MOUNTAINFILM
FOR STUDENTS

THINK LIKE A SCIENTIST: RENEWAL

DIRECTOR Jessica Plumb
DURATION 8 min

A breathtaking film about the un-damming of the Elwha River and its impact on migrating salmon. This film discusses how humans have manipulated the environment and looks at one scientist who is watching the Elwha River return to its original state, while also observing the animals around it.

Standards

COMMON CORE ANCHOR STANDARDS FOR READING

CCSS.ELA-LITERACY.CCRA.R.1 / Key Ideas and Details
Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

CCSS.ELA-LITERACY.CCRA.R.7 / Integration of Knowledge and Ideas
Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words

CCSS.ELA-LITERACY.CCRA.R.10 / Range of Reading and Level of Text Complexity
Read and comprehend complex literary and informational texts independently and proficiently.

COMMON CORE ANCHOR STANDARDS FOR WRITING

CCSS.ELA-LITERACY.CCRA.W.1 /Text Types and Purposes
Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.

CCSS.ELA-LITERACY.CCRA.W.4 / Production and Distribution of Writing
Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose and audience.

CCSS.ELA-LITERACY.CCRA.W.5 / Production and Distribution of Writing
Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.

COMMON CORE ANCHOR STANDARDS FOR SPEAKING & LISTENING

CCSS.ELA-LITERACY.CCRA.SL.1 /Comprehension and Collaboration
Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

CCSS.ELA-LITERACY.CCRA.SL.5 / Presentation of Knowledge and Ideas
Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.

Tags river restoration, dam removal, native culture, data collection

KeyVocabulary renewal, restoration, conservation, diversity, preservation

Filmmaker Interview

JESSICA PLUMB

Why did you become a filmmaker and how did you get started?
I came to filmmaking through a love of storytelling, via a circuitous route. I began by juggling twin loves of writing and photography, following questions that spark my curiosity. I've always been interested in the relationship between people and place, and much of my work has involved exploring the land and waters that sustain us. Ultimately, curiosity led me to the Elwha River, the subject of my first feature film, *Return of the River*, and to this short follow up film, *Renewal*.

When editing the film, was there anything you wished you could have included in the final cut?
There are always things I wish I could include that end up cut for timing reasons, and this film is no exception. At the heart of this short film is Cameron's story, and I would have loved to include much more about her, given the opportunity. This film was made as part of a series, with clear timing and content guidelines, and much of Cameron's backstory did not fit into this mold. Cameron, the young biologist in *Renewal*, is an inspiring person in many ways, and getting to know her was one of the joys of making this film. I would have been glad to share more about her complex background and the unlikely path to her current job. Cameron was raised by grandparents on tribal land in a family of mixed heritage. She is the first member of her family to pursue higher education. She was initially discouraged from studying science by some members of her family who are deeply religious, but a biology teacher piqued her curiosity, and mentors encouraged her to follow her interest. She is now pursuing a masters degree in wildlife biology, with the goal of returning to her tribe as a lead scientist, and her community celebrates her accomplishments. She observes that she has switched roles with her grandfather - she's working on restoration on the very same river where her grandfather supported the family as an employee of the hydropower industry. (That last detail made the film, I'm happy to say.)

When you made the film, did you have a specific audience in mind?
Yes - as described above, this film had a defined audience, as it was made for the *Think Like a Scientist* series. These films were initially released on *Nautilus Magazine* online, so the first audience was *Nautilus Magazine* readers. I'm very glad to see that it has found a broader audience, including younger viewers than the typical *Nautilus Magazine* reader.

Is there an action you hope people are inspired to take after seeing this film?
The characters in this film, Cameron and Kim, are part of a much larger ecological restoration story, the unprecedented restoration of the Elwha River. For both Cameron and Kim, science has been a path to protecting and restoring the land and wildlife they love. Their work begins with close observation; paying attention to the interconnected web of life in the ecosystem they call home. I hope that this film will inspire you to learn more about where you live, or places you love. Restoration opportunities exist everywhere. Can you make a difference in the land or waters that sustain you?

