

Biological Assessment of Stream Water Quality

Introductory Activity: Emriver Simulator / Watershed Mapping

Field Activity: Macroinvertebrate Matching, Outdoor Field Study

Description: As one component of water quality research, students collect, identify, and analyze benthic macroinvertebrate populations. Hester Dendy samplers are placed in streams two weeks prior to collection and removed the day of the program or students will properly collect samples during the field activity. Using dichotomous keys, flow charts, and interpretive macroinvertebrate identification software, students identify and count different macroinvertebrate species, categorize them based on pollution tolerance, and create distribution graphs. This information is analyzed to draw conclusions about local stream water.

Objectives: By the end of the program, the students will be able to:

- Define the terms watershed, benthic, macroinvertebrate, and indicator species
- Identify local watersheds by name and number
- Use simple dichotomous keys and flow charts to correctly identify different macroinvertebrates
- Construct a watershed model
- Construct and interpret a distribution graph
- Describe how macroinvertebrates function as indicator species
- Examine their role and formulate ways they can aid in maintaining healthy water
- Recognize the overall health and water quality of a stream is based on physical, chemical and biological analysis

Indiana Academic Standards for Science:

Fourth: 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 2.3, 2.4, 2.5, 2.7, 3.3, 4.2, 4.3, 4.4, 4.6, 5.4, 6.1, 6.2

Fifth: 1.1, 1.2, 1.3, 1.5, 1.6, 2.1, 2.2, 2.4, 2.7, 2.8, 4.4, 4.5, 4.7, 5.7, 5.8, 5.9, 5.10

Sixth: 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 2.2, 2.3, 2.5, 2.6, 2.7, 2.8, 3.8, 4.1, 4.3, 4.8, 4.13, 5.2, 5.4

Seventh: 1.1, 1.2, 1.3, 1.4, 1.7, 1.8, 1.9, 2.7, 2.8, 4.1, 4.2, 4.6, 4.8, 4.9, 4.14, 5.3, 5.4, 7.1

Eighth: 1.1, 1.2, 1.3, 1.8, 2.4, 2.5, 2.7, 2.8, 2.9, 3.6, 4.8, 5.8, 7.1, 7.2, 7.3, 7.4, 7.7

High School: Env.1.3, Env.1.4, Env.1.6, Env.1.10, Env.1.29, Env.1.34, Env.1.35, ES.1.10, ES.1.25, B.1.17, B.1.37, B.1.38, B.1.40, B.1.41, B.1.43, B.1.45

Indiana Academic Standards for Mathematics:

Fourth: 1.1, 1.2, 1.3, 1.9, 2.5, 2.6, 6.1, 6.2, 7.1, 7.3, 7.4, 7.5, 7.6, 7.8, 7.9

Fifth: 1.2, 2.1, 6.1, 7.1, 7.3, 7.4, 7.5, 7.7, 7.8

Sixth: 2.1, 2.2, 6.1, 7.1, 7.4, 7.5, 7.6, 7.9, 7.10

Seventh: 2.1, 6.1, 6.2, 6.4, 7.1, 7.4, 7.6, 7.7, 7.10, 7.11

Eighth: 2.1, 6.1, 6.2, 7.1, 7.4, 7.6, 7.7, 7.10, 7.11

Excellence in Environmental Education – Guidelines for Learning (Pre K – 12):

Fourth Grade	Fifth – Eighth Grade	Ninth Grade
Strand 1 A, C, D, E, G	Strand 1 C, D, E, G	Strand 1 C, D, E, G
Strand 2.2 A, C	Strand 2.2 A, B	Strand 2.2 A, B, C
Strand 2.3 A	Strand 2.4 A, B, D	Strand 2.4 A, D
Strand 2.4 A, D	Strand 3.1 C	Strand 3.1 C
Strand 3.1 C	Strand 4 D	Strand 4 D
Strand 4 D		

Please note specific learning objectives and academic standards will vary based on timeframe, location, availability of resources, and tailored content of programming.