



# Environmental Lesson Plans

## For use with *Decoding the Driftless*



Developed by Sustainable Driftless, Inc.

George Howe, Co-Producer & Jan Wee, Education Outreach

For use with award winning *Decoding the Driftless* Film Documentary





## Notes to Educators

Thank you for your interest in integrating our environmental education film documentary into your learning environment.

Our highly awarded film and lessons are being made available to you and your students freely because we believe in the importance of understanding and protecting the **Driftless Region** of Wisconsin, Minnesota, Iowa, and Illinois.

Our film tells the captivating story of this uniquely beautiful region which is the home to one of the largest migratory flyways in the world, the Upper Mississippi River watershed, precious and rare ecosystems including bluff prairies, underground rivers, and sacred Native American grounds. Our hope is for your students and your community of learners to develop a strong *sense of value and place* as well as become stewards and protectors of this important resource.

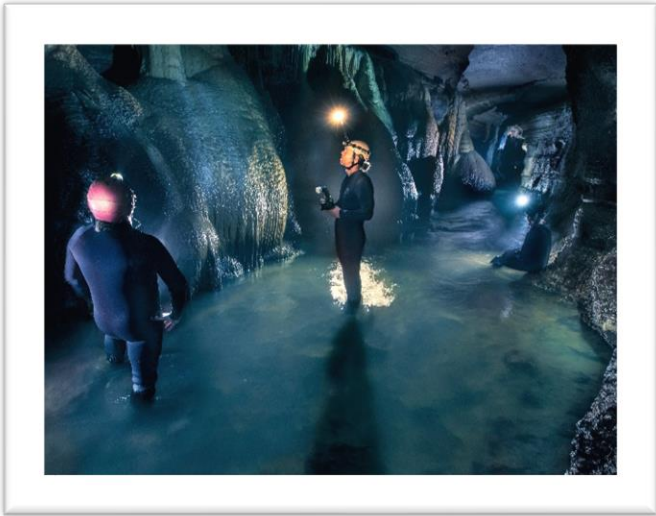
These six lessons have been created as a starting point for learning about the **Driftless Region** and the many treasures it holds. Each lesson is correlated to specific film segments and aligned with national standards. Please adapt these lessons to the grade level and curriculum as appropriate. We deeply value your feedback and suggestions.

Please contact [SustainableDriftless.outreach@gmail.com](mailto:SustainableDriftless.outreach@gmail.com) with your comments, questions, and suggestions for expanding our educational outreach.

George Howe, Co-Producer and Vice-President, Sustainable Driftless, Inc.

Jan Wee, Education Outreach Coordinator





# Lesson 1

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**Lesson 1: *Uniquely Driftless*: Environmental Lesson Plan** for use with *Decoding the Driftless* Film

*This guide corresponds to film clip segments and is freely provided to all educators integrating this film into learning. Modify as appropriate to grade level and needs of students. Feedback welcome! See footer.*

Film clip	Start  0:00:00	End  0:10:01
<b>Focus concepts</b>		
<ul style="list-style-type: none"> <li>• Uniqueness of the Driftless Region</li> <li>• Location and features of the Driftless Region</li> <li>• Changes in the natural landscape and environment over time</li> <li>• Earth’s history</li> <li>• Story in the rock layers</li> </ul>		
<b>Key vocabulary terms</b>		
glacial drift continental glacier continental drift glacial ice glacial periods or Ice Ages geology geologic calendar geologic time sub-tropical ocean	sedimentary rock: sandstone, limestone, dolomite, shale sedimentary rock layer cake landscape natural process weathering fossils: gastropod; maclurites, bivalves, seashells, artifacts: arrowheads, pottery.	
<b>Objectives</b>		
Students will be able to: <ol style="list-style-type: none"> <li>1. Identify the general location on a map and list and describe the unique features of the Driftless Region.</li> <li>2. Explain how rock layers and fossils help us understand the geologic history of this region</li> <li>3. Explain the theory of continental drift and its role in shaping the Driftless Region as we see it today.</li> </ol>		



4. Distinguish the natural forces that shaped the bluffs & river valleys of the Driftless Region vs. the forces that shaped the area and the surrounding region.

## Discussion

After viewing the film discuss the following:

1. What does it mean to “**decode?**” Why do you think this film is named “**Decoding the Driftless?**” *Decode means to translate or interpret. It was difficult to interpret the geologic events that shaped the Driftless Region until over time more scientific research helped identify events that shaped the land.*
2. Describe something *new or surprising* that you learned about the Driftless Region that has been “*decoded*” by watching this segment. *Students might be surprised to learn of the many sinkholes and caves found in the Driftless Region. They may also be surprised to learn sedimentary rocks were formed by sediment deposited during times when oceans covered the land and our continent was located nearer to the equator.*
3. Have students think about the places they have visited in their state and list the land features seen.

### **Examples**

**Wisconsin:** Wildcat Mountain; Devil’s Lake & Baraboo Hills; Rib Mountain; Wisconsin Dells & the Wisconsin River. **Minnesota:** Vinegar Ridge (Money Creek Forest); scenic bluffs along Mississippi River; Niagra Cave near Harmony; Eagle Mountain in northern Cook County; sinkholes of Fountain. **Iowa:** Loess Hills in western Iowa; Effigy Mounds National Monument near Harpers Ferry; Broken Kettle Grasslands Preserve in Plymouth County; Crystal Lake Cave in Dubuque; Ice Cave Hill Park near Decorah. **Illinois:** Charles Mound near Galena; Apple River Canyon State Park; Mississippi Palisades State Park (Savanna). Hicks Dome in Hardin County.

Which ones are part of the Driftless Region? How were these features formed?  
Answers depend on student input.

4. Brainstorm a list of the tools or resources needed to “decode” the history of a region. Hint: Think about the resources you saw used in the film. *Topographic and LIDAR maps, rock samples, fossil identification guide, soil samples, satellite, or aerial images, etc.*



## Activities

**Disclaimer:** *The activities provided are links and resources intended to be a starting point for use in the classroom and are by no means comprehensive or aligned to a particular region of the Driftless Area.*

*Please seek out local experts and resources to enhance student learning experiences.*

Suggested activities are found online and provide teacher support materials.

### Activity 1. Ice Age Geology - Glacial ice flow

This activity utilizes materials provided by UW- Extension

<https://wgnhs.wisc.edu/wisconsin-geology/ice-age/> and the UW-Extension 3D Map M504 Wisconsin Geology map (<https://wgnhs.wisc.edu/pubs/000958/>) and focuses on the glacial history of Wisconsin.

1. Provide small groups of 2-3 students with a copy of the 3DMap M504 Wisconsin Geology. *This map is included in the Google Drive download folder and a link is noted above.*
2. Based on the glacial ice flow graphics seen in the film have them draw the major ice lobes that surrounded the Driftless Region.

Lake Michigan Lobe  
Green Bay Lobe  
Superior Lobe

*Note: You may wish to have students view this helpful YouTube video by UW-Extension showing the ice margin positions.*

Wisconsin Ice-Margin Positions (Laurentide Ice Sheet)

<https://www.youtube.com/watch?v=rq90Qv0-tbo>

1. What factors can impact the rate of flow of continental glaciers? *Overall climate including periods of freezing and thawing; thickness of glacial ice; temperature at base of the glacier; surface features of the land (mountains, valleys, rivers, hills, etc.)*
2. Identify the forces or land features that prevented the continental glacier from affecting the Driftless Region during the last Ice Age 11,000-31,500 years ago? *The Lake Michigan and Lake Superior depressions directed the movement of the ice flows into lobes.*



## Activity 2 - Rocks and Fossils Tell the Story

This activity focuses on understanding how rocks are formed and how to interpret the history of an area based on rock layers.

