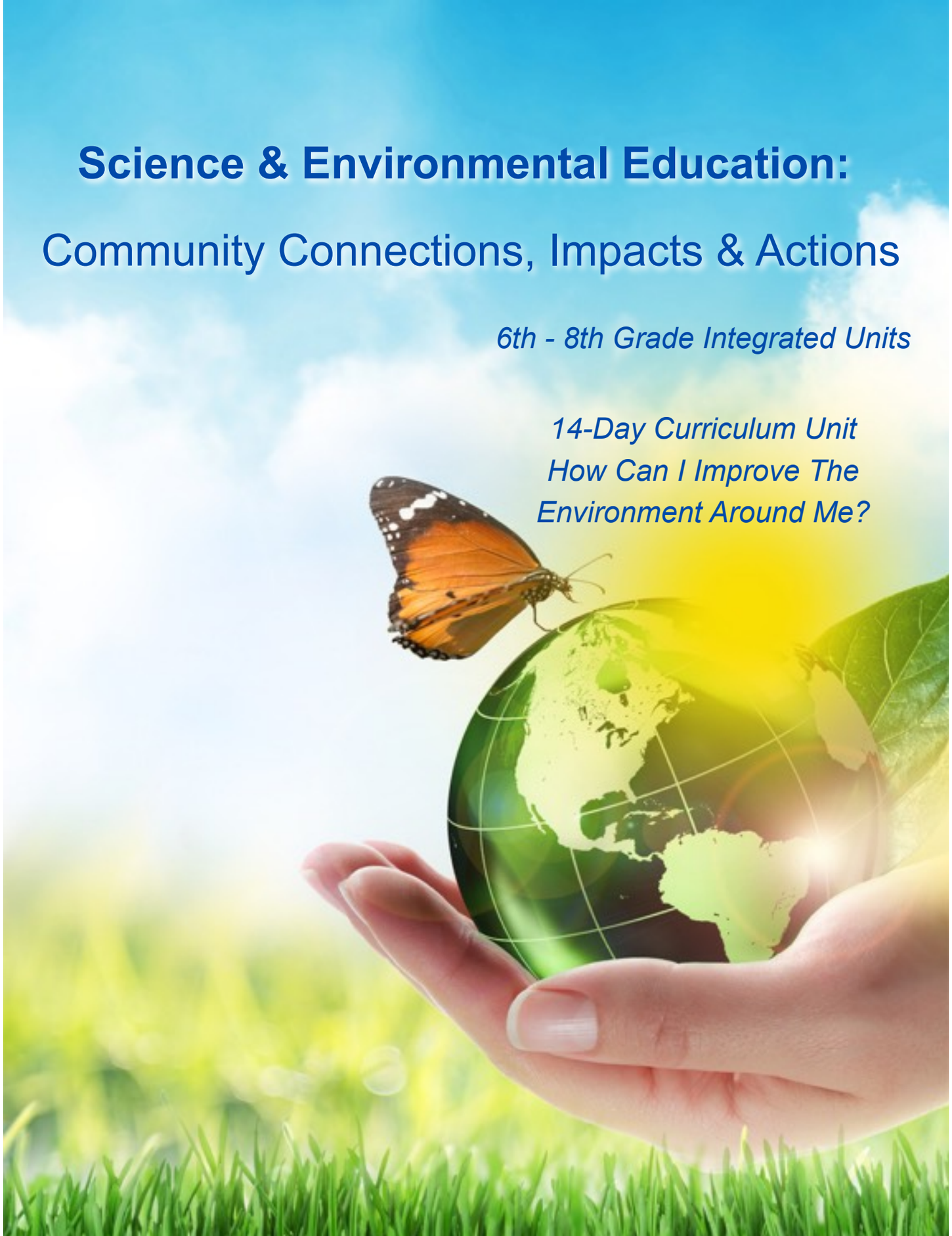
Science & Environmental Education:

Community Connections, Impacts & Actions

6th - 8th Grade Integrated Units

14-Day Curriculum Unit
How Can I Improve The Environment Around Me?



