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STEWARDSHIP INITIATIVE

STORMWATER RUNOFF:
A Template for Place-Based Educators

How can we protect water quality by managing stormwater runoff?

Pandemic-Ready – With Options for Grades 4 -9

This document provides ideas to help you develop a place-based stewardship education project. It includes core ideas for any teacher as well as add-ons and extensions for teachers with some experience with place-based education. Some of the ideas are best for remote teaching and learning and some are for teachers with students physically in school. Use the ideas you like and that suit your classroom; make changes to improve fit and feasibility.

About Stormwater Runoff

Stormwater runoff carries fertilizer, pathogens, and surface pollutants like litter, road salt, and leaking automotive oil into waterways, where it harms the quality of water for people and wildlife. Every home, building, and roadway is a potential source of polluted stormwater runoff.

The Elements of Place-Based Stewardship Education

Place-based stewardship education (PBSE) uses the local community and environment as the basis for teaching and learning—a feature that may make it especially engaging for learners. The elements of a complete PBSE effort are shown below. In practice, learners may circle back or jump forward in this sequence, depending on their explorations.

Element #1: Scan the Community

PBSE is driven by environmental issues and opportunities in the local community. Ideally, students, teachers, and sometimes community partners work to co-create a project. When students have voice and choice throughout a project, the work is more relevant to them and they are more invested.

The first stage of any effort is to begin identifying and considering options for learning and stewardship action that are locally meaningful. There are many ways to raise students' awareness of environmental issues in their community whether you are working in school or teaching remote learners.

If students are learning online or from home, you can…

- Have students walk about their neighborhood or yard to identify environmental issues or concerns (or think about what they've seen there if it's not safe to walk about). Use a mapping exercise if desired.
- Invite local environmental organizations to present a list of local needs for consideration, or to "pitch" students on a project they need help with. Use your online platform for synchronous meetings, have partners write a "challenge letter" that outlines the needs they see that students could help address, or ask partners to make their pitch via video so you can stream it to students.
- If an online version exists, have students consult your community's master plan to see if it has a chapter on environmental concerns.

If learning is at school, you can…

- Walk about the school campus with students to identify potential issues or concerns.
- Invite local environmental organizations to come into the classroom to present a list of local needs for consideration, or to "pitch" students on a project they need help with.
- Have students review copies of the community master plan for environmental concerns and issues.
- Survey neighborhood residents about their environmental concerns and priorities in the neighborhood.

No matter how you're learning, students can…

- Review a list of local environmental needs generated for students in past years (if you have a previous history of place-based education in the community).
- Interview their parents, mentors, caregivers, or fellow students about perceived environmental challenges in the area (or conduct an online survey).

If your teaching circumstances may be changing unpredictably, bear in mind…

- Capturing suggestions from local environmental organizations in writing or via video may give you more flexibility; even if you plan on face-to-face meetings with your partner(s), get their agreement up front to write up suggested projects or make a video in the event of a school shutdown.
- If these organizations are helping you generate ideas, ask them to generate some that suit in-school teaching and others that are suited to learning at home.

Element #2: Choose Your Focal Issue

Often, you'll have a list of many local stewardship needs and ideas to choose from. Students can play an important role in making a selection, and teachers can help them choose wisely using tools such as Earth Force's criteria-based decision-making process. As part of the process of developing decision criteria, teachers should consider in advance, and include in materials for students, any of the following criteria they deem important:

- What types of issues connect well to our curriculum?
- What types of issues and concerns are developmentally appropriate for my students?
- What partners are available to help us?
- What are current teaching and learning conditions? Given the constraints and opportunities of my current and anticipated situation, what types of projects seem feasible?

Providing opportunities for democratic decision-making is possible no matter the situation:

If students are learning online or from home, you can…

- Collaborate to develop decision criteria using Jamboard, Mural, or similar online tools.
- Have students vote for an issue using a survey tool accessible through a mobile phone.

If learning is at school, you can…

- Have students use small-group processes for deliberation about the decision criteria.
- Have students rate the options under consideration using paper ballots or Chromebooks.

