

Algal Bloom Investigation

Introductory Activity: Algal Bloom Concept Map / Algae Investigation Activity

Field Activity: Tools Explanation / Environmental Site Survey, Outdoor Field Study

Description: Students determine the likelihood that an algal bloom will occur on their school site stream or pond by identifying and assessing certain physical, chemical and biological components believed to be associated with algal blooms. Students use Vernier LabQuest scientific handhelds and sensors to measure pH, dissolved oxygen, and temperature. Additional physical and chemical parameters— flow rate, nitrates/phosphates, load rates, light intensity levels—are estimated using nutrient testing kits, light sensors and various field techniques. Using personal observation skills, students look for biological indicators and note relevant environmental conditions including air temperature, cloud cover, seasonal/weather conditions, habitat alterations, and potential land use inputs.

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

- Define the terms algae, algal bloom, pH, dissolved oxygen, nutrients, flow rate, nutrient load and light intensity
- Use scientific investigation tools and mathematics to conduct a physical-chemical-biological assessment
- Apply the scientific method to support or refute their prediction of the likelihood of an algal bloom formation
- Describe how chemical and physical properties of a stream or pond can contribute to the creation of an algal bloom
- Recognize that the overall health and water quality of a stream or pond is based on the interaction of physical, chemical and biological factors
- Explain positive and negative choices humans make that may affect an algal bloom formation

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, 3.11, 3.13, 4.2, 4.4, 4.7, 5.4, 6.1, 6.2, 6.3

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, 4.4, 4.5, 4.7, 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, 2.5, 2.6, 2.7, 2.8, 3.5, 3.8, 3.13, 3.16, 3.19, 4.2, 4.8, 5.2, 5.4, 5.6, 7.3

Seventh: 1.1, 1.2, 1.3, 1.4, 1.7, 1.8, 1.9, 2.3, 2.6, 2.8, 3.12, 3.11, 3.12, 3.13, 4.7, 4.8, 4.14, 5.4, 7.1, 7.3

Eighth: 1.1, 1.2, 1.3, 1.8, 2.2, 2.4, 2.5, 2.7, 2.9, 3.6, 5.1, 5.4, 5.7, 5.8, 5.9, 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.1.14, Env.1.15, Env.1.20, 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.1.43, 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.