STREAMS OF HOPE

WYLAND FOUNDATION

A non-profit classroom education and action program using web tools, citizen science, and community action for healthy oceans, lakes, rivers, streams and wetlands

EDUCATOR'S GUIDE

Includes goals, standards, and activities for use with the Streams of Hope program for Grades 6-8

Presented by

WYLAND FOUNDATION

Welcome to Streams of Hope: A Teacher's Guide

Greetings and welcome to the Streams of Hope Teacher's Guide! We've carefully curated this guide to empower you and your students to make the most of the Streams of Hope Web Tool. Within these pages, you'll find a suite of activities meticulously crafted to illuminate and harness the unique capabilities of our platform.

Each activity is structured to be user-friendly, starting with an enlightening introduction followed by clear, step-by-step instructions. For your convenience, we've incorporated standards correlations, ensuring that the lessons align with your curriculum objectives. Moreover, to deepen understanding and pique curiosity, we've listed additional resources to broaden exploration on the topics.

What truly sets this guide apart is the adaptability it offers. The Streams of Hope Web Tool is a treasure trove of diverse experiences, and the activities herein ensure each student's journey is distinctive. Depending on the specific Streams of Hope chosen, students will embark on varied learning paths, revealing endless possibilities. To cap it all, we've designed extensions that invite every student to partake in impactful actions, irrespective of their background, location, or prior familiarity with environmental topics.

Embrace the voyage of discovery and let the streams guide you!

President

Founder

RESEARCH GUIDE / OUTCOMES & BENEFITS

CREATING CHANGE

Streams of Hope, a program of the Wyland Foundation, is designed to bring about concrete environmental improvement by engaging all people across the nation's socio-economic spectrum in the health and vitality of their local water bodies. The core of the program is built around the belief that the collective contribution of many individuals can lead to meaningful and lasting environmental change.

Key Studies Supporting Pro-Environmental Outcomes

- Impact of Community-Based Water Quality Monitoring Programs: A study by Conrad and Hilchey (2011) reveals the efficacy of community-based water monitoring (CBWM) programs in fostering environmental stewardship and bringing about tangible improvements in water quality1. Streams of Hope's emphasis on user-led water quality monitoring and action projects aligns with the CBWM model, suggesting potential for similar results.
- Education and Environmental Action: A 2014 report by The Ocean Project demonstrates a strong correlation between education and pro-environmental behaviors2. Streams of Hope's educational components, including its interactive mapping feature and research-focused user assessments, could contribute to an increase in environmentally responsible behaviors among users.
- Environmental Volunteerism and Social Capital: A 2019 study by Pillemer et al. demonstrated that volunteer-based environmental programs not only contribute to environmental conservation but also foster social capital, improving community cohesion and resilience3. Streams of Hope's emphasis on volunteer projects opens the door to additional benefits extending beyond environmental conservation.
- Environmental Justice and Community Participation: The importance of community participation in addressing environmental justice issues has been demonstrated in numerous studies, including a 2015 report by Chavis and Lee4. By encouraging residents to assess local environmental risk factors, Streams of Hope could contribute to increased awareness and action on environmental justice issues.
- Community-Based Environmental Education in Underserved Communities: A 2020 report by the North American Association for Environmental Education highlights the potential for community-based environmental education programs to enhance environmental and social outcomes in underserved communities and Title 1 schools5. Streams of Hope, with its user-friendly platform and integration into educational curriculums, offers valuable resources and experiences for traditional and underserved communities and schools.

Footnotes

1. *Conrad, C. C., & Hilchey, K. G. (2011). A review of citizen science and community-based environmental monitoring: issues and opportunities. Environmental Monitoring and Assessment, 176(1-4), 273-291.*
2. *The Ocean Project. (2014). America's Aquariums: Educating to Conserve. Retrieved from https://www.theoceanproject.org/research-publications/*
3. *Pillemer, K., Wells, N. M., Meador, R. H., Schultz, L., Henderson Jr, C. R., & Cope, M. T. (2019). Engaging older adults in environmental volunteerism: the Retirees in Service to the Environment program. The Gerontologist, 59(3), 487-496.*
4. *Chavis, B., & Lee, C. (2015). The Role of Community in Addressing Environmental Justice. Health Affairs Blog. Retrieved from https://www.healthaffairs.org/do/10.1377/hblog20150423.046540/full/*
5. *North American Association for Environmental Education. (2020). Community-Based Environmental Education for a Sustainable Future. Retrieved from https://naaee.org/eepro/research/library/community-based-environmental-education*

OFFICIAL LESSON / ENVIRONMENTAL LITERACY

THE MAYOR'S DILLEMA

MATERIALS REQUIRED:
Tablets or computers with internet access for the Streams of Hope app. Note-taking materials for drafting proposals.

