Educating Youth on the Carbon Cycle within Biofuel Production

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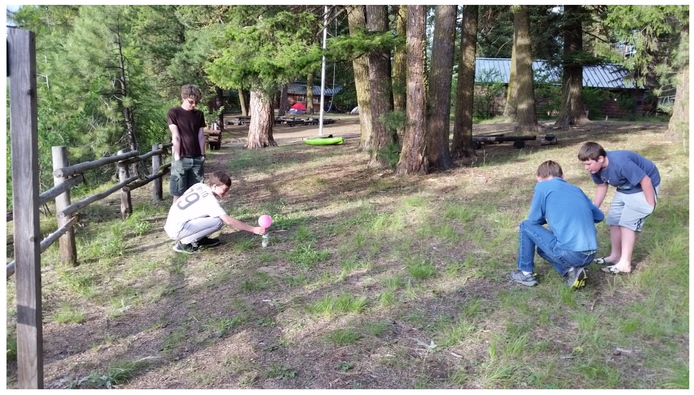
Introduction

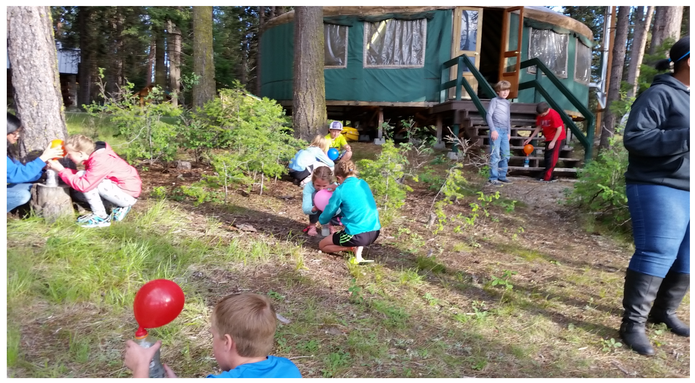
The carbon cycle is the process by which carbon is used, released, and stored. Using renewable carbon from crops and woody biomass rather than fossil fuels, the carbon cycle helps create renewable fuels that can be up to one hundred times healthier for the environment. Our youth is our future, and if we want a healthy future environment, we need to teach them how to achieve it. From this lesson, the students will learn about the carbon cycle by understanding the process and how carbon is effectively and efficiently turned into biofuel. The lesson is designed to be taught to students from the grade levels of 6th-12th.



Methods

1. Students were shown an in class PowerPoint that explained and showed videos on the carbon cycle and biofuel.

2. Students were assigned groups of two, to do the outdoors bottle rocket demonstration of the carbon cycle. In creating the bottle rockets the students are creating a mini version of ethanol that is produced in making biofuel.



3. Each group was given one bottle with vinegar inside which symbolizes the oil and moist from the ground. The teammate not holding the bottle was asked to find a piece of grass or leaf to put in the bottle which would be used only as a symbol for a common crop (corn, apples, etc.); this crop inside the vinegar represents "carbon source."

4. The students were then given a balloon that was used to represent a plane or jet and filled it with baking soda. The baking soda was used as a symbol of fire which is used to turn the grounded crop into ethanol for the motorized vehicle. Once each group placed their balloon onto the bottle the baking soda fell into the vinegar causing a reaction and the fake "ethanol" to form. Each student then holds the rim of the bottle as the balloon began to expand, emphasizing that ethanol is giving power to the plane or jet.

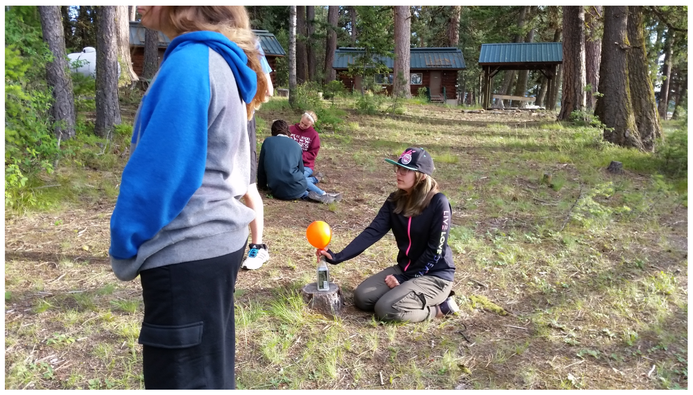
5. As the balloon began to expand, some of the groups jumped back in surprise because they thought that their balloon was filling too fast and was indeed going to burst. When taking the balloon off the bottle yes the balloon did fly but also the "carbon" was being released from the flying balloon.

5. Students took a survey which showed their understanding and knowledge of the carbon cycle and its importance for the environment.

6. Each group of students informed the entire class if they did or did not like building their bottle rocket, why it was able to work or why it was unable to work, and what they can do better to improve their bottle rocket.

Conclusion/Discussion

This lesson was taught to children from the grade levels of 6^{th}-8^{th} at the McCall Outdoor Science School. From this lesson the students learned: what the carbon cycle is, the importance of the carbon cycle, how the carbon cycle can help the world, the carbon cycle process, what biofuel is, examples of biofuel, and how carbon dioxide can be created. Although each student did learn every concept intended, there was still a small confusion on the link between the lesson and the bottle rocket demonstration. The lesson relates to the NARA project because NARA is all about using renewable sources. The carbon cycle explains the way in which crops can be turned into fuel for vehicles and then turned into CO2 that will then be released to the new crops to restart the carbon cycle.



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