

Unit Title: Nutrient Cycles
Grade Level: 9-12
Subject Area: Biology/Environmental Science
Duration/Length/Number of class periods: 5 days
Description: Students will be able to trace a specific matter (ex: oxygen) through its cycle then analyze the effect of changing amounts within the cycle (ex: global warming causes).
Established Goals (National, State, Local): HS-LS2.B: Cycles of Matter and Energy Transfer in Ecosystems

What <u>Enduring Understandings</u> are desired? All organisms depend on matter to survive.
What <u>Essential Questions</u> will be considered? How do nutrient cycles affect an ecosystem? What are the cycles for water, nitrogen, carbon, and oxygen and how do I fit in it?
Students will know / be able to: 1. Describe the matter cycles of water, nitrogen, carbon, and oxygen. 2. Describe the effect of changes in a cycle on an ecosystem.

Description	For ma tive	Su m ma tive	Intro duct ory Acti vity	Lear ning Acti vity	Stud ent Tech nolo gy Use d	Teach er Tech nolog y Used	ISTE Stand ards
Plant transpiration experiment (baggie around plant leaves) [Students will place plastic bags over a leaf on a plant in a shady area and sunny area to visually measure the amount of moisture collected. This will be the intro to the water cycle.] (This is also a review concept from biology.)			X				

The four cycles: water, nitrogen, carbon, oxygen [This is a video/google search/review of concepts for each cycle. Students can pull from notes/internet/reading to review then show what they know on flipgrid, google slides, google doc, etc in summary form (written, drawn, etc). This sets a baseline for letting me know if I need to do a more thorough review individually or small group.]	X			X	X		3a
Nutrient Pollution [This is a youtube video which sets students up to more thoroughly explore drinking water pollution, algal blooms, or dead zones. Students will research one type of pollution then present a slideshow or flipgrid sharing their research with their peers. This will jigsaw main areas.]				X	X	X	2c, 3a, 3d,
Case Study Exploration [This is just a quick summarizing activity to familiarize students with case studies in general. Students will present a summary of their case study using slides or flipgrid while letting them see the issues. This is a set up for a more in depth unit on case studies/social justice issues related to environmental science.]				X	X	X	1c, 1d, 3, 5c
Mini Project Exploration: [Students will research a key site such as EPA and MnTap to see what issues the site sees as important and what ways the sites support those issues. Students will present in slides or Flipgrid to the group.]				X	X	X	3, 5c
Essay: Which nutrient cycle is most affected by human activity? How do you know? [Students will present their argument in a five-paragraph essay to show their position and the evidence they believe supports their position.]		X					3b

Materials, tools and resources: Google classroom, Flipgrid, PBS LearningMedia
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Additional credit given to: