Environmental Science Lesson Plans

Unit 1 – Day 1
Lesson Goals
Students will understand my expectations and the requirements of the class.
Students will understand how their grade is calculated.

Unit 2
Day 2 – 3
Lesson Goals
Students will preview what we will do throughout the year by making observations at three different locations.
Students will be engaged in learning about what it s in their "backyard" beyond a tree, weeds, flowers, birds, etc…

Unit 3
Day 4 – 14
Lesson Goals
Students will understand how to use a topographic map and when one is appropriate.
Students will know the history of the area from present through 450,000 years ago.
Students will know what soil is and why it is important.
Students will know what soil forming factors are and how they influence the soil.
Students will know what a high water table is, how to identify it, and what it indicates in terms of limitations.
Students will be able to determine a soil profile.
Students will be able to identify when soil can act as a pollutant.

EQ

- What do topographic maps tell you that road maps do not?
- What is the history of the region?
- What is soil?
- What is the difference between soil and dirt?
- How do soils develop?
- Where is the water and why is it important?
- What does a soil's profile look like?
- Is too much soil a bad thing?

Topics

- Topographic maps
- Plant migration
- Glaciers
- Mohawk Valley
- Soil
- Dirt
- Climate
- Time
- Parent material
- Biotic
- Redoximorphic features
- Oxidation
- Reduction
- Limitations
- Septic system
- Sedimentation
- Dust bowl

Strategies

- Look at, use, and create topographic maps
- Discussion
- View soil profiles
- Identify redoximophic features
- Diagrams
- Examples

Assessment – Exam

Unit 4
Days 15 – 29
Lesson Goals
Students will be able to use biotic indicators and abiotic indicators to determine relative water quality of local streams.
Students will be able to measure flow rate in cfs.
Students will know the chemistry of water and why the properties of water are so important to life.
Students will be able to explain why lakes and ponds do not freeze solid in the winter and how life persists due to the properties of water.
Students will know the difference between a lake and a pond.
Students will know the history and importance of the Great Lakes and facts about each.
Students will know some of the introduced species in the GLs and how they have impacted the ecosystem.
Students will attend and understand the function of NYS's largest fish hatchery and be able to identify the fish being used and reared at the hatchery.
Students will understand what acid rain is, how it forms, and what it can lead to.

EQ

- Are there differences between two glasses of water?
- How do biotic indicators work?
- How do we measure flow rate?
- Why is water so important?
- Why don't lakes freeze solid?
- What makes a lake a lake and not a pond?
- What is the importance and history of the Great Lakes?
- What did you think of the Salmon River Fish Hatchery?
- What is acid rain and what does it lead to?

Topics

- Biotic indicators
- Abiotic indicators
- Tolerance
- Cfs
- Adhesion
- Cohesion
- Density
- Polar molecule
- Lake
- Pond
- Great lakes
- Introduced species (alewife, zebra mussel, gobie, Asian carp)
- Coho salmon
- Chinook salmon
- Strip
- Milt
- Acid rain
- Dead lake

Strategies

- Diagrams
- Examples
- Identification
- Application of knowledge
- Experience
- Discussion

Assessment – exam

Unit 5
Days 30 – 37
Lesson Goals
Students will know the characteristics that make a fish a fish.
Students will know the different groups of fish.
Students will recognize 50 local fish species and know something about each.
Students will know the internal and external anatomy of fish.

EQ
What is a fish?
What is the role of the state in regards to fish?
What are the fish on the cabinets and what is unique about each one?
What are the parts and functions of the external anatomy of a fish?
What are the parts and functions of the internal anatomy of a fish?

Topics
- Characteristics of fish
- Types of fish
- Local fish
- External fish anatomy and physiology
- Internal fish anatomy and physiology

Strategies
- Field trip
- Diagrams
- Discussion
- Research
- Dissection
- Review
- Pair review

Assessment – Exam

Unit 6
Days 38 – 41
Review for and administer the 10 week exam

Unit 7
Days 42 – 52
Lesson Goals
Students will understand how heat is lost from the body and how clothing material influences heat loss.
Students will understand how wind chill works.
Students will be able to plan a safe route out of the wilderness.
Students will recognize potential food resources.
Students will understand the priorities of life and how to address each one.
Students will know the signs, symptoms, and treatment of hypothermia.
Students will understand the importance of shelters and how to properly construct one.
Students will recognize signs of weather changes – good and bad.
Students will know relative ice safety based upon thickness.

EQ
Where do we lose heat?
How do clothing materials affect heat loss?
How do you plan a safe route to safety?
What is available to eat in the wilderness?
How long do we have to live under different extremes?
What is hypothermia?
What causes hypothermia?
What are symptoms of hypothermia?
How do you treat hypothermia?
Why are shelters important?
How can you predict the weather?
Is the ice safe?

Topics
- Proper clothing
- Heat loss
- Wind chill
- Planning a route
- Priorities of life (bleeding, breathing, temperature extremes, water, food)
- Common wilderness problems
- Hypothermia
- Shelters
- Predicting weather
- Ice safety

Strategies
- Discussion
- Examples
- Application of knowledge
- Exploration
- Review

Assessment – Exam
Assessment – shelter performance and construction

Unit 8
Days 53 – 71
Lesson Goals
Students will know what wildlife ecology is.
Students will know how to estimate populations of wildlife.
Students will know how to calculate standard error and the 95% confidence interval.
Students will be able to use a skull to infer characteristics of the living animal.
Students will be able to use tracks to explain what kind of animal made them and characteristics of the animal.
Students will recognize and know facts about many wildlife species of the region.
Students will know what makes a predator and prey species successful.

