

Building Elementary Science Teaching

Summer Institute 2018:
Investigations in life sciences

June 18-22, 2018 9:00-3:30 Richmond CA



**THE LAWRENCE
HALL OF SCIENCE**
UNIVERSITY OF CALIFORNIA, BERKELEY


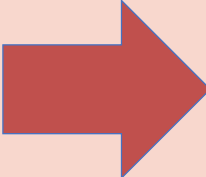



Crosscutting Common Experience



1. Count off 1 through 7.
2. Introduce yourselves and find something you have in common (not work related)
3. Describe or explain your common experience in terms of a crosscutting concept:
 - Group 1 **Patterns**
 - Group 2 **Cause and Effect**
 - Group 3 **Scale and Proportion**
 - Group 4 **Systems**
 - Group 5 **Energy and Matter**
 - Group 6 **Structure and Function**
 - Group 7 **Stability and Change**

Shifting to an NGSS approach

Focus: how CCCs help students do more “figuring out”

from science inquiry only		to a broader view of science practices
from learning about		to figuring out
from knowing a list of ideas		to knowing how ideas fit together
from simple explanations		to more complex explanations
from knowing that		to knowing why or how

Crosscutting Concepts in Science



Task #1

- Observe a cup of ice water
- What do you notice?
- Record your observations



Crosscutting Concepts

Crosscutting concepts have value because they provide students with

connections and intellectual tools

that are related across the differing areas of disciplinary content and can

enrich their application of practices

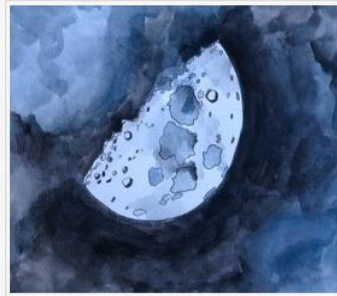
*and their ***understanding of core ideas.****

(NRC Framework, 2012, p. 233)

One phenomenon viewed through different lenses



Cause and Effect



Patterns



Structure and Function

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Systems and Systems Models



Stability and Change



Scale, Proportion, and Quantity




Energy and Matter

Task #2 -- take another look

- Observe the cup of ice water again using your assigned crosscutting concept as your lens
- Share




One phenomenon viewed through different lenses



Cause and Effect




Patterns




Structure and Function

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Systems and Systems Models



Energy and Matter



Stability and Change



Scale, Proportion, and Quantity

Task #3: Phenomenon viewed through two crosscutting concept lenses

- We will examine, describe and explain several distinct natural phenomena using two specific cross-cutting concepts for each.
- Use the critical questions handout to guide your discussions.

Crosscutting Concepts

- Use the two crosscutting concepts to describe and explain the scientific phenomenon.
- Use the critical questions handout to guide your discussions.

1. Explain: the top stays upright while it's spinning.



Stability and
Change



Cause and
Effect

Crosscutting Concepts

- Use the two crosscutting concepts to describe and explain the scientific phenomenon.
- Use the critical questions handout to guide your discussions.

2. Explain: The isopods' features and/or habitat.



Structure and Function



Systems and Systems Models

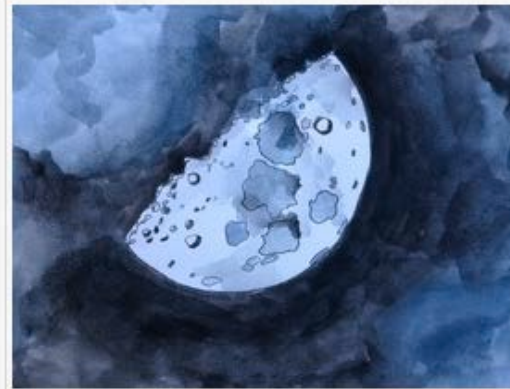
Crosscutting Concepts

- Use the two crosscutting concepts to describe and explain the scientific phenomenon.
- Use the critical questions handout to guide your discussions.

3. Explain: There are differences in these rocks.



Scale,
Proportion, and
Quantity



Patterns

Using Crosscutting concepts

Cause and Effect

Patterns

Structure and Function

Systems

Scale

Change and Stability

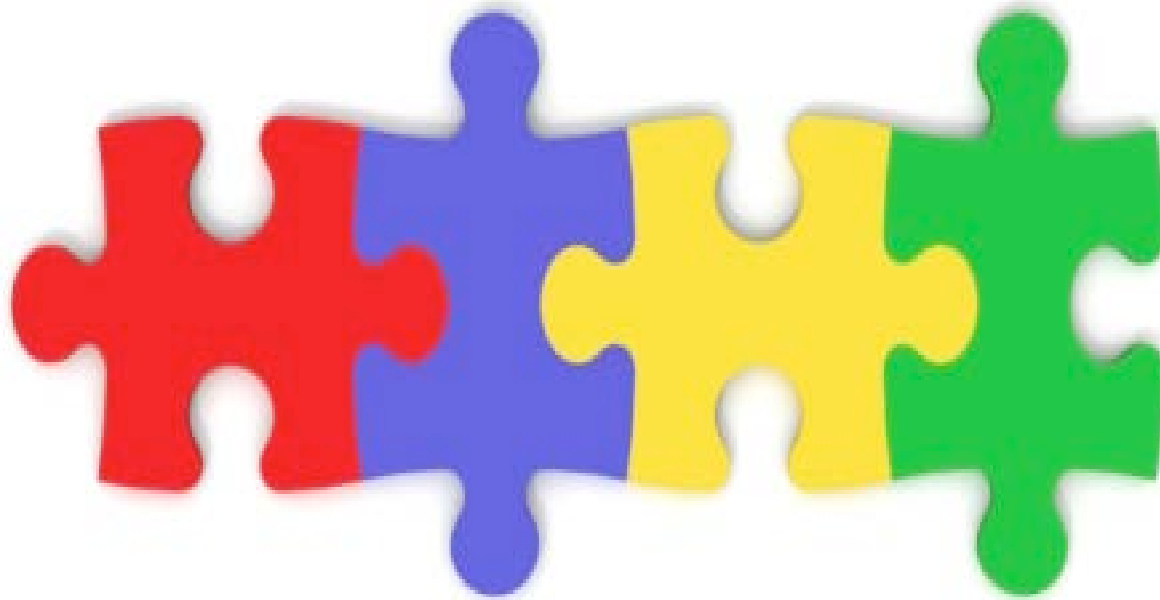
Matter and Energy

- Compare how the different crosscutting concepts used with your phenomenon provided different perspectives. What did the second one add.
- *Which CC(s) were most useful for making sense of the phenomenon.*
- How does emphasizing one or more CC help support student understanding.
- How does it help students go deeper into the science content?

One Lens – Many Concepts and/or phenomena

or

Many Lenses- One Concept and/or phenomena



Embedding CCs into curriculum

- use as a lens for explaining phenomena related to core ideas
- make connections with related scientific practices
- apply a single crosscutting concept to different contexts or areas of science & engineering
- use to provide common vocabulary for discussing science and engineering
- useful for asking questions about phenomena



Patterns



Cause and Effect



Energy and Matter



Structure and Function



Stability and Change



Scale, Proportion, and Quantity



Systems and Systems Models