Purpose of ENVIRONMENTAL EDUCATION

Environmental education is a lifelong learning process that leads to an informed and involved citizenry having the creative problem-solving skills, scientific and social literacy, ethical awareness and sensitivity for the relationship between humans and the environment, and commitment to engage in responsible individual and cooperative actions.

By these actions, environmentally literate citizens will help ensure an ecologically and economically sustainable environment.

Unit Shell Overview

The following 14 day integrated unit walks students through an inquiry investigation about an environmental issue and the problems associated with it. Students then develop a citizen action project and create storytelling media to share what they have learned and done.

Three different topics are available with lesson plans in this curriculum: recycling, stormwater, and animal adaptations. However, the unit can be applied to any of the Community Connections, Impacts & Actions Middle School Field Experiences with very little modification.

Each lesson has a suggested structure with room for teachers to infuse more discussions, videos, or work time, as well as adjust pacing as makes sense for their class. In addition to science content tied to the Next Generation Science Standards, content connects to the National Council for Social Studies C3 Framework, Wisconsin Environmental Education Standards, and Career Standards.

Standards

This integrated unit uses NGSS Performance Expectations, NCSS C3 Framework, and career readiness standards as the backbone to planning and infusing environmental education into curriculum.

	NGSS Performance Expectations	Wisconsin EE	NCSS C3 Framework	Career Readiness
Recycling	MS.PS.1-3 MS.ESS.3-4 MS.ETS.1-2	ELS.EX5	D1.1 & D1.4 D2.Civ. 2 D2.Civ.6 D4.2 D4.8	Dept of Labor Youth Competencies • Communication • Enthusiasm & Attitude • Teamwork • Networking • Professionalism • Problem Solving & Critical Thinking
Water Comparisons	MS.LS.2-1 MS.ESS.3-3 MS.ETS.1-2	ELS.EN7		
Survival and Adaptations	MS.LS.4-4 MS.ESS.3-3 MS.ETS.1-2	ELS.EX2		

Unit Outline

This unit is based on 14 classroom days of 50 minutes. Each lesson has a suggested structure with room for teachers to infuse more discussions, videos, or work time, as well as adjust pacing as makes sense for their class.

Day 1: What will I be learning about in this unit and why does it matter?

Day 2: What do I understand about this issue and what can I learn?

Day 3: What government agencies work on this issue and what resources do they have?

Day 4: Field Experience

Day 5: What does our data tell us and are there any best management practices?

Day 6: How can I make sound decisions about a course of action?

Day 7: What is the role of citizens in a democracy in addressing this environmental issue? What type of actions could we use to advance our decision?

Day 8: What tasks and actions must be taken to complete our project?

Day 9: What is my environmental impact story and how can I best share it with others?

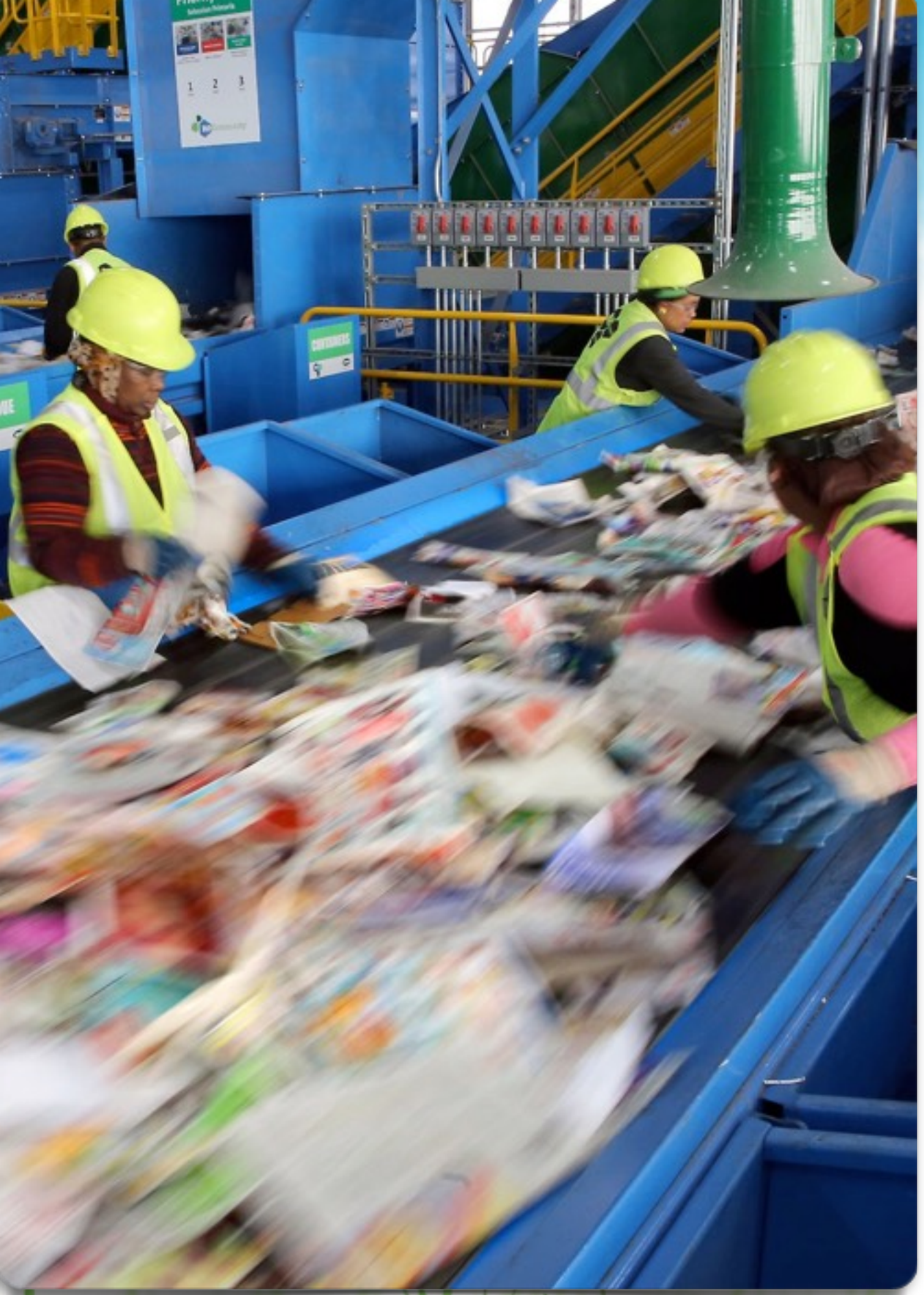
Day 10: What is my environmental impact story and how can I best narrate it for others?

Day 11: Can I give input to assist others in their storytelling?

Day 12: What media platform can I use to most effectively tell my environmental impact story?

Day 13: Is a career working with this issue interesting to me and how can I be prepared for it?

Day 14: What is the most useful thing I learned from this unit and how can I apply it to my life?



Before You Start: Recycling

Recycling reduces waste, conserves natural resources, and creates jobs, and in Wisconsin it's also the law. Recycling correctly makes sure that the entire system works well to sustain a circular economy.

This 14 day curriculum walks the students through an inquiry investigation into synthetic and natural resources, the recycling system, and the ways that system can be improved. Students will participate in classroom lessons, a field experience, and data analysis to learn about natural resources and recycling, and then select one way to help improve the quality of recyclables collected in their community. Students will develop a citizen action project and create storytelling media to share what they have learned.