1. View this Bill Nye Rock Cycle video (or another appropriate video on rock formation)  
[https://www.youtube.com/watch?v=BsIHV\\_voMk](https://www.youtube.com/watch?v=BsIHV_voMk)
2. Discuss the *three different types of rocks* - Igneous, Sedimentary and Metamorphic and how they form.

What types of rock layers are found in your area?

What can you tell about your region's history based on knowing the type of rock found there?

3. Wisconsin specific\*

Provide student groups a copy of the UW-Extension poster M502 Wisconsin's Geologic Past. This map is included in the Google Drive folder but is freely available online at <https://wgnhs.uwex.edu/pubs/m502/>

Lead a discussion on the age of Wisconsin rocks and the story these rocks tell.

- a. Where are the oldest rocks found? Why might this be the case? *Northern 1/3rd of Wisconsin*
- b. Is it likely that you will find fossils in the northern and central part of Wisconsin? *No. The rock outcrops are igneous and metamorphic. What types of rocks contain fossils? Sedimentary*
- c. Have students view the cross-section graphic from La Crosse to Milwaukee. What can you tell from this 3-dimensional view that you can't from the poster? *The relative elevation of land features.*
- d. Using the Wisconsin's Geologic Past downloadable poster have students create a historic chronology of the events that shaped Wisconsin.
- e. Discuss the events shaping Wisconsin's rocks today. Have there been any events within the past couple hundred years significantly impacting the landscape?



Additional Driftless Region geology resources

**\*Minnesota specific geology resource**

<https://www.mnqs.umn.edu/Education/edmatrls.htm> including student worksheet

**\*Iowa specific geology resource**

<http://www.iowapbs.org/iowalandandsky/story/31926/lessons-landscape-introduction-iowa%E2%80%99s-geology>

**\*Illinois specific geology resource**

<https://www.youtube.com/watch?v=3l-qoCRvL08> and  
<https://www.youtube.com/watch?v=Xj2GOAjLU6g&list=PL6XF93wsrAWq3HsCY49Eez5kZse0veNUT>

**Activity 3: Continental Drift: What is the big idea?**

PBS Learning Media Lesson . This is an interactive lesson designed for grades 5-8.

<https://wisconsin.pbslearningmedia.org/resource/midlit10.splwegener/continental-drift-whats-the-big-idea/support-materials/> and support materials <https://bit.ly/3boUdx6>

*Description from the WGBH web site: students learn how the theory that explains the position of Earth's continents was established and later modified. Students develop their literacy skills as they explore a science focus on how the scientific community operates. During this process, they read informational text, learn and practice vocabulary words, and explore content through a video and interactive activities. This resource is part of the Inspiring Middle School Literacy Collection.*

**Next Gen National Science Standards**

**NextGen Science Standards** <https://ngss.nsta.org/AccessStandardsByTopic.aspx>

Students who demonstrate understanding can:

4-ESS1-1. Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.

4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth's features





MS-ESS1-4. Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.

MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

MS-ESS2-3. Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.

## Relevant Lesson Links & Resources

### Uncovering Wisconsin's Geologic Past

<https://wgnhs.wisc.edu/wp-content/uploads/2012/07/Uncovering-Wisconsins-geologic-past-lesson-plan.pdf>

### Common Paleozoic Fossils of Wisconsin

<https://cdn.shopify.com/s/files/1/0145/8808/4272/files/ES45.pdf>

### Grade level 3-5: The Earth is a Changin'

[https://www.teachengineering.org/lessons/view/cub\\_earth\\_lesson5](https://www.teachengineering.org/lessons/view/cub_earth_lesson5)

## Materials

*Decoding the Driftless* film on DVD, Blu-ray or USB flash drive

*Found online:*

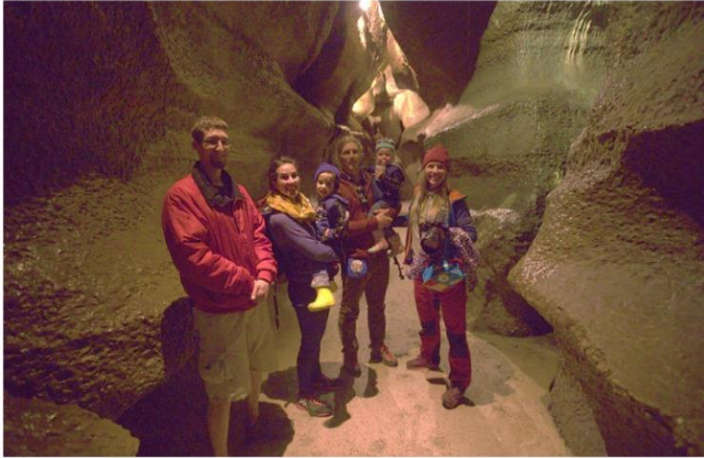
- 3DMap M504 Wisconsin Geology <https://wgnhs.wisc.edu/pubs/000958/>
- UW-Extension Ice Age Geology Website
- <https://wgnhs.wisc.edu/wisconsin-geology/ice-age/>  
UW-Extension poster M502 Wisconsin's Geologic Past  
<https://wgnhs.wisc.edu/pubs/m502/>

Provide access to drawings and pictures of bluffs, caves, sinkholes, continental glaciers, Upper Mississippi River, and state maps.

- images of fossils found in sedimentary rocks
- geologic Time Scale
- samples of rocks – igneous, sedimentary, and metamorphic
- manipulatives – toy bulldozer, soil/sand mixture with pebbles, and large rectangular box to simulate glacial erosion

## End Lesson 1





## Lesson 2

# Sinkholes, Caverns and Caves

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## Lesson 2: Sinkholes, Caverns and Cave: Environmental Lesson Plan for use with *Decoding the Driftless Film*

*This guide is correlated to film clip segments and is freely provided to all educators integrating this film into learning. Modify as appropriate to grade level and needs of students. Feedback welcome! See footer.*

Film clip	Start  10:06	End  23:33
<b>Focus concepts</b>		
<ul style="list-style-type: none"> <li>• Formation of limestone caves, caverns, and sinkholes</li> <li>• Rivers, streams, groundwater, and surface water shapes the landscape</li> <li>• Continental drift</li> </ul>		
<b>Key vocabulary terms</b>		
limestone dissolve groundwater surface water sinkhole cave Karst topography top layer, surface layer, sub layer claustrophobia main chamber tunnel system spring resurgence underground river	erosion sea lilies (crinoids) subtropical sea subterranean network mining/minerals - zinc and lead trout stream native brook trout uplift event inverse topography chemically dissolve dendritic pattern stream dissected landscape glaciers	



## Objectives

### **Students will be able to:**

1. Identify key concepts relating to how environmental changes (ex. climate, rainfall, wind, sea level changes, continental drift, deposition, erosion, and mountain building) over long periods of time *impact and change the earth's surface*.
2. Compare and contrast the formation of mountains with the formation of the bluffs found in the Driftless Area along the Mississippi and other Driftless Area rivers. How are they alike in formation? How are they different in formation?
3. Explain how the sedimentary rock layers found in the Driftless Area provide clues to the history of the region. Give specific examples from the film.