"I've always been interested in the relationship between people and place, and much of my work has involved exploring the land and waters that sustain us."

Pre-Screening Activities

Prior to watching the movie, it might help to gain more background information on the Elwha River restoration project. Below are some recommended activities that you can pick and choose from. It is recommended to at least complete Activity 1, as it is a great time-lapse video that will engage student interest prior to watching, *Think Like a Scientist: Renewal*. If you choose to do Activity 2, complete prior to Activities 3 and 4.

Activity 1

Watch a time-lapse video (2:17) of the Elwha Dam removal from the Burke Museum in Seattle, Washington: **https://www.youtube.com/watch?v=m96VcCF4Ess**

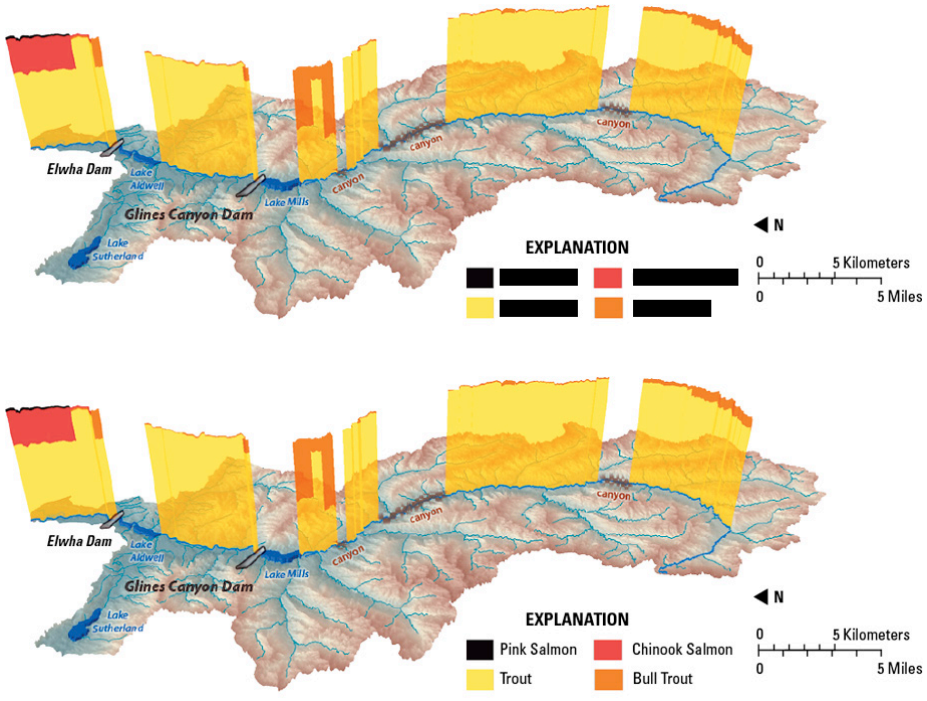
If you chose to watch this video with your class, have the students pay attention to how they divert the river to remove the dam. Afterward, see if you can have the students remember the steps to dam removal, as they reroute the river several times in different directions, and it is interesting to pay attention to.

Activity 2

To the right is a picture of a graph from the Elwha River Dam Removal – Rebirth of a River "Fact Sheet" from the USGS. The graph's key has been purposefully blacked out. Project the graph and let the students know that it is a graph representing something prior to the dams' removal. Ask the students what they think the different colors could represent and have a discussion about it. If students become really opinionated, you could ask them to take a stance and argue their point based off of the graph. You can find the graph at **https://pubs.usgs.gov/fs/2011/3097/**

Example: If a student were to believe that the graph represented a bug's population, they would stand on one side of the room and argue why they believe that. If they were to believe that the graph represented a bird's population, they would stand on the other side of the room and argue their point, and so on.