In this book you will find a lesson plan for each day as well as a student journal and a PowerPoint to help students focus and reflect on their learning experience. Before you start this curriculum, there are two days that will need to be planned ahead: the field trip on Day 4 and the expert panel on Day 13. In the lesson plans for these days there are resources listed for how and where to plan the field trip as well as suggestions for experts to invite for the panel. You may wish to include some extra work days within this curriculum as needed. Just keep in mind that extra work days will change your calendar and you may need to adjust the date of the expert panel.

While this curriculum has students plan a project that could improve local recycling quality (i.e., clearly labeling school recycling and trash bins), the actual implementation is not scheduled into the curriculum and may be done optionally by a club, small group, or as a class at the end of the school year. Support may be available to Waukesha County Schools in the form of technical assistance at no cost. Please inquire at recycling@waukeshacounty.gov for more information.

Before You Start: Water Comparisons

Introduction: Water surrounds us in Southeastern Wisconsin, providing opportunities for both industry and recreation. While many of the areas in the world have water scarcity issues, we have an abundance. With this valuable resource, also comes great responsibility. Protecting the health of our waterways is key to their continued use. One of the primary ways we can all protect water is by ensuring stormwater runoff is not polluting our water resources.

This 14 day curriculum walks the students through an inquiry investigation into stormwater runoff and both the problems and possible solutions associated with it. Students will participate in classroom lessons, a field experience, and data analysis to learn about the issue, and then select one solution to help improve local water quality. They develop a citizen action project and create storytelling media to share what they have learned.

In this book you will find a lesson plan for each day as well as a student journal and a PowerPoint to help students focus and reflect on their learning experience. Before you start this curriculum, there are two days that will need to be planned ahead: the field trip on Day 4 and the expert panel on Day 13. In the lesson plans for these days, there are resources listed for how and where to plan the field trip as well as suggestions for experts to invite for the panel. You may wish to include some extra work days within this curriculum as needed. Just keep in mind that extra work days will change your calendar and you may need to adjust the date of the expert panel.

While this curriculum has students plan a project that could improve the local water quality (i.e. planting a raingarden), the actual implementation is not scheduled into the curriculum and may be done optionally by a club, small group, or as a class at the end of the school year. Support may be available to Waukesha County Schools in the form of technical assistance or by providing native plants at no cost. For more information, please inquire at water@waukeshacounty.gov.

Before You Start: Survival in the Prairie

Biodiversity encompasses genetic, species and ecosystem diversity and includes all life on Earth. Biodiversity is important to most aspects of human life as it provides critical resources and services such as food, shelter, medicine, seed dispersal, climate regulation and nutrient cycling to name a few. Direct threats to biodiversity include unsustainable resource use, invasive species, pollution, climate change and habitat loss and fragmentation. The more we understand the components of biodiversity the more we can examine our actions to help ensure the survival of species and their habitats in our own backyard and around the world.

This 14 day curriculum walks the students through an inquiry investigation into biodiversity. Students will participate in classroom lessons, a field experience, and data analysis to learn about the importance of biodiversity and threats to it, and then select one solution to help protect and preserve biodiversity. They develop a citizen action project and create storytelling media to share what they have learned.

In this book you will find a lesson plan for each day as well as a student journal and a PowerPoint to help students focus and reflect on their learning experience. Before you start this curriculum, there are two days that will need to be planned ahead: the field trip on Day 4 and the expert panel on Day 13. In the lesson plans for these days there are resources listed for how and where to plan the field trip as well as suggestions for experts to invite for the panel. You may wish to include some extra work days within this curriculum as needed. Just keep in mind that extra work days will change your calendar and you may need to adjust the date of the expert panel.

While this curriculum has students plan a project that could spotlight biodiversity or improve local biodiversity (i.e. hosting a bioblitz or native plant outreach), the actual implementation is not scheduled into the curriculum and may be done optionally by a club, small group, or as a class at the end of the school year. Support may be available to Waukesha County Schools in the form of technical assistance and may be eligible for native plants at no cost. Please inquire at retzer@waukeshacounty.gov for more information.