## Discussion

1. List the steps in the formation of a sinkhole based on the animation shared in the film.
2. What is the difference between a *cave* and a *cavern*? *A cave is an opening in the ground large enough for some part of it to not receive sunlight. A cavern is a specific type of cave that naturally formed in soluble rock and contains cave formation such as stalactites and stalagmites.*
3. How can you identify *sinkholes* from above ground even before they totally collapse? *Look for depressions, circular lake, settling of ground or structures, slumping or falling of trees or fences.*
4. What other parts of the US have sinkholes that have become a concern to those living in the area? Refer to this article on areas prone to sinkholes: [https://www.usgs.gov/special-topic/water-science-school/science/sinkholes?qt-science\\_center\\_objects=0#qt-science\\_center\\_objects](https://www.usgs.gov/special-topic/water-science-school/science/sinkholes?qt-science_center_objects=0#qt-science_center_objects)
5. What are some indications that there may be caves or caverns in an area? *Sinkholes, springs, well-drilling logs, scientific studies, sudden drop of well water, muddy or cloudy well water, etc.*
6. Are all caves the same in the manner in which they form? *No.*
7. What might be other ways that caves form? *Many caves form in soluble rock such as limestone or dolomite. There are other caves that form in volcanic lava flows, glaciers, and through wind erosion.*



8. Where have you seen caves formed by wind and/or water erosion? *Along the shore of the Great Lakes such as the Lake Superior Ice Caves; National Parks such as Arches National Park and Wind Cave National Park; sea caves along the Atlantic and Pacific coastline.*
9. Ask students if they have ever visited any caves in the Driftless Area and their memories / impressions of their experiences. *Many of the caves listed below have frequent tours and educational programs.*

Some limestone caves students and guardians can visit in the Driftless Area include the following. Have students research these Driftless Area caves and report their findings including location, type of cave, unique features, estimate size and depth of cave, formations found within the cave, etc.

- Crystal Cave in Spring Valley, WI <http://www.acoolcave.org/>
- Cave of the Mounds outside of Mount Horeb, WI <https://www.caveofthemounds.com/>
- Mystery Cave - Forestville/ Mystery Cave State Park [https://www.dnr.state.mn.us/state\\_parks/park.html?id=spk00148#homepage](https://www.dnr.state.mn.us/state_parks/park.html?id=spk00148#homepage)
- Niagara Cave in Harmony, MN <http://www.niagaracave.com/index.html>
- Spook Cave near McGregor, Iowa <https://spookcave.com/cave-tour/>
- Maquoketa Caves State Park in Maquoketa, Iowa <https://www.iowadnr.gov/Places-to-Go/State-Parks/Iowa-State-Parks/Maquoketa-Caves-State-Park>

You may wish to have other students do research on a variety of caves and large sinkholes found in the United States and have them report on their findings.

## Activities

**Disclaimer:** The activities provided are links and resources intended to be a starting point for use in the classroom and are by no means comprehensive or aligned to a particular region of the Driftless Area. Please seek out local experts and resources to enhance student learning experiences

**The following suggested activities are found online and provide teacher support materials.**

### 1. Cave formation

The following activities provide opportunities for students to learn how stalagmites and stalactites form from chemical solutions. Please **see the PDF files** linked below. This lesson was created by ACS Chemistry for Life Activity

[Making Stalactites and Stalagmites from Epsom Salt PDF](#)

[1997 Planet Chemistry PDF](#)

*Alternate activity:* Flinn Scientific [Stalagmites and Stalactites](#)

[Making Carbonic Acid Lesson](#)- this lesson provides activities demonstrating how groundwater rich in acid dissolves limestone and helps to form caves, caverns and sinkholes.

## 2. Water table and groundwater flow by High Adventure Science <https://bit.ly/2RIHoww>

Lesson created by The Concord Consortium and the URL <http://concord.org>

This lesson has 20 interactive questions which help students understand how the water table and groundwater are affected by changing environmental conditions. Answers are recorded as activity is completed.

*Use interactive computational models to explore the underground flow of water and how it affects surface bodies of water. Predict how the water table will be affected by the placement of wells around a gaining stream. Finally, explore the reasons the river dried up in a case study of the Santa Cruz River in Arizona.*

## 3. Rivers and their importance

National Park Service **National River and Recreation Area**

(<https://www.nps.gov/miss/planyourvisit/hours.htm>) provides many lessons on the Mississippi River including:

- Lessons from Landscape - Our Place on the Mississippi River
- Map the Mississippi Watershed
- Questions about the Mississippi River

**4. Rivers and Streams Shaping the Environment Streams and Rivers lesson** created by East Bay California State (contact [jeff.seitz@csueastbay.edu](mailto:jeff.seitz@csueastbay.edu)) Sponsored by California Science Project, NASA, NSF and the California Department of Education.  
<https://teachearthscience.org/streams.html>

This unit contains a wealth of resources (presentations, PowerPoint, teacher lesson, student probe, vocabulary) about streams, how they modify the landscape, and flood hazards. This is a unit about erosion and deposition of sediments associated with streams.

## NextGen National Science Standards

ESS1.C: The History of Planet Earth

- Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe. (2-ESS1-1)

ESS2.A: Earth Materials and Systems

Wind and water can change the shape of the land. (2-ESS2-1)

ESS2.C: The Roles of Water in Earth's Surface Processes



Water's movements—both on the land and underground—cause weathering and erosion, which change the land's surface features and create underground formations. (MS-ESS2-2)

LS4.A: Evidence of Common Ancestry and Diversity

Some kinds of plants and animals that once lived on Earth are no longer found anywhere. (3-LS4-1)

Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. (3-LS4-1)

### **Relevant Lesson Links & Resources**

[The Water Cycle](#) by Untamed Science (YouTube Video)

Wisconsin Geological & Natural History Survey

[Karst sinkholes resources](#) - University of Wisconsin

[Cave of the Mounds \(Wisconsin\) Lesson Plan Resources](#)

[Caves Live - Lesson Plans for teachers K-12 and related video clips on caves and their formation](#)

Note: Copyright © 2020 Prince William Network, Prince William County Schools

[Investigating Karst topography](#) and its connection to SE Minnesota sinkholes and cave formations - field trip to Mystery Cave\_(Minnesota Driftless Area)

[Karst topography of NE Iowa](#)

[High Adventure Science](#)

[Teach Earth Science](#)

### **Materials**

*Decoding the Driftless* film on DVD, BluRay or USB flash drive

Books on caves, caverns, Karst topography, underground rivers, erosion, etc.

Internet research and note taking (suggest using Google doc)

Access to Internet connected computers for research

Materials for activities are noted within related documents

Use of large screen projection system or interactive whiteboard

## ***End Lesson 2***





## Lesson 3

# Unique Ecosystems of the Driftless Region

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### Lesson 3: Unique Ecosystems of the Driftless Region: Environmental Lesson Plan for use with *Decoding the Driftless Film*

*This guide is correlated to film clip segments and is freely provided to all educators integrating this film into learning. Modify as appropriate to grade level and needs of students. Feedback welcome! See footer.*

<b>Film clip:</b>	Start 23:34	End 33:49
<b>Focus concepts</b>		
<ul style="list-style-type: none"> <li>Ecosystems - especially those specific to the Driftless Region</li> <li>Algific Talus Slope and Bluff Prairie</li> <li>Adaption Endangered species</li> </ul>		
<b>Key vocabulary terms</b>		
Algific Talus Slope	ecosystem	camouflage
bluff	Northern Monkshood	bounty
adaptation	glacial ice	Six-lined prairie race runner
glacial ice	vents in limestone	rock crevices
vents in limestone	pressure gradient	habitats
pressure gradient	ice caves	species
ice caves	Centigrade	hibernation
Centigrade	bluff prairies or “goat prairies”	restoration
bluff prairies or “goat prairies”	aspect (direction)	invasive species
aspect (direction)	Pleistocene snails	natural communities
Pleistocene snails	Timber rattlesnake	federally endangered
Timber rattlesnake		Columbine, Black-eyed Susan, and wild asparagus
		Meadowlark, Bobolink, and Henslow’s sparrow
		refugia



## Objectives

Students will be able to:

1. Compare and contrast ecosystems found in the Driftless Region and other Midwest locations.
2. Describe the unique biological communities found within the Driftless Region.
3. Describe at least two fragile ecosystems found within the Driftless Region and how climate change could impact them.
4. Give examples of how humans have negatively and positively impacted the Driftless Region's habitats and ecosystems.