You've just been elected as a leader in your community, and you're eager to make a positive mark. As someone with a profound commitment to the environment, you come across the Streams of Hope tool, a groundbreaking platform that offers insights into the health of local waterways.

While there are concerns about some streams' well-being, there's also the potential to capitalize on the region's natural beauty to drive tourism and revenue. But with more tourists comes the responsibility to preserve and enhance the environment. As a passionate leader, you decide to embark on this journey with Streams of Hope as your guiding star.

Estimated Time: 3 hours.
Grade Level: 6-8
This lesson plan ensures students gain both technological and leadership insights, all while staying closely aligned with the Streams of Hope app and its real-world implications.

Standards Addressed:

- *·Science (NGSS): MS-ESS3-3, MS-ESS3-4*
- *·History-Social Science: 6.7.6 (Understanding economic and environmental concepts). English Language Arts: W.6.7, W.7.7, W.8.7 (Research and data interpretation). Environmental Literacy: Principle II (Understanding the impact of human activities on the environment).*
- *·Civics: 6.7.4, 8.2.7 (Understanding civic responsibilities and leadership roles).*

Objective

By the end of this module, students will be able to:

- Navigate and extract information from the Streams of Hope app effectively.
- Understand the importance of waterways in community development from a leadership perspective.
- Articulate potential strategies a leader might employ based on the data gathered from the app.
- Engage in discussions about the balance between tourism, revenue generation, and environmental sustainability.

Activity Details

1.Introduction to the Streams of Hope App (30 min)

- Introduce the app and its purpose.
- Discuss its significance in informing community leaders about waterway health and potential.

2.Hands-on Exploration (45 min)

- Allow students to explore the app, focusing on local waterways.
- Identify the Beauty Index and other parameters of their chosen waterways.
- Highlight areas of concern and potential.

3.Role-play Activity (1 hour)

- Students assume the role of newly elected leaders (Read: "Welcome Mayor...Now Fix Everything."
- Based on the data from the app, they must draft a proposal that addresses the current state of the waterways, potential tourism opportunities, and environmental protection measures.

4.Class Discussion (45 min)

- Leaders (students) present their proposals.
- Facilitate a discussion on the balance between promoting tourism, increasing revenue, and ensuring environmental protection

OFFICIAL LESSON / ENVIRONMENTAL LITERACY

WELCOME MAYOR ...NOW FIX EVERYTHING

Congratulations! You're the new Mayor

It's the start of a beautiful new day in the town of Riverton. The streets are abuzz and people are on the move. But the really big news is that today marks your first day on job as the newly elected mayor.

Getting here wasn't easy. The campaign had been intense. You had spoken passionately about restoring Riverton's glory, tapping into its hidden potential, and creating a sustainable environment for its residents. Your vision of a town in harmony with nature struck a chord with the townspeople, and they placed their faith in you. Now, the weight of that responsibility rests on your shoulders.

Before you can even finish your coffee, the town clerk hands you a report, and it quickly becomes clear that your biggest challenge and opportunity are the waterways of Riverton. These majestic rivers and serene lakes, once the pride of Riverton, are showing signs of environmental strain. Some areas teem with life, promising potential tourist hotspots, while others face pollution and degradation.

Yet, there is hope. You discovered the 'Streams of Hope' app, a tool designed to provide detailed insights into the health and potential of waterways. With this app, you can delve into the issues plaguing Riverton's waters. But the decisions ahead are complex. The town needs revenue, which tourism could provide. But promoting tourism might also risk damaging the very waterways you aimed to protect.

It's a tightrope walk, balancing economic growth with environmental sustainability. And the town looks to you, their new mayor, to lead the way.

Embracing the challenge, you decide to dig into the 'Streams of Hope' app. Your aim? To gather as much information as possible, draft a visionary plan, and steer Riverton towards a future where its waters shimmered with promise and prosperity. Your re-election hinges on your success.