Day
1

In this lesson students will be introduced to the main concepts of the unit and interpret learning standards for the unit in order to clarify learning expectations.

Guiding Question: What will I be learning about in this unit and why does it matter?

Hook Activity: Complete this engaging activity to demonstrate the impact of the environmental topic. Activities vary based on topic and include a video of a landfill operation, a look at how much water we really can use on Earth, and exploring the concepts of plant and animal survival and adaptation.

Student Journal: Complete the unit pre-assessment.

Unpacking the Standards: Students read a standard to identify the knowledge and skills they will need in this unit.

Student Journal and Closure: Students answer the daily guiding question in their journal, review it as a class, and preview the next class topic.

Recycling Lesson Plan

Stormwater Lesson Plan

Biodiversity Lesson Plan

Day
2

In this lesson students will be introduced to inquiry learning concepts and will then create a classroom KWL chart for use during the unit. A classroom activity will begin to build background knowledge.

Guiding Question: What do I understand about this issue and what can I learn?

Inquiry Overview: Watch a video of students engaged in inquiry based learning and discuss inquiry questions to guide the class learning in this unit.

KWL Chart: Complete a KWL chart based on the identified inquiry questions.

Guest Speaker Activity: Activities vary based on unit topic and include analyzing what is recyclable in our community, exploring a watershed using a model, and learning about prairie care through controlled burns. Resources for booking a topic-appropriate speaker are embedded in each lesson plan.

Student Journal and Closure: Students answer the daily guiding question in their journal, review it as a class, and preview the next class topic.

Recycling Lesson Plan

Stormwater Lesson Plan

Biodiversity Lesson Plan

Day
3

In this lesson students will be introduced to how government agencies work with the environment and will learn more about the topic with some pre-fieldwork activities.

Guiding Question: What government agencies work to protect the environment and what resources do they have?

Introduction to Government Agencies: Students will be introduced to local, state, and national government agencies and their role in protecting the environment.

Activity: Complete an activity to prepare for the upcoming field experience.

Closure and Field Trip Prep: Students answer the daily guiding question in their journal, review it as a class, and prepare for the next day's field trip.

Recycling Lesson Plan

Stormwater Lesson Plan

Biodiversity Lesson Plan

Day 4

Students will participate in a field experience to gather data ranging from a half to a full day field-trip.

Guiding Question: How can we reduce the impact of our choices on the environment?

Field Experience: Students will have the opportunity to tour the City of Milwaukee/Waukesha County Materials Recovery Facility (MRF), go to two sites to collect water data, or visit different ecosystems at Retzer Nature Center to gather data about animal and plant adaptations based on the selected modular curriculum unit.

Student Journal: Students will fill in their journal with their impressions of what they saw and learned on the field trip.

Recycling Lesson Plan

Stormwater Lesson Plan

Biodiversity Lesson Plan

Day
5

In this lesson students will be introduced to data analysis to reflect on the previous field experience. This data is used in different ways, with one module beginning to brainstorm creative, data-driven solutions while two modules learn how additional data is collected through citizen science and the important role it plays in assessing the environment and our impacts.

Guiding Question: What does the data from our field experience tell us and are there ways to help solve the problems that face this issue in our community?

Activity: Work in small groups to synthesize information gathered in the field. Students in the Recycling module may begin brainstorming possible solutions and project topic ideas while Water Comparison and Survival module students will also learn about Citizen Science.

Data Analysis and Life Skills: Students will be introduced to data collection and using it for comparisons to help the environment. Students will also discuss how to work together to solve problems and what to do when a team member causes the team to be less productive.

Student Journal and Closure: Students answer the daily guiding question in their journal, review it as a class, and preview the next class topic.

Recycling Lesson Plan

Stormwater Lesson Plan

Biodiversity Lesson Plan

Day
6

Stormwater and biodiversity modules will brainstorm creative, data-driven solutions to their environmental issue while the recycling module learns how additional data is collected through citizen science. Students in all modules will be introduced to using a decision matrix as a scientific tool to aid in decision making.