## Discussion

Discuss the following after viewing the film:

1. Have students contribute ideas associated with the word "ecosystem" – record answers and discuss. Ask students to explain why "system" is a key part of the word. What ecosystems have students experienced? *Plants and animals within an ecosystem exist in a state of dependence and form a "system" that is interrelated, interdependent, and interacting. Students have likely experienced a variety of ecosystems depending on their travels including mountain, forest, prairie, marine, tundra, rainforest, savannah, etc.*
2. Ask students to describe the plants and animals of the various types of ecosystems (marine, terrestrial and aquatic) that they have experienced within the region they live. *Answers depend on student input.*
3. Select a neighboring ecosystem familiar to students and discuss producers, consumers and decomposers found within the system. *Answers depend on location.*
4. Algific Talus Slopes are very fragile ecosystems. What conditions favor the formation of Algific Talus Slopes and Bluff Prairies?

*Algific Talus Slopes: North facing elevated habitat where air circulates over underground ice through vents (cracks) on hillside talus (broken rock materials).*

*Bluff Prairies: south-facing dry prairies on steep slopes with wind erosion.*



5. Identify producers, consumers, and decomposers likely to be found in these two fragile ecosystems.

**Producers:** *a wide variety of plants, trees, shrubs, grasses, flowers, mosses, ferns,*

**Consumers:** *small mammals (rabbits, squirrels, marmots, etc.) and larger mammals (deer, sheep, cows, etc.), reptiles (snakes and lizards), raptors, birds, snails, etc.*

**Decomposers:** *bacteria, fungi, insects, earthworms, millipedes, etc.*

6. What environmental (climate change, increased rainfall, flooding, etc.) changes might negatively affect them?

*Any changes such as climate, global warming, drought, and flooding will impact the overall ecosystem.*

7. What does it mean for a plant or animal to be considered “*federally endangered*?” What Driftless Region plants or animals are federally endangered?

*An **endangered** species is an animal or plant that's considered at risk of extinction. A species can be listed as **endangered** at the state, **federal**, and international level. On the **federal** level, the **endangered** species list is managed under the **Endangered Species Act**.*

*See <https://www.fws.gov/midwest/endangered/lists/wisc-spp.html> and <https://www.fws.gov/endangered/species/index.html>*

8. What man-made impacts might affect them adversely?

*Mining, chemical spills, fires, topsoil destruction, alteration of the topography (building), improper planting of invasive plants and animals.*

9. Unique plants and animals are found in the Driftless Region and many have made adaptations in order to survive.

What adaptations made by wildlife and plants of the Driftless Region?

*(See [https://www.fws.gov/refuge/Driftless\\_Area/wildlife\\_and\\_habitat/index.html](https://www.fws.gov/refuge/Driftless_Area/wildlife_and_habitat/index.html))*

10. Review the Black Bear adaptation overview found at <https://untamedscience.com/biodiversity/american-black-bear/> and discuss the adaptations black bears have made to increase their survival.



## Activities

Disclaimer: The activities provided are links and resources intended to be a starting point for use in the classroom and are by no means comprehensive or aligned to a location within the Driftless Region.

Please seek out local experts and resources to enhance student learning experiences.

Suggested activities are found online and provide teacher support materials and related resources.

### 1. How Disruptions Affect Animal Populations

<https://wisconsin.pbslearningmedia.org/resource/ilwgbh17-sci-rare-ildisruptions/how-disruptions-affect-animal-populations/support-materials/>

#### About This Lesson by PBS Learning Media Lesson / WGBH

The lesson invites students to examine how different disruptions—factors or events that upset the balance of an ecosystem—can dramatically affect the populations of animals living there. Handouts and Teacher Tips provided online at:

<https://wisconsin.pbslearningmedia.org/resource/ilwgbh17-sci-rare-ildisruptions/how-disruptions-affect-animal-populations/support-materials/#.XmpmmKhKiUk>

### 2. Animal and Plant Species of the Driftless Region

Have students select a plant or animal of the Driftless Region to research and prepare for a class sharing session. See for suggestions: <https://www.inaturalist.org/guides/3222>

Students are to include accurate information including scientific name, species, what it eats or needs to produce energy, what it is eaten by, and habitat description, any adaptations, survival challenges and interesting findings. *Student note taking handout (graphic organizer) available on the Internet via:* <https://www.dailyteachingtools.com/free-graphic-organizers-s.html#NoteTaking>

**3. Endangered Species – lessons for elementary through high school by the *Endangered Species Coalition* – Washington, DC includes downloadable *lesson plan, slideshow, playing cards, teacher script and puzzle.***

<https://www.endangered.org/campaigns/endangered-species-day/science-lesson-plan/>



## NextGen National Science Standards

### LS2.C: Ecosystem Dynamics, Functioning, and Resilience

When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die. (*secondary to 3-LS4-4*)

### LS4.C: Adaptation

For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)

### LS4.D: Biodiversity and Humans

Populations live in a variety of habitats and change in those habitats affects the organisms living there. (3-LS4-4)

### LS2.A: Interdependent Relationships in Ecosystems

Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors.

In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete for limited resources, access to which consequently constrains their growth and reproduction.

Growth of organisms and population increases are limited by access to resources.

## Relevant Lesson Links & Resources

### **Mysteries of the Driftless / into the Outdoors lessons**

<http://intotheoutdoors.org/topics/the-driftless-area/> and *Driftless Area Lesson Guide*:  
<http://intotheoutdoors.org/topics/the-driftless-area/#links>

### **Middle School: Disruptions in the Ecosystem**

<https://www.nextgenscience.org/resources/middle-school-disruptions-ecosystems>

### **Wildlife and Habitat (Driftless Region)**

[https://www.fws.gov/refuge/Driftless\\_Area/wildlife\\_and\\_habitat/index.html](https://www.fws.gov/refuge/Driftless_Area/wildlife_and_habitat/index.html)



## Materials

*Decoding the Driftless* film on DVD, BluRay or USB flash drive.

