

Plant Biodiversity and Photosynthesis

Introductory Activity: Photosynthesis and Respiration Relay / Primary Productivity Mapping

Field Activity: Tools and Experiment Explanation, Outdoor Field Study

Description: Is there a correlation between prairie plant size and photosynthesis? Students investigate this question through guided scientific inquiry, hypothesis formulation, experimentation and analysis of results. Students identify prairie plants, measure plant height, leaf shape, leaf structure, stem structure, blooms, etc. Using Vernier LabQuest handhelds and CO₂ and O₂ sensors, students measure the rate of CO₂ and O₂ during respiration and photosynthesis. Students compile and share their results, formulate an answer to the question and draw conclusions.

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

- Define primary productivity, adaptation, and biodiversity
- Recognize, label and arrange all components needed for respiration and photosynthesis
- Explain the processes of respiration and photosynthesis and how they differ
- Predict and compare global and local primary productivity levels
- Explain how plants have adapted to different environmental conditions
- Apply scientific investigation tools, the scientific method, and experiments to answer questions
- Collect accurate experimental data
- Investigate how much (if any) correlation exists between plant size and rate of photosynthesis

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, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 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, 2.6, 2.7, 2.8, 4.4, 4.5, 4.7, 5.1, 5.7, 5.8, 5.10, 6.1, 6.2

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, 2.8, 4.1, 4.2, 4.3, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 5.2, 5.4, 7.2

Seventh: 1.1, 1.2, 1.3, 1.4, 1.7, 1.8, 1.9, 1.10, 2.3, 2.6, 2.7, 2.8, 4.2, 4.6, 4.7, 4.8, 4.9, 5.3, 5.4, 7.1, 7.2

Eighth: 1.1, 1.2, 1.3, 1.6, 1.8, 2.2, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 4.8, 5.1, 5.4, 5.6, 5.7, 5.8, 5.9, 7.1, 7.2, 7.3, 7.7

High School: Env.1.1, Env.1.2, Env.1.3, Env.1.4, Env.1.6, Env.1.9, Env.1.10, Env.1.12, Env.1.14, Env.1.35, ES.1.10, ES.1.12, B.1.37, B.1.38, B.1.39, B.1.40, B.1.41, B.1.43, B.1.44, B.1.45, B.1.46, B.1.47

Indiana Academic Standards for Mathematics:

Fourth: 1.1, 1.2, 1.3, 1.9, 5.1, 7.1, 7.3, 7.4, 7.5, 7.6, 7.8, 7.9

Fifth: 1.2, 2.5, 5.6, 6.2, 7.1, 7.3, 7.4, 7.5, 7.7, 7.8

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

Seventh: 2.1, 5.1, 5.2, 7.1, 7.4, 7.6, 7.7, 7.10, 7.11

Eighth: 2.1, 3.7, 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, G	Strand 1 A, B, C, D, E, G	Strand 1 A, B, C, D, E, G
Strand 2.2 A, C, D	Strand 2.2 A, B	Strand 2.2 A, B, C
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.