



MAINE MASTER NATURALIST PROGRAM

Student Study Guide - Aquatic Ecology - River

Student Learning Goals:

1. Define what a watershed is.
2. Describe watershed factors that affect water system health.
3. Describe the riparian zone and its ecological functions
4. Define a macroinvertebrate and explain how they are used for biomonitoring.
5. Differentiate point vs. non point water pollution

Student Pre-Class Assignments:

1. Watch YouTube What are Macroinvertebrates? 7:03 <https://www.youtube.com/watch?v=zleWJ3PMKVC>
2. Browse the **Macroinvertebrate Photo Gallery** - from Stroud Water Research Center listed in Additional Resources
3. Read the two excerpts from the Maine DEP Stream Survey Manual (no need to print)
Stream Survey Manual Vol I excerpt PDF (7 pages incl photos & diagrams)
Stream Survey Manual Vol II excerpt PDF (8 pages incl photos)

Bring to Class:

1. Key to Stream Macroinvertebrates PDF - from Izaak Walton League
2. Key for Maine Stream Explorers Basic Macroinvertebrate Guide PDF
3. Maine Stream Explorers Basic Field Data Sheet PDF
4. For Field Day - sturdy waterproof boots or waders (or be prepared to have wet shoes & legs)
5. Hand lens

Vocabulary List:

- water cycle
- watershed
- macroinvertebrate
- riparian zone

A useful glossary is available at the beginning of the Stream Survey Manual Appendix in the first listing in Additional Resources.

Topic Agenda:

Classroom: (1.5 hours)

1. Presentation PowerPoint:
 - Watersheds
 - Water chemistry
 - Pollution
 - Macroinvertebrates
 - Riparian zones
2. Activity - determining stream order and watershed area.
3. Activity - identifying macroinvertebrates.

Field Agenda:

- Collect macroinvertebrates and assess stream quality.

Student Homework Assignments:

None



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Additional Resources:

1. **Maine DEP Volunteer River Monitoring Program** - statewide network of volunteer groups participating in quality assured river sampling. The two volume **Stream Survey Manual and Appendix** can be found here: https://www.maine.gov/dep/water/monitoring/rivers_and_streams/vrmp/index.html
2. **Maine Audubon - Stream Explorers** - website for a community science project featuring aquatic insects and what they can tell us about water quality: <https://maineaudubon.org/projects/stream-explorers/>
3. **Stroud Water Research Center** - site on freshwater systems - the Education link and Macroinvertebrate Resources link include some of the resources below: <https://stroudcenter.org/>
4. **Macroinvertebrate Photo Gallery** - from Stroud Water Research Center: <https://stroudcenter.org/macros/gallery/>
5. **Atlas of Common Freshwater Macroinvertebrates of Eastern North America** - online key with photos and clickable links: <https://www.macroinvertebrates.org/>
6. **Identification Guide to Freshwater Macroinvertebrates PDF** - 16 pages from Stroud Water Research Center: <https://stroudcenter.org/wp-content/uploads/StroudWebsiteMacroKeyFNL.pdf>
7. **Connecticut DEEP Macroinvertebrate Field Identification Cards PDF** - very nice: https://portal.ct.gov/-/media/DEEP/water/volunteer_monitoring/rbv/rbv-macroinvertebrateidcards.pdf
8. **Izaak Walton League of America - Clean Water - Resources for Monitors:** <https://www.iwla.org/water/resources-for-monitors>
9. **Allegheny College - Macroinvertebrate Identification Game** - quiz yourself: <https://sites.allegheny.edu/creekconnections/classroom-resources/macroinvertebrate-identification-game/>