Through the focused use of the Streams of Hope app, students get a first-hand experience of the decisions and strategies a community leader must contemplate. They will appreciate the intricate balance between community development, revenue generation, and environmental sustainability

Additional Resources to Explore

Book: "The Death and Life of the Great Lakes" by Dan Egan

- A powerful look at the environmental, economic, and political narratives that highlight the importance of water resource management.

Website: World Resources Institute: Water

- Deep dive into sustainable water management and the intricacies of decision-making at community and global levels.
  - Link:World Resources Institute: Water

Website: Wyland Foundation's My Water Pledge - Mayor's Challenge Classroom Edition

- Interactive tools and resources to understand and take action on water conservation, bridging the gap between environmental awareness and community involvement.
  - Link:Wyland Foundation's My Water Pledge

OFFICIAL LESSON / ARTS

THROUGH THE LENS

Estimated Time: 3 hours.
Grade Level: Sixth
This includes time for taking photos, selecting and arranging the best shots, and sharing and discussing the project.

Standards Addressed:

- *Visual Arts: 1.1.6, 2.5.6, 5.3.6*
- *Information and Technology (ISTE): 5a, 6a*
- *Geography (National Geography Standards): Standard 14*

Today, you'll look at waterways in a whole new light – through the lens of a camera. Whether it's a lake, stream, or even a storm channel, your mission is to capture the emotions these waterways stir in you. Is it a sense of wonder or worry? Joy or despair? Curiosity or reflection? Let's get started!

Activity Details

1) Choose Your Waterway (15 min): Using the Streams of Hope application, select any waterway that you want to photograph.

2) Capture Your Perspective (1 hour): Now, take a walk along your chosen waterway. Try to capture what you feel when you look at it. Remember, the way you frame your shots can help communicate your emotions. You're an artist now, so feel free to get creative!

3) Curate Your Photos (1 hour): From all the photos you took, choose about five that best represent your feelings. These will form your photo project.

4) Title Your Project (15 min): Once your project is ready, give it a title. The title should be an adjective that describes the emotions you hope to communicate with your photos.

5) Share and Compare (30 min): Pair up with a partner and share your photo projects. Without telling them your title, ask your partner to give your project a title based on their own interpretation. Discuss any similarities and differences between your titles.

6) Post Your Project (15 min): Finally, upload your photos to your Stream of Hope. Rate your stream on the beauty index, reflecting your emotional connection to the waterway.

Additional Reading

"Zoom In, Zoom Out" - National Geographic Kids

- This interactive feature on the National Geographic Kids website allows students to explore different perspectives in nature, from the very large to the very small. It's a great way to learn about scale and perspective in photography. Website

"See Think Wonder -

- "A routine for exploring works of art and other interesting things" - Harvard Project Zero: This is a fantastic resource to help students explore works of art (including photographs) and think critically about what they see. Website

If you like the Streams of Hope Arts Education Activity, check out these resources. Each provides important insights into the power of perspective and how to communicate through art and photography

"Andrew Goldsworthy: Rivers and Tides" - Documentary:

- This documentary showcases the work of Andrew Goldsworthy, a British sculptor and photographer who works with nature to create stunning, transient works of art. Although it's a movie, it's an excellent way to introduce students to a new perspective on nature, art, and photography. Movie Link

"Art in Nature Photo Activity for Kids" - National Wildlife Federation:

- This activity guide encourages kids to think about how they can create art using natural materials and then photograph their creations. It's a fantastic way to get kids thinking about perspective, composition, and the intersection of nature and art. Activity Guide

"Photography for Kids!" by Michael Ebert and Sandra Abend:

- This book introduces kids to the basics of photography, including how to compose a photograph, choose a subject, and work with light. It also features works by young photographers for inspiration. Book Link