No matter how you're learning, students can…

- Use Google Sheets or Microsoft Excel to analyze digital data from a voting procedure.

If your teaching circumstances may be changing unpredictably, bear in mind….

- It may be helpful to document students' work products at school each day so progress isn't lost in case of a shutdown.
- Consider having students keep a project journal.

The remainder of this template assumes your community scan (element #1) and democratic decision-making process (element #2) have resulted in a focus on **stormwater**.

If you're interested in the GLSI's other templates for place-based stewardship education, contact your regional GLSI hub.

Element #3: Form Partnerships

Community partners can offer knowledge and expertise, historical and current data sets for students to analyze, direction on the type of action project best suited to your timeline and students, access to a field site, equipment, opportunities to publicize your work, a home for the data you collect, and opportunities for students to learn about careers related to natural resources.

Partners for a stormwater runoff effort could include your local watershed council or coalition; a regional, metropolitan, or local planning commission; a "Friends" group in your watershed; a county drain commissioner; your local Extension educator; a conservation district; or your city, township, village, or Tribal government. If your local waterway runs through a significant park system, the parks department may also be a good partner.

Although partnerships can be developed after an issue is chosen, they can also be developed as part of the process of choosing an issue for learning and action. Not every place-based stewardship education effort follows the six steps in the order listed in this template.

If students are learning online or from home, consider…

- Whether you engaged with partners to choose your stormwater focus or not, you can Invite local stormwater organizations to present a list of relevant local needs for consideration, or to "pitch" students on a stormwater project they need help with. Use your online platform for a live meeting over the Internet or ask partners to make their pitch via video or in writing so you can share it with students.

If learning is at school, consider…

- Invite local stormwater organizations to present a list of local stormwater-related needs for consideration, or to "pitch" students on a stormwater project they need help with. Prepare students for Q&A before the partners arrive.

No matter how you're learning, you can…

- Ask partners to write a "challenge letter" for students that provides an overview of a stormwater-related need in the community, what's at stake, and what is entailed in addressing the need.
- Have students research watershed groups in your area. A partial list of Michigan organizations is here: https://www.mi-wea.org/watershed_groups.php.
- You can identify and reach out to potential partners yourself; while student voice and involvement is valuable, it isn't always feasible to involve students in every decision. For pointers on connecting with a community partner, see p. 31 of Connecting Classrooms to the Community.

If your teaching circumstances may be changing unpredictably, bear in mind….

- Capturing partners' ideas in writing or via video may give you more flexibility; secure partners' commitment to these forms as a backup if you plan for face-to-face work
- If partners are helping you generate ideas, ask them to include some that suit in-school teaching and others that are suited to learning at home.

Element #4: Research the Issue in the Community

Before they can take action on stormwater runoff, students will need to build their knowledge and understanding of the specific harms it is causing locally and the solutions that could help.

If learning online or from home, students can…

- Observe runoff at a home site during and after rain events. Describe where water pools and for how long. Compare/contrast observations across locations to develop a general understanding of where water puddles, how long the puddles last, and the path taken by runoff.
- Collect empirical data on standing water by measuring and recording it to a common Google Sheets document, or by mapping it on My Maps.
- Map the path that rainfall takes from a home site to one of the Great Lakes and the ocean. Check to see which jurisdictions it travels through.
- Create a simplified DIY watershed model at home.
- Use the Yard Assessment Worksheet to calculate the amount of runoff a home site generates, and the degree to which existing features can absorb it.
- Use the Watershed Pollution Scavenger Hunt to identify potential problems associated with runoff at a home site; compile results to develop a community perspective.

If learning is at school, students can…

- Observe runoff at school during and after rain events. Describe where water pools and for how long, and the path taken by runoff.
- Collect empirical data on standing water on school grounds by measuring and recording it to a common Google Sheets document, or by mapping it on Google My Maps.
- Map the path taken by rainfall at school before it reaches the Great Lakes. Check to see which jurisdictions it travels through.
- Create a DIY watershed model as a group.
- Use the Yard Assessment Worksheet to calculate the amount of runoff coming from the school site and the degree to which existing features can absorb it.
- Use the Watershed Pollution Scavenger Hunt to identify the community's problem areas related to water pollution.
- Do water quality testing as a field experience at a local stream or river.