Internet connected computers for research

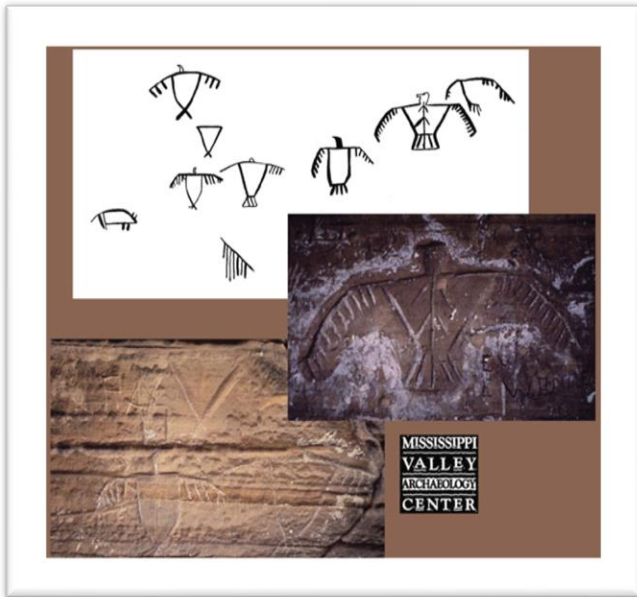
Resources including books, online links, and pictures of animals and plants of the Driftless Region, endangered species, ecosystems, adaptations, restoration practices, etc.

Student note taking (graphic organizer) handout available via Internet Google Search:

<https://www.dailyteachingtools.com/free-graphic-organizers-s.html#NoteTaking>

***End of Lesson 3***





## Lesson 4

# Ancient Wonders of the Driftless Region

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**Lesson 4: Ancient Wonders of the Driftless Region: Environmental Lesson Plan for use with *Decoding the Driftless Film***

This guide is correlated to film clip segments and is freely provided to all educators integrating this film into learning. Modify as appropriate to grade level and needs of students. Feedback welcome! See footer.

<b>Film clip</b>	<b>Start</b>	<b>End</b>
	33:50	40:13
<b>Focus concepts</b>		
<ul style="list-style-type: none"> <li>• Early humans of the Driftless Region</li> <li>• Rock art &amp; paintings</li> <li>• Effigy and burial mounds</li> <li>• LiDAR</li> </ul>		
<b>Key vocabulary terms</b>		
archaeology	nomadic	
rock art & rock paintings (petroglyphs)	habitation site	
cultural history	corridors of water	
Ho-chunk	mound building cultures	
natural rock shelters	engineering acumen	
Effigy and burial mounds	alignment of the sun, moon, and stars	
sedimentary rock	LiDAR technology	
vernal equinox		
<b>Objectives</b>		
<p>Students will be able to:</p> <ol style="list-style-type: none"> <li>1. Demonstrate how ancient records and artifacts of the past help us to understand the culture and traditions of early settlers of the Driftless Region.</li> <li>2. Explain how the Driftless Region has changed and how might it change in the future?</li> <li>3. Appreciate the value of maintaining historic artifacts and historical or spiritual places. Be able to share examples of the information that can be learned from</li> </ol>		





artifacts and sacred grounds like the Effigy Mounds.

4. Introduce students to LiDAR and how it is used to help scientists conduct research, capture information about the landscape, and produce a variety of useful maps which help us understand ecosystems.

## Discussion

*Discuss the following after viewing the film:*

1. *Why is the Driftless Region ideal for early cultures to settle and establish communities? Rich agricultural soil, access to water, access to major streams and tributaries, abundant wildlife, and relatively safe environment.*
2. *What does the evidence of early life in the Driftless Region indicate about the early humans who resided here? They were skilled hunters, gatherers, and were knowledgeable about the land and waters. They developed creative and technological skills building shelters, tools, pottery, smoking pipes, and cave art etc.*
3. *What geographic features helped to sustain the early inhabitants of the Driftless Region? Forestlands for wood and hunting, caves for shelter, river and streams for fishing and navigation, bluffs for viewing possible intruders, navigation, wild game, herbs, etc.*
4. *What would you choose as a symbol to represent our present day Driftless Region? Why? Where and how would you build your mound? Why? Dependent on student input but look for symbolism and rationale and sense of place, as well as a location of meaning with a level of safety and access.*
5. *What types of technologies would you use to help you select a location for your mound? How would these technologies selected help you with your selection? Dependent on student input but anticipate a variety of maps, compass, useful images or photographs.*
6. *What evidence of life might be found in the future of our culture that will last the test of time and provide important information about our communities? Dependent on student input - cell towers, dams, bridges, cemetery headstones, foundations of buildings, landfill items.*
7. *What compelling questions do students have about the Driftless Region and the cultures that settled this area? Dependent on student input*



## Activities

Disclaimer: The activities provided are links and resources intended to be a starting point for use in the classroom and are by no means comprehensive or aligned to a location within the Driftless Region.

Please seek out local experts and resources to enhance student learning experiences.

1. **Honoring our past is key to understanding our future.** Divide students into teams of researchers to collect and report findings on the following topics

- a. **Native Americans** of the Driftless Region - using a tribal map of your region of the Driftless Region, research the first settlers and their culture.

Note: Paleo Indians first settled the Driftless Region about 12,000 years ago. See *Archaeology of the Rodney Clark Site* <https://mvac.uwlax.edu/wp-content/uploads/2014/07/RodneyClark.pdf>

- b. **Driftless area mounds** - types (conical, linear, platform, effigy) and their locations, history, and unique features.
- c. **Caring for the earth** - Native Americans and the environment. Research and share the ways in which Native Americans showed respect and care for the earth.

2. **Archaeology of the Driftless** - define archaeology, the tools used by archaeologists, key findings by local and regional archaeologists, and *artifacts* found within the Driftless region including petroglyphs, arrowheads, pottery, structures, etc. Investigate the Mississippi Valley Archeological Center (MVAC) resources and contact additional state archaeology experts who have deep knowledge of the artifacts and archaeological digs in your area and state.

A good place to start is your local universities or your Office of the State Archaeologist. Invite an expert into your classroom via a virtual visit to discuss artifacts and dig findings. Brainstorm a list of topics and questions with students in advance. Have students discuss if becoming an archaeologist is of interest - and why or why not.

- Mississippi Valley Archaeology Center (MVAC) – UW-L <https://mvac.uwlax.edu/>
- Iowa Office of the State Archaeologist <https://archaeology.uiowa.edu/>
- Minnesota Office of the State Archaeologist <https://mn.gov/admin/archaeologist/>
- Wisconsin Office of the State Archaeologist <https://www.wisconsinhistory.org/Records/Article/CS4048>
- Illinois Office of the State Archaeologist [https://www.isas.illinois.edu/office\\_of\\_the\\_illinois\\_state\\_archaeologist](https://www.isas.illinois.edu/office_of_the_illinois_state_archaeologist)



Alternative activity - contact your **state's cartographer's office** and plan an interview with him or her regarding use of LiDAR and other mapping tools within your state or region. How is LiDAR mapping (or other mapping resource tools) being used to help make decisions about land use planning and zoning, agriculture, and archaeological studies?

- Wisconsin <https://www.sco.wisc.edu/data/elevationlidar/>
- Minnesota <http://www.mngeo.state.mn.us/address.html>
- Iowa <https://iowadot.gov/gis/staff> (check with GIS developer at Dept. of Transportation)
- Illinois [https://www.isas.illinois.edu/office\\_of\\_the\\_illinois\\_state\\_archaeologist/research/gis](https://www.isas.illinois.edu/office_of_the_illinois_state_archaeologist/research/gis)

## National Social Science Standards

D2. Geo.4.3-5. Explain how culture influences the way people modify and adapt to their environments.

D2.Geo.7.3-5. Explain how cultural and environmental characteristics affect the distribution and movement of people, goods, and ideas.

D2.Geo.2.6-8. Use maps, satellite images, photographs, and other representations to explain relationships between the locations of places and regions, and changes in their environmental characteristics

D2.Geo.6.9-12. Evaluate the impact of human settlement activities on the environmental and cultural characteristics of specific places and regions.

