

**Approximate time:** 40 minutes  
(can be split into shorter sections if needed)  
Part 1: Vertical Alignment (15 min – discussion)  
Part 2: CCC Lenses (25 min – interactive and discussion)

### Learning Goals

Participants in the activity will

- understand how Crosscutting Concepts (CCCs) build in depth and complexity from K through 12
- think beyond the titles of the CCCs and become aware of the grade-level specific details they encompass
- know that any piece of content can potentially be addressed with multiple CCCs
- recognize that using different CCCs with the same content can highlight different ideas or have different learning outcomes for students

### Materials

- [Vertical Alignment cards](#) (at least one set; see “Prepare,” below.)
- [Copies of NGSS Appendix G](#) (1 per participant)

### Shark Lagoon Cam



With our high-definition webcam, you can spot every detail on the 19 species of sharks, rays, and bony fishes living in our Shark Lagoon.

### Background for Facilitators

The first step in understanding the Crosscutting Concepts (CCCs) is to see how they can serve as a framework to organize content or phenomenon around a single theme, which is addressed in the [CCC Speed Dating and Station Rotation](#) activity. Once they have grasped that basic framework, educators can move on to explore how the CCCs progress across the grades and how they can be used to draw different ideas out of a single piece of content. This pair of activities explores these two ideas and will help participants deepen their understanding of the CCCs as a versatile tool to support student learning.

The vertical alignment activity is a quick card sort intended to engage participants with the NGSS language describing the CCC progression. The explicit goal is to gain an understanding of how each CCC builds in complexity from kindergarten through high school. However, an additional “behind the scenes” motivation is to get participants interested in looking at Appendix G! This NGSS Appendix includes a table describing the specifics of what the CCCs should look like for each grade band. This

level of detail is important to be aware of, and this activity helps push educators to go beyond just the title of the CCC and think more deeply about what it actually means.

The CCC lenses activity explores the power of the CCCs as a tool for guiding student thinking. Many phenomena or pieces of content can be connected with more than one CCC. This initially seems confusing—how do I fit this piece of content into a CCC framework if there are multiple places it could fit? However, this creates an opportunity for crafting intentional connections that support specific learning goals. For example, a topic like ecosystems could be explored through the lens of the Systems and System Models CCC, the Energy and Matter CCC, or the Stability and Change CCC. Each of these lenses would bring out different ideas and understandings about ecosystems, and a thoughtful combination of CCC lenses would give students a rich, multi-tiered perspective on the topic.

### Prepare

- Print and cut out the Vertical Alignment cards.
- Decide how to group your participants for the activity. With seven CCCs to work with, the most straightforward option would be seven groups of 2 – 4 participants each. If your group is much larger, you might have two groups per CCC (in which case you will need to print an extra set of cards). If your group is much smaller, you could have each group work with two CCCs, or you could select a few CCCs to leave out.
- Choose something to focus on for the CCC Lenses activity. We like to use the [California Academy of Sciences shark lagoon webcam](#), but you can really use any phenomenon or image. Pick something that will be engaging for your participants to think about.

### Procedure

#### Part 1: Vertical Alignment of a CCC (15 minutes)

1. Remind your participants that the Crosscutting Concepts (CCCs) span across all grade levels from K – 12. You would expect that an idea like Energy and Matter would look quite different in a kindergarten classroom than it would in a high school classroom. Students' understanding of and ability to apply these big ideas will develop and deepen over time. The NGSS lays out guidelines for what this progression should look like.
2. Show them the Vertical Alignment cards and explain that each card has the description of what the CCC should look like in a specific grade band (K-2, 3-5, 6-8, or 9-12). However, the grade bands are not labeled on the cards! Each group is tasked with reading the cards for one CCC and trying to put them in the correct developmental order, K through 12.
3. Give each group a set of cards for one CCC and give them five minutes to read and organize the cards.
4. As groups finish, go around with your copy of Appendix G and check their work.

- In our experience, there are usually one or two groups that get the middle school and high school cards in the wrong order. Tell them this is not an unusual mistake, and ask them to look again at the text and see if they can figure out a way to explain the sequencing of ideas.
5. When everyone is finished, lead a brief discussion with the whole group. Questions may include:
- **Do these progressions make sense? Was it clear what order the ideas belonged in?**
  - **What clues helped you figure out the progression?**
    - *Increasing complexity of vocabulary*
    - *In some cases, more concrete, observable ideas appear in the lower grades, followed by more abstract ideas in the higher grades.*
- Key Messages**

*Make sure participants leave the discussion with these ideas:*

  - Each CCC has grade-level specific details that are articulated in Appendix G.
  - The CCCs build in depth and complexity from K through 12.
6. Show participants where to find the table in Appendix G that these progressions were copied from. Encourage them to spend some time later on looking through the table and getting familiar with what the CCCs look like for the grade band that they teach. (If you have extra time, you can give them a chance to do this with a partner and discuss what they find.)

### Part 2: CCC lenses (25 minutes)

1. Looking at the details of each CCC progression highlights the fact that the CCCs are more than just labels for *categorizing* your content—rather, they are ways of *thinking* about content. Tell participants that in this activity, we will explore how using different CCCs to approach the same content might produce different learning outcomes. In other words, looking at the same thing through different lenses might allow you to see different things that might otherwise not be visible.
2. Introduce something for the class to focus on. This can be a webcam (we like to use our [shark lagoon webcam](#)), an interesting photograph, or something as simple as looking out the window at a tree outside the classroom.
3. Tell participants that each group will continue to use the same CCC that they looked at for the Vertical Alignment activity. Their task now is to use that CCC as a lens to explore what they see in the webcam (or photograph, or whatever you have chosen). They should discuss the following questions:
  - **Could we connect this thing to this CCC?** Can they stretch their imagination to find *some* connection?
  - **Should we connect this thing to this CCC?** Is this connection *meaningful*? Does it help you understand something about the object or phenomenon?
  - **What might students learn from viewing this thing through this CCC lens?**
4. Give them ten minutes to discuss this in small groups.

5. Have each group share out their answers and ideas.
6. Lead a discussion with the whole group about this experience. The overall goal of the discussion is to draw out the idea that the same piece of content can be explored using different CCCs, and as a result, the CCCs can be used as a tool to reach a desired learning objective. Discussion questions could include:
  - **How did ideas about what students might learn differ based on the CCC they were using being applied?**
  - **What was it like forcing yourself to examine this thing through a specific lens? Did you notice or think about anything you might have missed otherwise?**
  - **How might you go about deciding which CCC to use when teaching a given piece of content?**
  - **How might students benefit from using different CCCs to explore the same content?**
    - *This is a good place to highlight the importance of intentionality in the NGSS. The CCCs are a tool that you can use to reach the goals and outcomes you have in mind for your students. Be deliberate about choosing the CCCs that will help your students reach those goals.*

### Key Messages

*Make sure participants leave the discussion with these ideas:*

- Any piece of content can potentially be addressed with multiple CCCs.
- Using different CCCs with the same content can highlight different ideas or have different learning outcomes for students.