Guiding Question: What actions can be taken to improve this issue and how can I make sound decisions on a course of action?

Activity: Students in Recycling will learn about the importance of citizen science, how one can become a citizen scientist, and ways these data from citizen scientists is being used from a PowerPoint presentation. Students in the Water Comparison and Survival modules will brainstorm possible solutions.

Decision Matrix: As a class, brainstorm possible solutions for the environmental problem & criteria by which to evaluate them. This will be the beginning of the Decision Matrix.

Student Journal and Closure: Students answer the daily guiding question in their journal, review it as a class, and preview the next class topic.

Recycling Lesson Plan

Stormwater Lesson Plan

Biodiversity Lesson Plan

Day 7

In this lesson students will complete their decision matrix in small groups and select a final project based on the matrix. Students will learn how to address problems in society using A.G.E.N.T.S. and if their project fits the A.G.E.N.T.S. scheme.

Guiding Question: What is the role of citizens in a democracy in addressing the problems of this issue properly? What types of actions could we use for our selected solution?

Complete Decision Matrix: Students will complete the decision matrix and decide on a solution or Best Management Practice to address this topic. This can be done as a whole class, in small groups, or individually based on how many different project topics you would like students to be working on for the duration of the unit.

AGENT Action: Discuss the role of citizens in a democracy in addressing these problems. Introduce the A.G.E.N.T.S. scheme to students and have students identify different projects to promote their solution.

Student Journal and Closure: Students answer the daily guiding question in their journal, review it as a class, and preview the next class topic.

Recycling Lesson Plan

Stormwater Lesson Plan

Biodiversity Lesson Plan

Days 8 & 9

In these lessons students will learn how to use a project charter as part of project management and the art of storytelling by creating their own storyboards for their project.

DAY 8: **Guiding Question:** What tasks and actions must be taken to complete our project?

Project Charters: Introduce students to project management and how to develop a project charter to manage a project.

Teamwork Discussion: In their small group, students will learn about the many “personality shapes” that can form a balanced, cohesive team.

Work Time: Students will have small group work time to complete a project charter.

Student Journal and Closure: Students answer the daily guiding question in their journal, review it as a class, and preview the next class topic.

DAY 9: **Guiding Question:** What is my environmental impact story and how can I best share it with others?

Storytelling: Students learn about six components of storytelling and how to create a storyboard to make their personal environmental impact **story more effective.**

Work time: Students begin formulating their environmental impact story.

Student Journal and Closure: Students answer the daily guiding question in their journal, review it as a class, and preview the next class topic.

Recycling	Stormwater	Biodiversity
Lesson Plan 8	Lesson Plan 8	Lesson Plan 8
Lesson Plan 9	Lesson Plan 9	Lesson Plan 9

Days 10&11

In these lessons students will learn public speaking tips and how to use storytelling as a form of speaking. Students will also learn how to effectively provide and receive feedback by presenting their storyboards.

Day 10: Guiding Question: What is my environmental impact story and how can I best narrate it for others?

Public Speaking: Introduce students to public speaking and review public speaking tips.

Life Skill Discussion: Discuss stereotypes in the workforce and how people from many different people can work together on the same goal.

Work time: In their small group, students will review their graphic organizer from the previous workday and work on developing a narrative to accompany the graphics they have selected.

Student Journal and Closure: Students answer the daily guiding question in their journal, review it as a class, and preview the next class topic.

Day 11: Guiding Question: Can I give input to assist others in their storytelling journey?

Life Skill Discussion: Prior to presenting their storyboards, discuss the difference between praise, criticism, and feedback and how people respond differently to each.

Peer Review of Storyboard Presentations: Small groups should present their storyboards to peers for review. Peers should provide feedback, not criticism on the proposed storyboards.

Editing Work Time: Using peer review, students make edits to their final product.