OFFICIAL LESSON / CITIZEN SCIENCE

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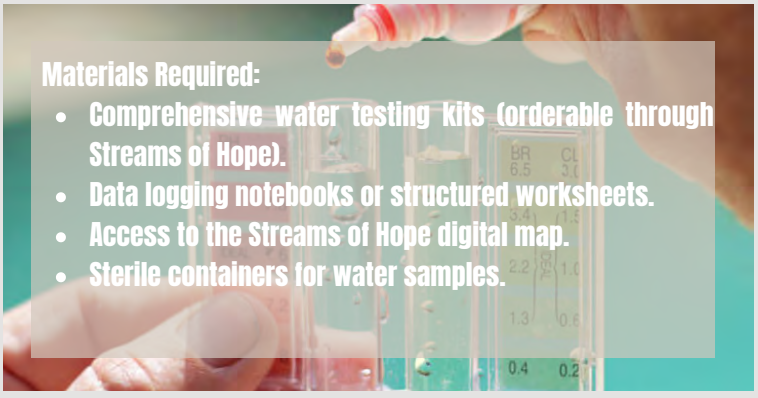
PURITY IN PRACTICE

This comprehensive lesson plan integrates the process of water quality testing with practical hands-on experience and the application of modern tools like Streams of Hope, promoting both scientific inquiry and environmental stewardship.

Estimated Time: 4 hours.
Grade Level: 6th-8th
This includes time for instruction, hands-on testing, data analysis, group discussion, and presentations.

Activity Details

1. Introduction to Water Quality (30 min):
   - Discuss the importance of water quality.
   - Brief on common pollutants and their origins.
2. Water Sampling (45 min):
   - Using Streams of Hope Map: Students will identify nearby water sources and potential testing locations.
   - In-Person Site Assessment: With an accompanying adult, students will evaluate the shortlisted sites to select a safe location for water collection.
   - Ordering Testing Kits: Students or teachers can order water testing kits directly through the Streams of Hope website.
   - Sample Collection Demonstration: Learn the nuances of proper water sample collection.
3. Hands-On Water Quality Testing (1 hour):
   - Distribute water testing kits.
   - Test for parameters such as dissolved oxygen, water temperature, sodium, calcium, bromide, nitrate, turbidity, pH, total algae, and ammonium.
   - Diligently document the outcomes.
4. Data Analysis and Uploading (45 min):
   - Analyze findings collaboratively.
   - Compare data against water quality benchmarks.
   - Students upload their results to the Streams of Hope database.
5. Brainstorming Session (30 min):
   - Deliberate on detected pollutant sources.
   - Propose solutions for water quality improvement.
6. Group Presentations (30 min):
   - Students share their findings and recommendations.



Materials Required:

- Comprehensive water testing kits (orderable through Streams of Hope).
- Data logging notebooks or structured worksheets.
- Access to the Streams of Hope digital map.
- Sterile containers for water samples.

Standards Addressed:

- *Science (California NGSS): MS-LS2-4, MS-ESS3-3, MS-ESS3-4.*
- *Math: 6.SP.5.*
- *Health Education: 6.2.N.*
- *Information and Technology (ISTE): 5a, 6a.*
- *Environmental Literacy (California's Blueprint for Environmental Literacy): Gr. 6-8 standards.*

Additional Reading - Books

1. The Big Thirst: The Secret Life and Turbulent Future of Water" by Charles Fishman
   - This book gives readers an in-depth look into the world of water, its significance in our lives, and the challenges of the future concerning it. An abridged version or selected chapters might be suitable for the target age group.
2. "A Long Walk to Water: Based on a True Story" by Linda Sue Park
   - This dual-narrative book combines the story of Salva Dut, a Sudanese boy who becomes one of the "Lost Boys" of Sudan due to civil war, with a fictional story of Nya, a girl facing challenges of water scarcity.
3. "Lifeline: The Story of the Atlantic Salmon" by Rosamond Richardson
   - A beautifully illustrated story of the life cycle of the Atlantic Salmon, it offers a detailed view of river habitats and emphasizes the importance of clean water for aquatic life.

Overseeing water quality is pivotal for ensuring the vitality of our ecosystems and human habitats. Advocacy for uncontaminated water is a shared responsibility. If you like the Streams of Hope Citizen ScienceActivity, check out these resources related to water quality, its relationship with human health, ecology, and inspiring stories of bravery and courage related to this precious resource.