No matter how you're learning, students can…

- Work in small groups (connecting by phone, email, text, or Teams or other online platforms supported in your district, or face-to-face if in school) for small online research efforts around a topic related to stormwater runoff.
- Consider regional rainfall data for storm events that occur during the project period; compare current rainfall amounts/patterns to historical data.
- Explore watershed data with the Model My Watershed tool.
- Explore your local waterway's condition using EPA's "How's my waterway?" tool.
- View a general introduction to the role of green infrastructure.
- Explore practices applicable to various residential environments or school grounds: rain gardens, rain barrels, revegetation, mowing practices, grading, managing clippings and leaves, pet waste, and care in use of fertilizers, soaps, and chemicals in areas subject to runoff.

If your teaching circumstances may be changing unpredictably, bear in mind….

- Observing patterns of runoff both at home and at school may be the safest strategy as it allows work to continue even if the location of schooling changes.
- If you engage in water quality testing, videotape it for sharing with students who are unable to participate because they are learning from home (or for classes who may not get to the field site).

Element #5: Carry Out an Action Project

Depending on where you're teaching and learning and the degree to which students have access to reliable Internet service, action projects might be individual projects, small group projects, or full group projects.

If learning online or from home, students can…

- Identify stormwater issues on their home site, the best management practices (BMPs) recommended for the home site, and the potential benefits to water quality. Make a presentation or write a letter with recommendations to local parties (parents, caretakers, building managers, homeowners association).
- Implement one or more BMPs at home with the help and permission of parents, mentors, and/or caretakers; present a set of videos or photos showing the before-and-after landscape.

If learning is at school, students can…

- Install rain barrels or rain gardens at school. Connect with partners (local nurseries, landscapers, native plants specialists, school grounds staff) for advice on what to plant and how to maintain it.
- Repair eroded sections of land at school or a chosen field site. Always have students seek permission through proper channels before altering school grounds, and check with other stakeholders (other students, for example).
- Personally present recommendations for stormwater management on publicly owned properties (based on class observations) to the local municipality.
- Personally present recommendations for stormwater management on the school campus to the buildings and grounds department.

No matter how you're learning, students can…

- Write letters requesting action on stormwater management and present their findings to substantiate their requests.
- Develop an outreach and education campaign relating to residential BMPs for stormwater runoff (e.g., a video with social-media distribution with a hashtag; an article in a community or school newsletter) and track its reach. If needed, connect with a local journalist or marketing firm for help with effective social or print media.
- Generate maps (either hand drawn or developed using online technologies like My Maps): a "before" map of issues and challenges and an "after' map indicating what solutions were or should be installed (and where). This could be part of a broader plan to share recommendations with others.

If your teaching circumstances may be changing unpredictably, bear in mind….

- Civic/social outreach is always a possibility as local elected bodies are continuing to meet over the Internet even in lockdown conditions
- Offering choice and flexibility will increase student engagement and reduce barriers associated with students' specific situations

Element #6: Share Knowledge and Celebrate

Every PBSE effort should include some method by which students communicate about what they've learned and what they've done to enhance the community. Sharing and celebrating may be a particular challenge during the pandemic due to safety concerns about gathering in groups.

If in phases 1-4 of the MI Safe Start Plan, consider…

- Compile video, photographs, presentations, and other visual artifacts into a YouTube video, Google Slides presentation, digital story, or My Maps compilation.
- Students can create a podcast that tells the story of stormwater in the community, how they studied it, and their results.
- Host an online event at which students share their work and results.