Student Journal and Closure: Students answer the daily guiding question in their journal, review it as a class, and preview the next class topic.

Recycling	Stormwater	Biodiversity
Lesson Plan 10	Lesson Plan 10	Lesson Plan 10
Lesson Plan 11	Lesson Plan 11	Lesson Plan 11

Days 12&13

In these lessons students put together their final storytelling product and prepare for an expert panel by discussing their communication styles. Students will have the opportunity to receive feedback from experts and learn about the importance of networking when job searching.

Day 12: Guiding Question: With what media platform can I most effectively tell my environmental impact story?

Storytelling Final Product: Using peer review from the previous class, students use work time to put everything together.

Prepare for Expert Panel: In groups, students discuss how they communicate with different sets of people (i.e., family, friends, professional/ school).

Student Journal and Closure: Students answer the daily guiding question in their journal, review it as a class, and preview the next class topic.

Day 13: Guiding Question: Is a career working with science interesting to me and how can I be prepared for it? What skills did I use in my storytelling that will be useful in any career?

Expert Panel: Introduce experts and have them share about their careers. As a group, students and experts will watch storytelling presentations and allow for feedback from experts and peers.

Networking Discussion: Discuss the importance of networking when looking for a job. Also discuss the time and commitment involved in the “active” process of networking to develop new relationships and new opportunities.

Student Journal and Closure: Students answer the daily guiding question in their journal, review it as a class, and preview the next class topic.

Recycling	Stormwater	Biodiversity
Lesson Plan 12	Lesson Plan 12	Lesson Plan 12
Lesson Plan 13	Lesson Plan 13	Lesson Plan 13

Day
14

In this lesson students will reflect on this unit, the project they made, the lessons they learned, the activities they did, and complete the post assessment.

Guiding Question: What is the most useful thing I learned from this unit and how can I apply it to my life?

Content Reflection: Using the KWL chart created in Lesson 2, students will reflect on the activities they did and the project they made.

Content Assessment: Using the rubric that was created in Lesson 1, students will complete the post assessment in their journals.

Life Skills Reflection and Assessment: Consider giving special recognition for each life skill highlighted in the curriculum. Have a discussion with the students about screening job candidates on the web.

Recycling Lesson Plan

Stormwater Lesson Plan

Biodiversity Lesson Plan

Additional Resources

[Recycling Curriculum PowerPoint]

[Recycling Student Journal]

[Stormwater Curriculum PowerPoint]

[Stormwater Student Journal]

[Biodiversity Curriculum PowerPoint]

[Biodiversity Student Journal]

[Rain Garden Addendum]

3 Cooperative Locations:

Retzer Nature Center is over 450 acres of prairie, forest, wildlife habitat, nature trails and environmental learning facilities in Waukesha County.
The state-of-the-art, 90-seat, Digistar-6 planetarium is owned and operated by the School District of Waukesha.

Carroll University's Prairie Springs Environmental Education Center and Greene Field Station are located in the Town of Genesee, about 10 miles from the University's main campus in Waukesha. The site includes a stunning new facility for teaching and research—as well as 75 acres of natural springs, wetlands, woodlands and grasslands along Genesee Creek.

The E.B. Shurts building, located in the Fox River Sanctuary, is home to the environmental education program of the School District of Waukesha. The building is operated through a cooperative agreement between the School District of Waukesha and the City of Waukesha, Park and Recreation Department.

Waukesha County, Waukesha School District, and Carroll University have collaborated to create a comprehensive, interdisciplinary K-12 science and environmental education curriculum fully integrated with NGSS Science and Literacy standards.

The goal of this curriculum is to create more scientifically and environmentally literate citizens with the ability to understand and critically assess current scientific and environmental issues, along with a desire and ability to engage in these issues. This project focuses on improving efficiencies through program coordination among partners as well as building comprehensive approaches.

Curriculum development assistance was provided by Susan Root, PhD