EQ
What is wildlife ecology?
How are wildlife populations estimated?
How do we use the mark and recapture method?
What can a skull tell you?
What can tracks tell you?
What are local animals to the region and facts about each one?
What is predation and how are predators successful?
What are prey species and how do they avoid predation?

Topics
- Wildlife ecology
- Estimating populations
- Mark and recapture
- Deer population exercise
- Paper estimation
- Skulls
- Tracks
- Local wildlife species and information about each
- Predation
- Prey species
- Defenses
- Wildlife habitat creation / enhancement

Strategies
- Discussion
- Examples
- Practice problems
- Application of knowledge
- Hands on learning

Assessment
- Exam
- Research project

Unit 9
Days 72 – 80
Lesson Goals
Students will read articles on contemporary issues in the environment and understand them.

EQ
What is going on in the environment and how do you relate to it or are going to be affected by it?

Topics
Varies

Strategies
Students will take ownership of their own interests.

Assessment – summary of issues

Unit 10
Days 81 – 89
Students will review, take, and review the 20 week exam

Unit 11
Days 91 – 92
Lesson Goal
Students will work on their winter safari project and combine the environment with an interest in literature.

EQ
How does what you have captured fit your literary piece?

Topics
- Photography
- Drawing
- Poetry
- Passage

Strategies
Students take ownership of their own work.

Assessment – finished project

Unit 12
Days 93 – 101
Lesson Goals
Students will know how to tie 15 knots and know when the use of each is appropriate.

EQ
What know is appropriate and how do I tie it?

Topics

- Square knot
- Sheet bend
- Double sheet bend
- Fisherman's knot
- Double half hitch
- Trucker's hitch
- Bowline
- Bowline around the waist
- Bowline on a bite
- Figure 8
- Clove hitch
- Constrictor knot
- Albright knot
- Tautline
- Student's choice

Strategies

- Demonstration
- Explanation
- Review
- Pair work

Assessment

- Knot exam

Unit 13
Days 102 – 118
Lesson Goals
Students will now basic terms relating to environmental relationships.
Students will know cycles in nature.
Students will know human caused problems.
Students will know wildlife related diseases and parasites.
Students will understand what a gall is.
Students will understand the physics of lift.

EQ
What are common environmental relationships that exist in nature?
How do the carbon, water, and nitrogen cycle occur?
How might these environmental problems affect you?
What are some common wildlife related diseases and parasites that could affect you?
What made that lump?
How do things fly?

Topics
- Environmental relationships
- Water cycle
- Nitrogen cycle
- Carbon cycle
- Global warming
- Ozone depletion
- Acid rain
- Wildlife diseases
- Parasites
- Gall
- Taxonomic key
- Physics of lift

Strategies
- Examples
- Discussion
- Diagrams
- Application
- Review

Assessment
- Group project
- Exam

Unit 14
Days 119 – 124 And 130 – 141 (Days 125 – 129 are the 30 week exam prep, administration, and review)
Lesson Goals
Students will know the nesting requirements, nesting location, and habitat location for a specific bird species.
Students will understand what migration is, what causes it, and how it occurs.
Students will recognize local bird calls.
Students will recognize local bird by sight.
Students will eliminate potential birds based upon the habitat the bird is in.

EQ

- How will my house fit my bird of choice?
- What is migration? Why do they occur? What are benefits and detriments to the environment and the species?
- What bird do I hear?
- What bird do I see?

Topics

- Nesting cavity
- Habitat
- Migration
- Bird calls
- Bird identification by sight

Strategies

- Hands on application
- Research
- Examples
- Discussion
- Practice
- Review

Assessments

- Project
- Exam

Unit 15
Days 142 – 151
Lesson Goals
Students will recognize different types of forests.
Students will know different methods of seed dispersal.
Students will be familiar with forestry terms.
Students will know local trees and shrubs as well as their timber and wildlife value.

EQ

- What are the different types of trees and forests found around here?
- Are all trees the same?
- What kind of tree or shrub am I looking at and how do I know?

Topics

- Types of trees
- Seed dispersal
- Soil requirements
- Springwood / summerwood
- Mast
- Timber value
- Wildlife value
- Succession
- Timber harvest
- Renewable / nonrenewable forests
- Tree and shrub identification

Strategies

- Notes
- Discussion
- Examples
- Hands on application
- Practice
- Review

Assessment

- Exam

Unit 16
Days 152 – 154
Lesson Goals
Students will know local medicinal and edible plants.

EQ

- What plants can I use and for what?

Topics

- Edible and medicinal uses of local plants

Strategies

- Discussion
- Notes
- Project

Assessment

- Project

Unit 17
Days 155 – 160
40 Week Project with HPE and GWF
Lesson Goals
Students will know the information well enough to teach it to a group of 5th graders.

EQ

- What is the most important information that the 5th graders should know from the assigned unit?

Topics

- Varies from group to group

Strategies

- Responsible for teaching the unit.
- Review
- Practice
- Present

Assessment

- Lesson delivery

Unit 18
Days 161 – end
Entomology if time allows
Otherwise review the year for the final exam and take the final exam