

## Chemical Assessment of Stream Water Quality

Introductory Activity: Emriver Simulator / Watershed Mapping

Field Activity: Tools Explanation, Outdoor Field Study

**Description:** As one component of water quality research, students use Vernier LabQuest scientific handhelds and sensors to measure stream pH, dissolved oxygen, temperature and turbidity. Electronic field notebooks, running interactive water quality software, aid students in hypothesis creation, data entry, observation records and scientific conclusions concerning local stream water.

\*If desired, to demonstrate the principles of wet chemistry, nitrate and phosphate levels can be measured using a CHEMetrics multi-analyte photometer.

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

- Define the terms watershed, point source pollution, non-point source pollution, pH, dissolved oxygen, and turbidity
- Identify local watersheds by name and number
- Name different sources of pollution
- Explain how pollutants travel through the watershed and river
- Explain how different chemical properties of a stream affect water quality
- Construct a watershed model
- Use scientific investigation tools and mathematics to collect chemical water quality data
- Apply the scientific method
- 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 assessment

### Indiana Academic Standards for Science:

**Fourth:** 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 2.1, 2.3, 2.4, 2.5, 2.7, 3.3, 4.7, 6.1, 6.2

**Fifth:** 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 2.1, 2.2, 2.4, 2.5, 2.7, 2.8, 5.1, 5.7, 5.8, 5.10

**Sixth:** 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 2.1, 2.2, 2.3, 2.8, 3.8, 4.8, 5.2, 5.4

**Seventh:** 1.1, 1.2, 1.3, 1.4, 1.7, 1.8, 1.9, 2.3, 2.6, 2.8, 3.12, 3.13, 4.14, 5.4, 7.1

**Eighth:** 1.1, 1.2, 1.3, 1.8, 2.2, 2.4, 2.5, 2.7, 2.9, 3.6, 5.1, 5.8, 5.9, 7.1, 7.2, 7.3, 7.4, 7.7

**High School:** Env.1.4, Env.1.6, Env.1.10, Env.1.15, Env.1.29, Env.1.34, Env.1.35, ES.1.10, ES.1.25, B.1.37, B.1.38, B.1.40, B.1.41, B.1.45

### Indiana Academic Standards for Mathematics:

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

**Fifth:** 1.2, 2.1, 2.5, 5.6, 7.1, 7.3, 7.4, 7.5, 7.7, 7.8

**Sixth:** 2.1, 2.2, 2.3, 5.1, 5.6, 6.3, 7.1, 7.4, 7.5, 7.6, 7.9, 7.10

**Seventh:** 2.1, 3.3, 6.2, 7.1, 7.4, 7.6, 7.7, 7.10, 7.11

**Eighth:** 2.1, 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, B, C, D, E, F, G	Strand 1 A, B, C, D, E, F, G	Strand 1 A, B, C, F, G
Strand 2.2 C	Strand 2.1 B	Strand 2.1 B
Strand 2.3 A, C	Strand 2.3 A	Strand 2.2 A
Strand 2.4 A, B, D	Strand 2.4 A, B, D, E	Strand 2.4 A, B, D
Strand 3.1 C	Strand 3.1 B, 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.