**Breaking the Cycle**

***Introduction****:* Ecosystems consist of a network of interdependent biotic and abiotic factors. Biological, geological, chemical, and physical processes interact in a closed system, resulting in complex, integrated cycles. This includes the carbon, nitrogen, and hydrologic cycle, each of which are affected by and relied on by living organisms. Human activities often impact each of these cycles in a negative way, causing long-term direct and indirect alterations to the cycles. In this project, you will consider humans’ role in the carbon or hydrologic cycle, describe our impact, discuss the value of maintaining healthy biogeochemical cycles, and propose methods of minimizing the human impact.

**Option 1: Carbon Footprint Challenge**Carbon footprint is the CO2 released due to human usage of fossil fuels. Measure your carbon footprint as a group at your school and find ways to improve your impact on Earth. Using that data, design and implement a program at your school or in your community that will decrease your carbon footprint. Write a 300-500 word essay that describes the rationale behind your project and steps you took to measure, plan and implement your project at your school or in your community. Explain why your project will positively impact the Carbon Cycle and what impact it had on the people involved. Create a poster to present your work. Include sketches and prototypes used during your developmental process.

**Option 2: Air Quality Performance**

Salt Lake, Provo, and Logan consistently rank in the top ten U.S. worst cities in air pollution year after year. Polluted air affects the environment, animal species, and ultimately short-term and long-term human health. Create a performance that creates community awareness of human’s impact on the relevant cycles and highlights some of the solutions to the air quality issues we face in Utah. Examples include writing and performing a song, doing a dance, writing a poem, etc. The piece should reflect your thoughts, feelings, awareness and solutions about Utah’s air quality issues and each performance must be accompanied by an essay (300-500 words) explaining the performance and how it relates to this topic.

**Option 3: The Great Salt Lake Visual Art**

We have the eighth-largest terminal lake in the world right here in our backyard! The Great Salt Lake is one of our most important economic resources as well as an essential home for many diverse species. Due to drought, overuse of water, and pollution, we aren’t able to utilize most of the resources this lake has to offer. Create an art piece that showcases the beauty and importance of the Great Salt Lake and/or ecosystems near you that are tied to the Great Salt Lake. Entries must include a short essay (300-500 words) describing the role the GSL plays in the water cycle, why you chose to highlight that certain area, and how it relates to the significance of the Great Salt Lake.

**Option 4: Biofuels & Alternative Energy Short Film**

If we want to keep up the lifestyle we have now we MUST look into and adopt renewable energy resources such as biofuels. Films can be a strong and powerful way to get a message across. Make a short film about biofuels, how they are developed, how we can use them in place of fossil fuels, and what impact they have on the Carbon Cycle. Videos must be between 2-4 minutes. No essay is required.

**Rubric**

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|  | **10** *All expectations met* | **5***Most expectations met* | **0***Few/No expectations met* |
| Cycle processes- *The relevant cycle’s (carbon, water, nitrogen) processes are accurately explained.* |  |  |  |
| Cycle impacts - *Human activities affecting the cycle are identified and their impacts on the cycle are clearly and accurately described.*  |  |  |  |
| Solutions – *Realistic ways to minimize human impact on the cycle are identified and explained accurately and clearly.* |  |  |  |
|  | **5** *All expectations met* | **3***Most expectations met* | **0***Few/No expectations met* |
| Quality of Work – *Work is accurate, neat, visibly appealing.* |  |  |  |
| Creativity – *Work creates awareness of the issue in an engaging, informative way.* |  |  |  |
| Participation – *All group members involved and on task throughout the research and production process.*  |  |  |  |
| Essay – *Response addresses all requirements, is clear and concise, and is free of grammatical/spelling errors.* |  |  |  |
| **Total** | / 50 |