If in phases 5 or 6 of the MI Safe Start Plan, consider…

- Having students present to the local municipal board or the school board (for campus-based recommendations).
- Hosting a community event with poster presentations or verbal presentations. Use social distancing and/or an outdoor venue if in phase 5.
- Participating in a larger event for multiple schools hosted by a GLSI hub

No matter how you're learning, students can…

- Distribute their outreach materials to all parents through the school's email system or newsletter or through social media.
- Distribute materials to governing bodies and participate in public meetings, which continue over video conferencing services even if face-to-face meetings are not possible.
- Publish a blog to share the story of their work and its impacts.
- If you meet synchronously, don't forget the celebration elements, such as online games.

If your teaching circumstances may be changing unpredictably, bear in mind….

- Opportunities for positive interactions with community audiences increase the educational value for students; if using prerecorded materials, consider how to gather positive feedback to relay to students, and how to screen out negative comments in an online environment .

Consider These Cross-Cutting Options for Exemplary Place-Based Education

Some elements of exemplary PBSE ripple throughout an effort.

- **Reflection** offers opportunities for students to clarify (and write about) their values relating to the environment. Prompts for a stormwater unit might include: "What would you be willing to pay to manage polluted stormwater runoff on your property?" "Should homeowners and other property owners privately pay the costs of on-site stormwater management? Why or why not?"
- **Quality assessments** do more than demonstrate that students have learned; they prompt students to develop their knowledge further. What types of authentic assessments can you use throughout this PBSE effort?
- **Building and district support** is essential to a sustained PBSE practice. How can you engage and inform administrators?

Pandemic Toolkit

Teaching in a pandemic can be aided with selected technologies for collaboration and decision-making. The following tools are recommended by the GLSI:

General Tools for your PBE journey:

- Connecting Classrooms to the Community is a comprehensive guide to place-based education with many lessons and activities.
- Criteria-Based Decision Making by Earth Force provides a method and tools for democratic decision-making around stewardship action projects
- Inspiration of Strategies for your Change in a Distance Learning Environment by Earth Force is a typology of action projects in remote teaching/learning
- Google My Maps is an easy-to-use mapping utility with numerous potential applications to stewardship learning
- Google Jamboard is a whiteboard useful for brainstorming online
- Trello is a project-management app with templates suitable for place-based project management
- "How Well Do You Know Your Place?" Questionnaire from the Lake Superior Stewardship Initiative is a Word download for kicking off your community explorations

Topical tools related to this challenge:

- Communities for Clean Water video series by WGVU and Groundswell, a GLSI hub
- Yard Assessment Worksheet
- Watershed Pollution Scavenger Hunt
- Social Distancing Stewardship in the Watershed from the Flint River Watershed Coalition contains resources and lessons for remote teaching and learning on water quality
- The NEEF Water Quality Backyard Activity Guide provides hands-on demonstrations of the water cycle and a homemade pH testing opportunity
- The Great Lakes Literacy Principles are essential knowledge for every citizen of the region
- The Climate Explorer models past and future precipitation (and other climate related variables) under varied scenarios

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See the full text of our Guiding Principles

greatlakesstewardship.org

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GUIDING PRINCIPLES FOR EXEMPLARY PLACE-BASED STEWARDSHIP

1. Situate environmental learning and stewardship in the places students live, grow, and play.
2. Equip students to understand how all humans, in various ways, affect and are affected by the natural environment, and that the community's environmental resources, laws, beliefs, and perspectives influence and are influenced by broader physical and social systems.
3. Build your place-based stewardship education effort out of rigorous experiential learning, support it with appropriate teaching practices, and integrate it into your local educational system.
4. Cultivate collaborative, mutually beneficial school-community partnerships.
5. Explore local environmental issues over a period of weeks or months, with sufficient time for all parts of the inquiry cycle and relationship development, and offer opportunities to repeat the process over the years of schooling.
6. Deliver meaningful benefits to the local environment and the community.
7. Cultivate student voice and involve students in democratic practices throughout the course of a place-based stewardship effort.
8. Use deliberate processes to identify and consider multiple perspectives regarding a stewardship issue or project.
9. Incorporate opportunities for students to develop and clarify their personal values related to nature and community, and to develop the social competencies essential to stewardship.
10. Support and enable the visible, meaningful participation of students in the community's public discourse.