D2.Geo.8.3-5. Explain how human settlements and movements relate to the locations and use of various natural resources.

## NextGen National Science Standards

4-ESS2-2 Earth's Systems Analyze and interpret data from maps to describe patterns of Earth's features.

## Relevant Lesson Links & Resources

**Mississippi Valley Archaeology Center** <https://mvac.uwlax.edu/educators/lessons-activities/>

**Mississippi Valley Archaeology Center** 1725 State Street La Crosse, Wisconsin 54601  
Phone: 608-785-6473 Web site: <http://www.uwlax.edu/mvac/>



## **Milwaukee County Museum**

[Ho-Chunk](#) links to culture, history, treaties

## **Wisconsin Indian Tribes**

<https://wisconsinfirstnations.org/current-tribal-lands-map-native-nations-facts/>

**Wisconsin Public Television First Nations** educational videos, teacher professional development resources, and lesson plans for all grades, and learning tools for your classroom and library.

<https://wisconsinfirstnations.org/>

## **Minnesota Indian Tribes**

<https://mn.gov/portal/government/tribal/mn-indian-tribes/>

## **Iowa Indian Tribes**

<http://www.native-languages.org/iowa.htm>

## **Illinois Indian Tribes**

<http://www.native-languages.org/illinois.htm>

## **Unlocking the Secrets of the Past <http://backtoschooltoolkit.org>**

**Lesson 5 Using a time capsule activity, students analyze primary and secondary sources to construct a historical argument about the story of the United States.**

[https://www.facinghistory.org/back-to-school/download/Lesson Plan 5 Unlocking the Secrets.pdf](https://www.facinghistory.org/back-to-school/download/Lesson_Plan_5_Unlocking_the_Secrets.pdf)

**Lesson Plans to Incorporate Archaeology into the 5th grade Curriculum in the Southwest Michigan Public Schools (aka Archaeology CSI, Cultural Scene Investigation)** includes nine lessons on archaeology including observation, inference, and evidence; what is archaeology?; modern day mystery object; context game; stratigraphy and cross dating; survey and gridding a site; getting ready to dig, measure and document; present and protect and more. <https://bit.ly/2LfQnvn>

## **What is LiDAR and how does it work?**

<https://www.earthdatascience.org/courses/use-data-open-source-python/data-stories/what-is-lidar-data/>

## **LiDAR - Introduction to Light Detection and Ranging YouTube video**

<https://youtu.be/m7SXoFv6Sdc>



## Materials

*Decoding the Driftless* film on DVD, BluRay or USB flash drive.

Books and websites on the Driftless Region Native Americans, archeology, cultural geography, early settlements, cave art and paintings, Native American legends and stories, Effigy and other mounds, and LIDAR technology.

Theler, James L. and Robert F. Boszhardt, *Twelve Millenia: Archaeology of the Upper Mississippi River Valley*. Iowa City, University of Iowa Press, 2003.

Boszhardt, Robert F. *Cave Rock Art in the Upper Mississippi Valley*. St. Paul, Prairie Smoke Press, 2003.

Birmingham, Robert A. *Spirits of the Earth: The Effigy Mound Landscape of Madison and Four Lakes*. Madison, University of Wisconsin Press, 2010.

Archaeological tools for display

Pictures of cave art and paintings

## End of Lesson 4





## Lesson 5

# Rivers Run Through It

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**Lesson 5: Rivers Run Through It: Environmental Lesson Plan for use with *Decoding the Driftless Film***

*This guide is correlated to film clip segments and is freely provided to all educators integrating this film into learning. Modify as appropriate to grade level and needs of students. Feedback welcome! See footer.*

<b>Film clip</b>	Start 40:14	End 46:02
<b>Focus concepts</b>		
<ul style="list-style-type: none"> <li>• Upper Mississippi River</li> <li>• rivers, streams, and river systems</li> <li>• watersheds</li> </ul>		
<b>Key vocabulary terms</b>		
topography	glacial sediment	
ice flow	glacial wash	
Driftless Region	Mississippi River and Mississippi River Valley	
Devil’s Lake	water carved	
bedrock	locks and dams	
outcrops	ancient marine sediment	
Lake Superior Lowland	sedimentary rocks	
Green Bay Lowland	river bottom	
Lake Michigan Lowland	glacial outwash sediment	
troughs	Lake Pepin	
Wisconsin arch	Chippewa River	
deflect and slow or stop		
<b>Objectives</b>		
<p>Students will be able to:</p> <ol style="list-style-type: none"> <li>1) describe how the topography (the arrangement of the natural and artificial physical features of an area) of the Driftless Region has been shaped by historical climate change and geological processes.</li> </ol>		



- 2) explain how water erosion and deposition change a river or stream over time?
- 3) describe the Mississippi River's watershed and how climate and other changes affect the river and stream system.
- 4) Identify the ways in which the Mississippi River provides economic value and stability to the towns and cities along its shores.
- 5) Explain how locks and dams on the Mississippi River have impacted its flow, habitat, fisheries, migration, water quality, and the overall river valley.

## Discussion

Discuss the following after viewing the film:

- 1) How would wildlife and humans living in and along the Mississippi River be changed if...
  - a. Climate change caused a drought and river levels dropped significantly. *Entire Upper Mississippi ecosystem would be impacted with loss of fish, plants, birds, animals, recreational and economic usage. River navigation impacted causing a negative effect on the economy, trade, and supply chain.*
  - b. A dangerous chemical leak occurred in the St. Paul, MN area and 50,000 gallons were dumped into the River. *Ecosystem damage affecting wildlife, fish, plants, recreational use of river, beach and shoreline damage, etc.*
  - c. Invasive species of amphibians and fish found their way upriver from Louisiana. *Native species could become overwhelmed as food supply and habitat are disrupted. Invasive species can consume considerable amounts of aquatic vegetation that other organisms rely on for food and cover. Interferes with boating, anglers, and fishing.*
  - d. A volcanic eruption in Washington state released tons of particulate matter and huge amounts of it settled into the Upper Mississippi River watershed *Darken skies, air quality declines, water contaminated, crop damage (inedible), temperatures may drop due to lack of sunlight, increased storms, etc.*
- 2) The Mississippi River's flooding during the past several years has an immense impact. How does this affect the region economically? The River's course? Water quality? Recreational? Fish and wildlife?

Helpful article link: Time Magazine

[Can the Mississippi River Handle the Next Big Flood? | Time](#)

Show students the watershed of the Mississippi River





<https://svs.gsfc.nasa.gov/4493>

What are some of the major rivers and streams in your region of the Driftless Region?

*Depends on location. Mississippi River and the following:*

**SW Wisconsin:** Wisconsin River, Baraboo River, Kickapoo River, Chippewa River, Yellow River. **NE Iowa:** Upper Iowa River, Turkey River, Cedar River, Maquoketa River. **SE Minnesota:** Cannon River, Root River. **NW Illinois:** Galena River

What value does the river or stream play to your community? *Depends on location. Recreation, fishing, boating, esthetic beauty, habitat for wildlife and plants.*

Does flooding occur along the river/stream? *Depends on location.*

What type of interventions have been taken to limit flooding?

*Depends on location. Dams, levees, floodplain control, barriers.*

How is your community improving the overall health of the river or stream? *Depends on location.*

## Activities

Disclaimer: The activities provided are links and resources intended to be a starting point for use in the classroom and are by no means comprehensive or aligned to a location within the Driftless Region.

Please seek out local experts and resources to enhance student learning experiences.

