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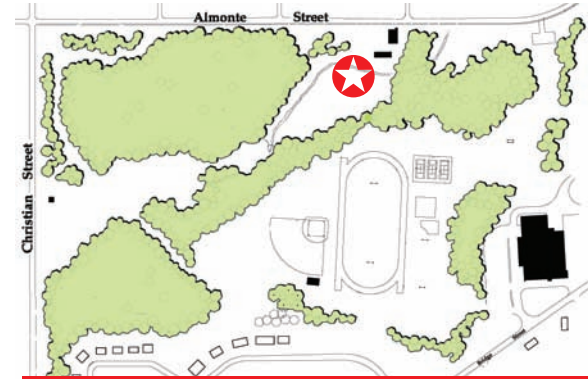
AQUATIC STATIONS

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TERRESTRIAL STATIONS

Funded jointly by Almonte and District High School and Mississippi Valley Field Naturalists

Map reprinted with permission from Mississippi Mills



BIOLOGY **SUSTAINABLE ECOSYSTEMS**

GRADE 9

CURRICULUM USE MAY TO NOVEMBER, 60 MINUTES PLUS TRAVEL TIME

Curriculum Expectations

- Identify and describe the characteristics of biotic and abiotic components of terrestrial and aquatic ecosystems
- Compare and contrast the characteristics of aquatic and terrestrial ecosystems
- Compare qualitative and quantitative data of disturbed and undisturbed terrestrial and/or aquatic ecosystems in order to establish the importance of biodiversity for sustainability

Objective

- To observe, measure, record and report on biotic and abiotic components at a variety of aquatic and terrestrial ecosystem sites
- Instill an appreciation of nature in Gemmill Park

Summary

The Gemmill Park setting provides an opportunity to discover the variable characteristics of both natural and disturbed aquatic and terrestrial ecosystems. In a freshwater ecosystem, water is the most important element. It is needed by all living things for respiration and support, and its characteristics affect all other components of the environment. In a terrestrial ecosystem, change is a constant feature and the plant community causes the change by modifying the abiotic and biotic features of the physical environment.

Prior Knowledge

- Abiotic elements of an ecosystem in a disturbed and undisturbed setting
 - o Stream flow, clarity, temperature and water chemistry
 - o Soil type, water, air, light, wind and temperature on land
- Interdependence between all living things and their environment
- Species identification using guides and measurement

Special Notes

- When planning a date for the field work, it is best to use the lunch period for travel to or from the Park
- Dress for the weather; bring bug spray

Assessment Opportunities

1. Completion of Aquatic and Terrestrial Ecosystem Worksheets (insert)
2. Graphs, using class results. Put position or place or component on x-axis (slow/fast water, field/forest/cut grass or chemistry) and a biotic or abiotic component on y-axis (abundance, type of organism, light intensity, temperature, chemistry)
3. Description and/or analysis of results, possibly combined with group presentations and reports.

Extensions

The Mississippi Valley Field Naturalists would always be interested in a brief presentation of the findings by a small group of students at one of their meetings, scheduled for the 3rd Thursday of each month. Contact Patricia Larkin (613 256 5301)

Preparation for Going Gemmill Ecosystems Study

A few days in advance - In class

- When planning a date for the field work, it is best to use the lunch period for travel to or from the Park
- Divide students into Teams of three or four
- Have each Team prepare their fieldwork kit
 - o 1 copy of Aquatic and Terrestrial Ecosystem Worksheets (Insert)
 - o 1 copy of Selected Biotic Component Identification Key (Page 3) and Map with station locations (Page 4)
 - o Water collection bottle; soil collection bag; pH paper; thermometer
 - o Pencil; clipboard; calculator, measuring tape; stop watch; trowel; bucket or basins; dip net; magnifying glass
- Review: a) use of pH paper and what it means; b) proper use of thermometers; c) protocol for water sampling; d) how to measure stream speed
- Orient students to the map and explain rotation schedule (Below)
- Discuss the activities to be completed in the park and how they might share the tasks in order to complete the data collection at each station
- Remind students when and where to meet to begin the field trip (behind Reformed Presbyterian Church) and to dress for the weather

Day of field trip – Gemmill Park - 60 minutes

Aquatic and Terrestrial Ecosystem Stations


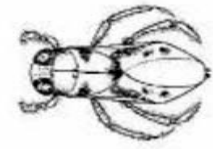



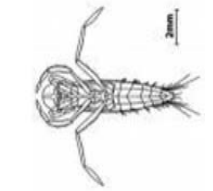
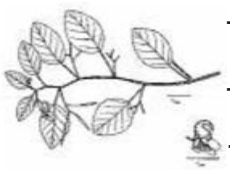
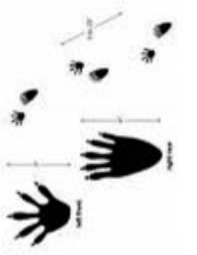