ELWHA RIVER DAM REMOVAL – REBIRTH OF A RIVER



Activity 3

If you would like a more in-depth explanation of the dam removal project, here is a link to the USGS video (1:16) highlighting satellite images of the Elwha River Dam removal: **https://www.youtube.com/watch?v=bt3UVSCCeSA**

Activity 4

The Seattle Times created a very informative and easily accessible website detailing the dam removal project timeline, the different watersheds of the Elwha River (Upper River, Middle River, Lower River, and the Mouth of the Elwha) as well as detailing the effects on the habitats and wildlife along the way. You can find it here: **https://projects.seattletimes.com/2016/elwha/**

You can split your class into groups and/or assign each student a section to share with the class, using 2-3 sentence summaries.

Example two sentence summary: Starting in 2011, the Elwha Dam on the Elwha River was removed as part of a project to rid the state of Washington of hydropower dams that were no longer worth the cost to repair and maintain. The Elwha Dam removal cost $325 million and was the largest dam removal project ever.

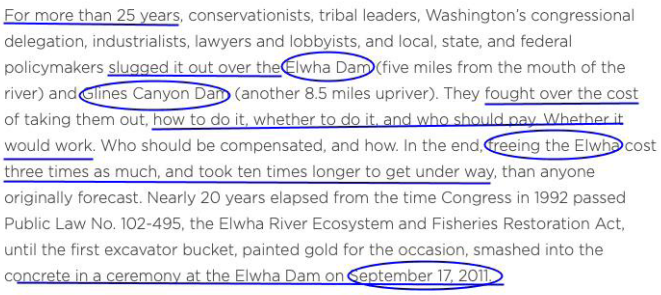
Activity 5

This article from the National Parks Conservation Association, by Lynda V. Mapes, titled "Elwha: A River Reborn" gives a quick 7-paragraph explanation of the history of the Elwha Dam removal project: **https://www.npca.org/articles/1042-elwha-a-river-reborn**

Pass out physical copies, as the students will be interacting and marking up the text.

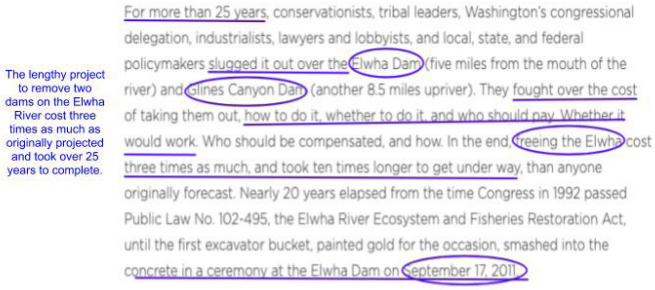
1. **Read through the article once as a class and number the paragraphs.**
2. **On the second read through, have the students circle the keywords and underline the claims of the author. Keep in mind that there is no "correct" way to complete this task. The goal is to get the students to interact with the text more than once and to deepen comprehension.**
3. **Once students have completed the second read, see if they can work with a partner or individually to write a one-sentence summary for each paragraph.**

Step 2 Example:



For more than 25 years, conservationists, tribal leaders, Washington's congressional delegation, industrialists, lawyers and lobbyists, and local, state, and federal policymakers slugged it out over the Elwha Dam (five miles from the mouth of the river) and Glines Canyon Dam (another 8.5 miles upriver). They fought over the cost of taking them out, how to do it, whether to do it, and who should pay. Whether it would work. Who should be compensated, and how. In the end, freeing the Elwha cost three times as much, and took ten times longer to get under way, than anyone originally forecast. Nearly 20 years elapsed from the time Congress in 1992 passed Public Law No. 102-495, the Elwha River Ecosystem and Fisheries Restoration Act, until the first excavator bucket, painted gold for the occasion, smashed into the concrete in a ceremony at the Elwha Dam on September 17, 2011.

Step 3 Example:



The lengthy project to remove two dams on the Elwha River cost three times as much as originally projected and took over 25 years to complete.

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Discussion Guide

GENERAL/OPEN PROMPTS

1. Why do you think it is important to restore the Elwha River to its natural habitat?
2. Describe why people choose to restore and conserve nature.