Suggested activities are found online and provide teacher support materials and related resources.

### 1. **What is a Watershed? by PBS Media**

<https://wisconsin.pbslearningmedia.org/resource/ket09.sci.ess.water.wshed/what-is-a-watershed/> View video and utilize the online support lesson materials which include background reading and five discussion questions.

### 2. **Locks and Dams by TeachEngineering** Students are introduced to the structure, function and purpose of locks and dams, which involves an introduction to Pascal's law, water pressure and gravity.

[Locks and Dams - Lesson - TeachEngineering](#)



3. **View *Build Your Own Stream Table*** by Ryan Hollister, science coach Turlock Unified School District [https://www.youtube.com/watch?v=dg\\_I4A9KLig](https://www.youtube.com/watch?v=dg_I4A9KLig) which provides detailed instructions on building your own classroom stream table. Ryan Hollister gives helpful ideas on extending the lesson through inquiry and problem solving. Access the ***Erosion and Deposition Lab*** Ryan Hollister, science coach Turlock Unified School District via this link:

[http://scienceovereverything.com/wp-content/uploads/2018/05/Lab\\_Erosion-and-Deposition.pdf](http://scienceovereverything.com/wp-content/uploads/2018/05/Lab_Erosion-and-Deposition.pdf)

## NextGen Science Standards

**ESS2-2 Earth's Systems: Processes that Shape the Earth** Develop a model to represent the shapes and kinds of land and bodies of water in an area.

**MS-ESS2-4 Earth's Systems:** Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity

**5-ESS-2 Earth's Systems:** Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales

**MS-ESS-4:** Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.

**HS-ESS-2-2:** Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.

**HSS- 2-5** Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.

## Relevant Lesson Links & Resources

### **National Park Service - Mississippi River Visitor Center**

<https://www.nps.gov/miss/learn/education/teacherresources.htm>

### ***A trip down the mighty Mississippi***

<https://www.youtube.com/watch?v=oGJ6BTKp8cq>

From the gentle rising headwaters in Northern Minnesota, to the Gulf of Mexico over 2,300 miles downstream, Mo Rocca takes a trip on the Mississippi River.

**Streams & Rivers** <https://teachearthscience.org/streams.html>



resources about streams, how they modify the landscape, and flood hazards. This is a unit about erosion and deposition of sediments associated with streams.

**Mississippi River at Work:** Lesson Plan <https://bit.ly/2ZehAGH>

Minnesota Pollution Control Agency - **Characteristics of the Mississippi River Headwaters** and related reports

<https://www.pca.state.mn.us/water/watersheds/mississippi-river-headwaters>

### **Erosion and Deposition of Flowing Water**

<https://www.ck12.org/book/ck-12-fourth-grade-science/section/2.10/>

**Lake Pepin** <https://www.dnr.state.mn.us/areas/fisheries/lakecity/pepin.html>

**Geology of Devil's Lake** video 37 minutes(appropriate for high school level) by Steve Baumann  
<https://www.devilslakewisconsin.com/learning-center/geology-of-devils-lake/>

### **Materials**

*Decoding the Driftless* film on DVD, BluRay or USB flash drive.

Internet access for research

Access to YouTube video

Stream table supplies (basin, sand, water source and other materials per PDF lesson plan)

## **End of Lesson 5**





## Lesson 6

### A Place to Sustain

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## Lesson 6: *A Place to Sustain*: Environmental Lesson Plan for use with Decoding the Driftless Film

*This guide is correlated to film clip segments and is freely provided to all educators integrating this film into learning. Modify as appropriate to grade level and needs of students. Feedback welcome! See footer.*

<b>Film clip</b>	Start 46:02	End 60.00
<b>Focus concepts</b>		
<ul style="list-style-type: none"> <li>• conservation of natural resources</li> <li>• biodiversity</li> <li>• stewardship of natural resources</li> <li>• habitat protection</li> <li>• migratory flyway</li> <li>• conservation of the Mississippi River</li> <li>• sustainability</li> <li>• sense of place</li> <li>• local pride</li> </ul>		
<b>Key vocabulary terms</b>		
diversity of habitats	USFWS National Wildlife Refuge	Trout Unlimited Driftless Area Restoration Effort (TUDARE)
wildlife management	turtles	wildfires and prescribed burns
predated	nest	The Prairie Enthusiasts (TPE)
neotropical songbirds	migratory flyway	invasive species
Tundra swans & other waterfowl	birdwatchers	stewards of the land
restoration	erosion	Driftless Area Land Conservancy (DALC)
cold water springs and streams		peregrine falcon
		predators
		raptors
		Raptor Resource Project (RRP)
		DDT
		artificial nest boxes



## Objectives

Students will be able to:

1. communicate the value, economic, cultural, aesthetic, and intrinsic of the Driftless Region in their own words and creations (art, music, writing etc.).
2. identify how human intervention on the land, waters, and wildlife can be positive and have an important long-lasting impact. Give specific examples from the film and from personal experience or research.
3. discuss stewardship and wise management of land and animals in the tradition of our native American ancestors.
4. develop a plan to increase awareness within your community about the value of land and wildlife protection.
5. interact with key Driftless Region conservation or wildlife protection organizations through family or school-sponsored distance learning or physical visits and engage in exploratory questions and answers of most interest.
6. compare and contrast community conservation and nature programs that demonstrate care and sustainability for the local environment.
7. devise a plan to support sustainability of some aspect of the Driftless Region (ex. trout stream renewal, wildlife protection, removal of invasive species, flood control, erosion control, pollution control, etc.).

## Discussion

Discuss the following after viewing the film:

1. What surprises you about the conservation work being done within the Driftless Region? Can you see yourself in a career relating to stewardship of wildlife, land conservation, or environmental science? Why or Why not?  
*Answers dependent on student input.*
2. The Mississippi River and Driftless Region provide shelter to wildlife as they migrate during the late fall and early winter months. What global challenges are affecting migratory animals? How many migratory flyways are within the continental US? What threats exist in each region?  
**Global Challenges:** *climate change (temperature increases, sea level rising, sea ice melting), wind production development, urbanization.*



**Migratory Flyways:** Four - Atlantic, Mississippi, Central and Pacific Flyways.

**Threats:** Bird species declining due to threats across the landscape. Bird habitat lost or degraded due to development, agriculture, and forestry practices. Students can research specific threats per region. Helpful reports available <https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php>

Show the **Bird Conservation Timeline** found at [Migratory Bird Program | Conserving America's Birds](#) and discuss the State of the Birds report available [State of the Birds 2009 Report](#)

3. Discuss what “invasive species” means and why allowing uncontrolled growth of invasive species could destroy the biodiversity of the Driftless Region.

*“An alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.”*

How are invasive species removed once they are found in an ecosystem? Ex. Asian carp, garlic mustard, multiflora rose, leafy spurge, wild parsnip, Canada thistle, European buckthorn, and honeysuckle.

*Helpful resource: There is a wide variety of methods to reduce invasive species depending on the specific type of species including education, establishing and enforcing laws, prescribed burns, manual removal, chemical or biological interventions.*

<https://dnr.wi.gov/topic/Invasives/control.html>

4. What does it mean to be a steward of nature? What actions can you take as a student to be a steward of the Driftless Region?  
*Stewards of nature foster management of natural resources including wildlife, plants, trees, forests, and the land. Students can become advocates for nature through their own behavior and actions that demonstrate responsible use. Participate in community and organizational group activities improving the local environment. They can also help educate peers and adults through modeling care of the environment and natural resources.*

See [Every Kid Outdoors](#) which includes making a school stewardship plan.