Web Sites

4. "Water.org's Student Learning Resources https://water.org/our-impact/water-crisis/student-resources/
   - This website provides resources and information on the global water crisis, emphasizing the importance of clean water for health and human development.
5. WHO's Water, Sanitation, Hygiene, and Health https://www.who.int/water_sanitation_health/en/
   - Information on the essential role of water quality in health. It includes articles, data, and interactive resources focusing on sanitation and hygiene.
6. The Water Project: Stories https://thewaterproject.org/community/interest/stories
   - Personal stories and updates on water project impacts in sub-Saharan Africa. These stories often highlight individual and community bravery and resilience.

OFFICIAL LESSON / TECHNOLOGY

MAPPING MATTERS

MATERIALS REQUIRED:
1) Water quality test kits.
2) Tablets or smartphones with Google Maps and internet access for the Streams of Hope platform.
3) Note-taking materials.

Estimated Time: 3.5 hours.
Grade Level: 6-8
By integrating Google Maps and understanding coordinates, students appreciate the significance of their local waterways in a broader context. As they contribute to Streams of Hope, they become aware of the ripple effect of their findings on larger ecosystems. Through this activity, they not only grasp the importance of data but also the interconnectedness of our environment.

Standards Addressed:

- *Science (NGSS): MS-ESS3-3 (Human impacts on Earth systems), MS-ESS3-4 (Constructing explanations for Earth and human activity).*
- *Geography: 6.G.1.4 (Use maps and other geographic representations, tools, and technologies to acquire, process, and report information).*
- *Math: 6.SP.5 (Summarizing and interpreting data), 7.SP.1 (Using random sampling to draw inferences), 7.SP.2 (Drawing informal comparative inferences about two populations).*
- *Technology: 6-8.TT.1.6.b (Use technology to identify and explore complex systems and issues).*
- *Civics: 6.7.4, 8.2.7 (Understanding civic responsibilities and leadership roles related to environmental impacts and decisions).*

Activity Details:

1. Introduction and Briefing (30 min)
   - Brief overview of the Streams of Hope mission and the role of data in environmental science.
   - Quick tutorial on Google Maps and understanding coordinates.
2. Field Data Collection (45 min)
   - Students head to a predetermined local water source or use a virtual demonstration if necessary.
   - Using the water quality test kits, they collect and record initial data.
   - Students note down the coordinates of their location using Google Maps.
3. Data Analysis, Insights, and Implications (1 hour)
   - Compile water quality results into a class database.
   - Group discussion on data patterns, variations, and potential reasons.
   - Discuss how larger sample sizes can provide clearer insights and reduce the impact of outliers.
   - Reflect on how their local water quality could impact larger downstream ecosystems.
4. Data Entry and Connecting to a Bigger Picture (45 min)
   - Students input their data into the Streams of Hope platform, linking it to the exact coordinates of their location.
   - Identify the next major body of water downstream from their location using Google Maps.
   - Discuss potential impacts based on their findings and hypothesize what might happen downstream.
5. Wrap-up and Reflection (30 min)
   - Reiterate the importance of the role of citizen scientists.
   - Discuss potential real-world implications and the responsibilities of community leaders in using such data for decision-making.

Objective - By the end of this module, students will:

- Understand the significance of consistent data collection and its role in scientific research.
- Learn how to map and understand coordinates using Google Maps.
- Input their water quality data into the Streams of Hope platform, linking to specific geographic coordinates.
- Grasp the interconnectedness of water systems and the potential impact downstream.

Additional Reading

Books:

- "Data Detectives: The Role of Data in Science" by Michael A. Dispezio
  - Guides students through understanding data in a scientific context, with references to environmental applications.
- "Numbers Save the World: Using Data to Tackle the World's Biggest Challenges" by Laura K. Zimmermann
  - Presents an overview of how numbers and data are crucial in addressing global challenges, with several environmental cases.
- "How to Lie with Maps" by Mark Monmonier
  - Teaches students critical thinking and how data can be manipulated or misrepresented. Great for understanding the importance of accurate data representation.

Web sites

- USGS Data in Schools
  - https://www.usgs.gov/educational-resources/usgs-data-schools
  - Methods & strategies for the use of available data from the United States Geological Survey to incorporate & improve data literacy practices in the K-12 science classroom.
- TuvaLabs
  - Website Link
  - Offers real-world datasets and teaching materials designed to help students develop data literacy and critical thinking skills.
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By emphasizing consistent location-based data collection, students experience firsthand the critical nature of meticulous data gathering in the scientific process.

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