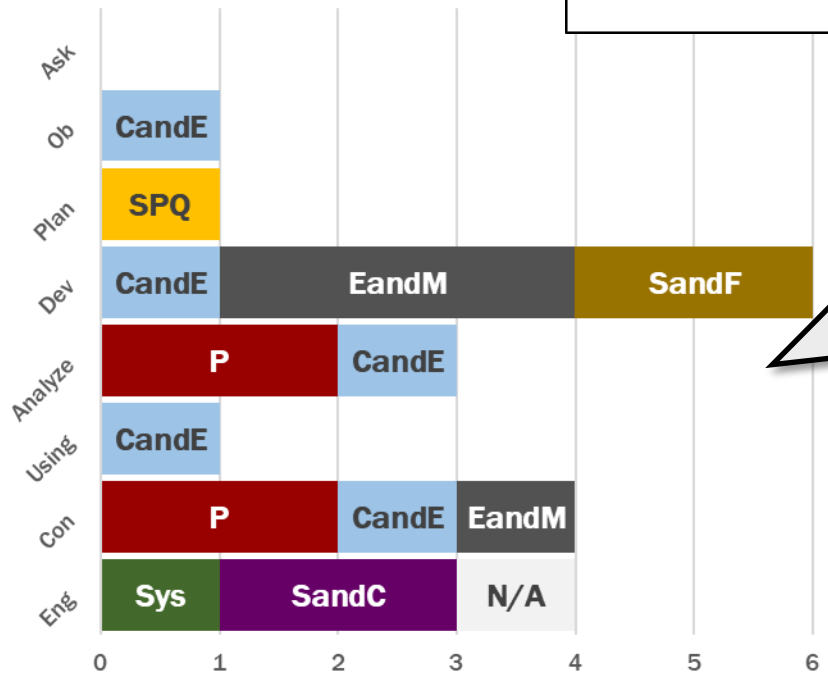
Earth and Space Sciences



The earth and space sciences domain has 15 middle school ISSS.

When students analyze earth and space science data what are they uncovering?

Life Science



The life science domain has 20 middle school ISSS.

Students develop and use models to clarify cause and effect, energy and matter, and structure and function relationships.

What habits of mind do students exercise when engaging in argument using evidence?