## Activities

Disclaimer: The activities provided are links and resources intended to be a starting point for use in the classroom and are by no means comprehensive or aligned to a location within the Driftless Region.

Please seek out local experts and resources to enhance student learning experiences.

1. Assign teams of students to research one of the following topics and report their findings using a **KWL organizational chart** for their notes. They should plan to lead an 8-10 minute sharing session including Q & A from the audience. Note: there are a multitude of freely available KWL templates for all grade levels found by using a web search engine.
  - migratory flyway of the Mississippi River
  - trout streams of the Driftless Region
  - fisheries of the Mississippi River
  - raptors (Birds of Prey) of the Driftless Region
  - endangered plants and animals of the Driftless Region
  - land trust conservancies in the Driftless Region

2. The Driftless Region is sometimes called the **Midwest's premier biodiversity hotspot**.

*Discuss the meaning of biodiversity after viewing the PBS Media online video **What is biodiversity?** Why is biodiversity important to the Driftless Region?*

*Utilize the teaching support materials available online at **Wisconsin PBS Learning Media (PBS Wisconsin)** including Teacher tips, student handout, and discussion questions.*

*<https://wisconsin.pbslearningmedia.org/resource/stn15.sci.biol.biodiversity/what-is-biodiversity/>*

3. Native Americans have a long tradition of respect and care for the earth and living creatures. Invite a member of Ho-Chunk to visit your classroom either virtually or in person <https://ho-chunknation.com/speaker/> to explain tribal beliefs and practices relating to stewardship.

Incorporate the ***Slice of the Earth*** lesson plan into the study of stewardship.

Lessons of our Land: Tribal Resource Department



**A Slice of the Earth Lesson Plan** which uses an apple to help students understand how a small fraction of the earth's resources supports all human life.

<http://www.lessonsofourland.org/lessons/tribal-resource-departments/>

Another option is to invite a member of the **USFWS** or **Trout Unlimited** or other wildlife or land conservancy organization.

4. **Sense of Place** - Discuss the concept of “a sense of place” by using the “think – share-pair” strategy <https://www.theteachertoolkit.com/index.php/tool/think-pair-share>

*A **sense of place** comes from a **feeling** of connectedness, be it physical, emotional, or spiritual, to a specific geographic area (Relph 1976). **Developing a sense of place** through geographic experiences helps build the social and emotional foundation children need and will one day use as adults.*

Students can choose to use their own unique talents to *convey their relationship with the Driftless Region* - art, music, poetry, photography collage, writing or any other talent which can help them share their *sense of the world* in which they live.

Students should share their creations in small groups and explain their insights and motivation to create their product.

- Use a word cloud generator such as Word Cloud Art <https://wordart.com/>
- Poem Generator provides many options for creation of a Driftless poem <https://www.poem-generator.org.uk/>
- Freehand draw scenes (or create a diorama) representing the Driftless Region
- Create a photo collage representing the plants, wildlife, and landscape of the Driftless Region
- Write a story or legend using the Driftless Region as the setting

Further explore the concept of “sense of place” using the Walden curriculum materials found at <https://www.walden.org/education/> and <https://www.walden.org/education/curriculum-collection/sense-of-place/>

## **Environmental Standards\***

Wisconsin Environmental Education Standards

<https://dpi.wi.gov/environmental-ed/standards>

Please check your state's education standards for environmental education.

**Standard 1 Students develop and connect with their sense of place and well-being through observation, exploration, and questioning.**



Grades 3-5 Describe natural and cultural histories of a locality, explain the relationship between the two from a variety of perspectives, and identify how that creates a sense of place.

Grades 6-8: Understand the relationships between the environment and geography of a locality and its history, culture, and economy.

Grades 9-12: Analyze relationships between parts of local and global natural and cultural systems. Compare and contrast historical and current resource use, and analyze effects on the local, regional and global natural and cultural systems.

**Standard 5: Students investigate and analyze how change and adaptation impact natural and cultural systems.**

Grades 3-5: Describe how living things respond to changes in natural systems. Explain how changes affect how organisms adapt and survive...

Grades 6-8: Explain how change and adaptation can enhance...or limit the carrying capacity of a system. Analyze historic climate patterns to describe the impacts on natural and cultural systems.

Grades 9-12: Argue a perspective regarding a sustainability issue by examining individual and group actions, critiquing the decision-making processes, describing shared and conflicting values and principles, and assessing the impact on natural and cultural systems.

**Standard 7: Students engage in experiences to develop stewardship for the sustainability of natural and cultural systems**

Grades 3-5: Design and implement a plan to address a sustainability issue, weighing the pros and cons of proposed solutions.

Grades 6-8: Examine sustainability issues that need attention in the school or community, identify perspectives of various stakeholders, and consider how different perspectives could contribute to solutions.

Grades 9-12: Research issues related to environmental sustainability, critiquing the economic, environmental, and societal aspects of the issue, and examine how citizen action and public opinion can influence outcomes. Evaluate the needs of a local community to identify potential projects related to environmental sustainability. Identify and describe perspectives of stakeholders in the issue

**Relevant Lesson Links & Resources**

***Fish & Wildlife Service Midwest Planning Upper Mississippi Affected Environment***

<https://www.fws.gov/midwest/planning/uppermiss/feis/Chapter3.pdf>



## ***Wildlife and Habitat Driftless Region***

[https://www.fws.gov/refuge/Driftless\\_Area/wildlife\\_and\\_habitat/index.html](https://www.fws.gov/refuge/Driftless_Area/wildlife_and_habitat/index.html)

## **USFWS Upper Mississippi National Wildlife Refuge**

[https://www.fws.gov/refuge/upper\\_mississippi\\_river/](https://www.fws.gov/refuge/upper_mississippi_river/)

## **Environmental Stewardship**

<https://everykidoutdoors.gov/activities/scholastic-two.pdf>

## ***Trout Unlimited Driftless Area Restoration Effort***

<https://www.tu.org/project/driftless-area-restoration-effort/>

## **Driftless Area Land Conservancy**

<https://www.driftlessconservancy.org/>

## **Raptor Resource Project**

<https://www.raptorresource.org/>

## **NPS's *Animals of the Mississippi National River and Recreation Center***

<https://www.nps.gov/miss/learn/nature/animals.htm>

## ***United Nations 17 Sustainability Goals***

<https://sustainabledevelopment.un.org>

## **Materials**

***Decoding the Driftless*** film on DVD, BluRay or USB flash drive.

**KNL organizational chart** found online via Google or another search engine

Internet access for research

A variety of materials on conservation, environment, wildlife and land management, Mississippi River Flyway, migration, trout streams, raptors, invasive species, endangered species, land conservancy, Native Americans and care of the earth and conservation organizations.



**Wisconsin PBS Learning Media What is biodiversity? Support Materials (linked within lesson)**

Fremling, Calvin R. *Immortal River: The Upper Mississippi in Ancient and Modern Times*. Madison. University of Wisconsin Press. 2005.

## End of Lesson 6

Educators: We value your feedback on the Environmental Lesson Plans and our Film, *Decoding the Driftless*. Please send us your comments, suggestions, ideas for improvement, and how you are integrating these resources into your classroom or leaning environment.

*George Howe, Co-Producer & Jan Wee, Education Outreach*

Send feedback to: [SustainableDriftless.outreach@gmail.com](mailto:SustainableDriftless.outreach@gmail.com)



Figure 1 Rob, George, Jonas, and Tim