Analyzing Science Practices and Concepts in Wild Hope

hhmi | BioInteractive

Activity
Educator Materials

OVERVIEW

In this activity, students identify the science practices and concepts in a *Wild Hope* episode. *Wild Hope* is a series of short documentary films that highlight people working to protect species and ecosystems threatened by biodiversity loss. *Wild Hope* episodes are developed for general audiences, and they can be used to incorporate stories into the classroom to support student understanding and engagement. This activity encourages students to think more deeply about what they observe in the episodes.

There are two versions of the "Student Handout" for this activity, based on different curricular frameworks:

- The **NGSS** handout uses the Next Generation Science Standards (NGSS) framework for **high school** life science, focusing on the "Science and Engineering Practices" and the "Crosscutting Concepts."
- The **V&C** handout uses the Vision and Change (V&C) framework for **undergraduate** biology, focusing on the "Core Competencies and Disciplinary Practices" and the "Core Concepts."

Additional information related to pedagogy and implementation can be found on this resource's webpage, including suggested audience, estimated time, and curriculum connections.

KEY CONCEPTS

- Science practices (e.g., the science and engineering practices in NGSS, the core competencies and disciplinary practices in V&C) are important for figuring out problems and phenomena.
- Overarching science concepts (e.g., the crosscutting concepts in NGSS, the core concepts in V&C) are lenses through which we can figure out problems and phenomena.

STUDENT LEARNING TARGETS

- Identify and describe the aspects of science used by the people in a *Wild Hope* film.
- Identify and describe the science ideas (concepts and practices) used to define and solve specific problems in the film.

PRIOR KNOWLEDGE

It may be helpful for students to have had some exposure to the NGSS or V&C frameworks. You can introduce or review these with students as needed. The relevant concepts and practices for each framework are summarized at the end of the "Student Handouts" and include:

- certain science practices (e.g., using models, data, systems, scientific argumentation, etc.)
- certain overarching science concepts (e.g., energy and matter, ecosystems, genetics, evolution, etc.)

MATERIALS

- copies of the selected "Student Handout"
- access to the selected *Wild Hope* episode

BACKGROUND

Wild Hope

Wild Hope is a video series highlighting the intrepid changemakers who are restoring and protecting our planet. The episodes (all under 30 minutes in length) feature a diversity of people and settings and connect to topics in

biology and environmental science. Visit the *Wild Hope* landing page to access all the available episodes and additional materials.

Next Generation Science Standards (NGSS)

In the United States, most state standards for K–12 science education are based on *A Framework for K-12 Science Education*: a set of research-based recommendations released in 2012. This framework set expectations for what students should know and be able to do in different grades, which build coherently across grade levels. State standards based on the *Framework* include the Next Generation Science Standards (NGSS) and other, often similar, variations.

This activity focuses on two dimensions of science learning within the *Framework*: Science and Engineering Practices (SEP) and Crosscutting Concepts (CCC). More information about the NGSS is provided on the NGSS website and in the BioInteractive activity "Using Three-Dimensional Learning Cards in the Science Classroom."

Vision and Change (V&C)

V&C was an initiative led by the National Science Foundation (NSF), American Association for the Advancement of Science (AAAS), and other partner organizations to modernize undergraduate biology education. The recommendations of the initiative are detailed in the 2011 report "Vision and Change in Undergraduate Biology Education."

This activity focuses on the "Core Concepts" (overarching themes and principles) and "Core Competencies and Disciplinary Practices" (relevant skills) that the report identifies as key features of undergraduate biology education.

TEACHING TIPS

- Review potential *Wild Hope* episodes for suitability before assigning them to students.
  - Visit the *Wild Hope* landing page to view all available episodes.
  - Go to individual episode pages for additional resources, such as transcripts and "Educator Materials," that can help you review the episodes more quickly.
- To choose the episode that is most relevant to your students and your classroom goals, consider:
  - science concepts and practices shown in each episode
  - geographical locations (You may prefer a more local/regionally relevant example or an example in another area to which students can apply their learning.)
  - people, groups, and communities represented
  - types of solutions highlighted

PROCEDURE

1. Select a *Wild Hope* episode for students to watch.
2. Select which version of the "Student Handout" to use.
   a. NGSS is recommended for high school students.
   b. V&C is recommended for undergraduate students.
3. Before students watch the episode, give them time to review what is being asked of them in their "Student Handout." This includes the science concepts and practices they will need to identify (summarized at the end of the handouts).
   a. For the NGSS handout, review the "Science and Engineering Practices" and the "Crosscutting Concepts." It may be beneficial to provide the corresponding "SEP" and "CCC" cards from "Using Three-Dimensional Learning Cards in the Science Classroom." Students could use these cards to support their thinking.

   b. For the Vision and Change handout, review the "Core Competencies and Disciplinary Practices" and the "Core Concepts."

4. Remind students that they do not have to complete the questions in the handout in a specific order. They can return to different questions as they learn new information.
5. Have students watch the episode in whichever way is most suitable for your class.
   a. If you are showing the episode in class, consider turning on closed captions and providing students with copies of the episode transcript.
   b. If students are watching the episode outside of the class, ensure they will have access to it. Episodes can be streamed from their individual webpages or on YouTube.
6. Have students complete the "Student Handout" individually or in groups.
   a. Students can fill in the handout individually while watching the episode. They will most likely need additional time to complete the handout after the episode has ended.
   b. Students may also work in small groups after watching the episode to share their ideas and add more to their own responses.
7. Once all students have had an opportunity to complete their handouts, you can have them share out their ideas with the class, so that they can compare their observations with their peers'.

ASSESSMENT GUIDANCE

Student responses will vary and depend upon the selected episode. For the tables, it is important that students provide evidence that explicitly supports the practices/concepts they identified in the first column.

For example, if students identify "Using Mathematics and Computational Thinking" (NGSS) or "Use Quantitative Reasoning" (V&C) as a practice they observed, they should include evidence of the practice specific to the episode's context, such as "The scientist explained how they calculated the frequency of..."

OPTIONAL EXTENSION

You can complement this activity with *Designing Solutions to Preserve Biodiversity*, another activity in which students watch and analyze a *Wild Hope* episode (specifically in Parts 2 and 3). In that activity, students collaboratively explore major biodiversity threats and design, present, and refine solutions for preserving biodiversity. They also consider the roles of local partners and potential constraints in developing and implementing their solutions.

REFERENCES

NGSS Lead States. 2013. *Next Generation Science Standards: For States, By States.* Washington, DC: The National Academies Press. https://www.nextgenscience.org/.

American Association for the Advancement of Science. 2011. *Vision and Change in Undergraduate Biology Education.* https://www.aps.org/programs/education/undergrad/upload/Revised-Vision-and-Change-Final-Report.pdf.

CREDITS

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