EXPLORING SELF

1. What do you find most compelling about restoring the Elwha to its natural habitat? The vegetation, the fish, the sediment? Why do you find this the most compelling?

EXPLORING THE WORLD

1. What do you think the purpose of the title, *Think Like a Scientist: Renewal*, is? Do you think it is an effective title? What are some other possible titles for the movie?
2. What do you think the filmmaker's purpose is for making this movie? Why do you think they wanted to share Cameron Macia's story?

EXPLORING SOCIAL ISSUES

1. Why do you think the removal of the dams is significant? Do you think that this event will have an impact on history? Do you think people will remember it in 100 years?

SENSE OF WONDER

1. Describe the events that would follow, if you were able to restore your hometown to its natural habitat. What would your hometown look like in 20-30 years? 100 years?

Activity

MATERIALS NEEDED:

1. **8 ½ x 11 sheet of unlined paper**
2. **Markers or colored pencils**

Many benefits of un-damming of the Elwha River are discussed in the movie, *Think Like a Scientist: Renewal*. After watching the movie, ask students which benefits were discussed and create a list on the board.

Once students have brainstormed the benefits that were discussed in the movie, let students know that they will be creating a one-page report on the effects of the un-damming on either the sediment, fish population or vegetation of the Elwha River. Students will either work in a small group or independently and will be asked to synthesize information from both an article and a video (links below) to demonstrate their knowledge of the benefits of the un-damming of the Elwha River on a specific topic

Assign each student and/or student group only one topic (sediment, fish population, or vegetation).

FINAL ONE-PAGE REPORT SHOULD INCLUDE:

- **Title of text and video at the top of the page, including authors and publication date.**
- **Quote from the text and video, including an explanation of why it is important and/or related to the benefit of the un-damming of the Elwha River.**
- **Summary of the claims from the article and video.**
- **Drawing of at least one illustration to represent the ideas discussed in the video and the text.**

Sources

SEDIMENT:

Article: "Moving Mountains: Elwha River Still Changing Five Years After World's Largest Dam-Removal Project: More than 20 million tons of sediment flushed to the sea" by Andy Ritchie, Johnathan Warwick, and Leslie Gordon, from USGS website (September 2018): **https://www.usgs.gov/news/moving-mountains-elwha-river-still-changing-five-years-after-world-s-largest-dam-removal**

Video (3:41): "Elwha Sediment Brings New Life Downstream" by EarthFix Media (March 2014): **https://www.youtube.com/watch?v=vTRms4ELRLM**

FISH POPULATION:

Article: "River Revives After Largest Dam Removal in U.S. History" by Brian Clark Howard, for National Geographic (June 2016): **https://news.nationalgeographic.com/2016/06/largest-dam-removal-elwha-river-restoration-environment/**

Video (3:21): "After Largest Dam Removal in U.S. History, This River is Thriving" from National Geographic (June 2016): **https://www.youtube.com/watch?v=VipVo8zPH0U**

VEGETATION:

Article: "'Nature can do most of the work for you': Once-flooded Elwha land becomes forest" by Lynda Mapes for The Seattle Times (May 2018): **https://www.seattletimes.com/seattle-news/environment/elwha-revegetation-effort-plants-forest-on-once-flooded-land/**

Video (2:07): "Elwha Wildlife Reservoir Study" by Northwest Treaty Tribes (October 2015): **https://www.youtube.com/watch?v=m8GFl12yjfQ**

RECOMMENDED EXTENTIONS

TeachEngineering is a "digital library comprised of standards-based engineering curricula for K-12 educators to make applied science and math come alive through engineering" from University of Colorado at Boulder that has a plethora of lesson plans and activities for a variety of topics.

This is an entire unit on dams (including lesson plans, activities, and assessments):
https://www.teachengineering.org/lessons/view/cub_dams_lesson01

Here is a great activity with accompanying lesson plan where you perform a macroinvertebrate survey to gauge the health of a local river:
https://www.teachengineering.org/activities/view/cub_dams_lesson05_activity1

REFERENCES

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