

# Scientific & Engineering Practices

An understanding of the Science & Engineering Practices Dimension is provided through examples of the Practices with supporting resources.

The activities included in the Toolkit are not meant to serve as lesson plans, but have been chosen to highlight the concepts of each of the Practices. It is expected that teachers using the Toolkit will connect the practice to their specific grade level and lessons. Practices and associated activities are also connected to relevant Crosscutting Concepts and Disciplinary Core Ideas to illustrate some of the ways that the three dimensions can be used together.

In order to develop an understanding of the change process, each Practice will follow the steps of the Conceptual Change Model (Stephans, 2003, p. 7). The six stages of the Conceptual Change Model have been modified to fit the development of understanding the Practices as follows:

1. Teachers becoming aware of their own preconceptions about the Practices.
2. Teachers expose their beliefs about the practices, sharing their ideas with others.
3. Teachers confront their beliefs by engaging in a specific Practices activity.
4. Teachers work toward resolving conflicts (if any) between their ideas and their experience with the Practices, thus accommodating the Practice.
5. Teachers extend the concept by connecting the Practices specifically to instruction.
6. Teacher go beyond by continually reflecting on the Practices, asking questions and engaging with other teachers about the Practices

*“Preexisting beliefs are tenacious and may require repeated challenges in different settings and context to replace.”*  
(Stephans, 2003, p. 7)

Start by reviewing [A Framework for K-12 Science Education: Practices, Crosscutting Concepts and Core Ideas](#) (2012) [pages 1-40](#), then begin exploring specific Practices and activities.