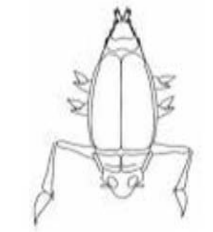

















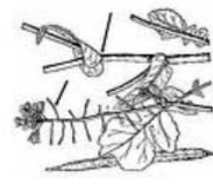
- Upon arrival, remind teams to listen for the whistle and to rotate sequentially through their stations
- Direct teams to their first Station and once they begin, allow 10 minutes for them to complete the appropriate column on the Worksheets
- Teacher signals with whistle that it is time to rotate
- Groups move to their next station, in sequential order, to assess abiotic and biotic components
- Allow 7 minutes to complete column at subsequent stations - repeat until Teams have visited 7 stations

Next days – Science lab

- Test kit analysis
 - o For water samples, determine dissolved oxygen, phosphate and nitrate concentrations
 - o For soil samples, determine water content, humus content, phosphate and nitrate concentrations
- View collected water with a microscope to see algae
- Share results – not all teams collected data at all stations
- Consider suggestions for Assessment Opportunities and Extensions (Page 1)

Team #	STATION ROTATION						
	Start	Second	Third	Fourth	Fifth	Sixth	Last
1	A1	A2	A3	A4	A5	T6	T7
2	A2	A3	A4	A5	T6	T7	T8
3	A3	A4	A5	T6	T7	T8	A1
4	A4	A5	T6	T7	T8	A1	A2
5	A5	T6	T7	T8	A1	A2	A3
6	T6	T7	T8	A1	A2	A3	A4
7	T7	T8	A1	A2	A3	A4	A5
8	T8	A1	A2	A3	A4	A5	T6

Selected Biotic Components Identification Key - Not to Scale

TERRESTRIAL PLANTS		White Cedar	COMMON AQUATIC ANIMALS		Water Boatman	SPECIES THAT FLY		Dragonfly	ANIMAL TRACKS		Deer Mouse
		Larch			Backswimmer			Jewelweed			Raccoon
		Spruce			Whirligig Beetle			Purple Loosestrife			Red Fox
		Aspen			Water Strider			Mosquito			Skunk
		Oak			Leech			Blue Damselfly			Squirrel
		White Pine			Flathead Minnow			Birds			Deer
		Milkweed			Leopard Frog						
		Ragweed									
		Mustard									

Going Gemmill "AQUATIC ECOSYSTEM" Worksheet Date: _____

Team members: 1) _____ 2) _____
 3) _____ 4) _____

	A1 Sheltered waterfall	A2 Rock-cut channel	A3 In open straight	A4 In shade at bend	A5 In open at bend
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ABIOTIC COMPONENTS

* Site Description					
Water Temperature °C					
** Light					
*** Description of stream bottom					
**** Stream velocity (speed in m/s)					
Water pH					
Dissolved O ₂ concentration (in class – optional)					
Nitrate concentration (in class – optional)					
Phosphate concentration (in class – optional)					

BIOTIC COMPONENTS

Species Name or Description					
Measurement					
Abundance 1, 2-5, 6-10, >10					

* Site Description – open, protected, forest, disturbed, undisturbed

** Light – choose either a) Sun, b) Part Sun/Shade, or c) Shade

*** Stream bottom – bedrock, rubble, gravel, sand, silt/mud

**** Stream velocity – time travel of a leaf (m/s) **OR**

Describe as very fast (white water), fast (rapids), slow (some current), very slow (almost still)

Going Gemmill "TERRESTRIAL ECOSYSTEM" Worksheet Date: _____

Team members: 1) _____ 2) _____
 3) _____ 4) _____

	T6 Open Meadow	T7 Forest	T8 Cut Grass
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ABIOTIC COMPONENTS

* Site Description			
Soil Temperature °C			
** Light			
*** Soil types			
Soil pH			
Soil water content (in class – optional)			
Soil humus content (in class – optional)			
Soil nitrate concentration (in class – optional)			
Soil phosphate concentration (in class – optional)			

BIOTIC COMPONENTS

Species Name or Description			
Measurement			
Abundance 1, 2-5, 6-10, >10			

* Site Description – open, protected, forest, disturbed, undisturbed

** Light – choose either a) Sun, b) Part Sun/Shade, or c) Shade

*** Soil Type – List presence of rock, sand, clay, humus