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Topic: Matter & Energy Flow Video

Summary: Students will model how a carbon atom makes a round trip from a person through the atmosphere and ecosystem and end finally back in the same person. Energy flow is also incorporated in the video.

NGSS Standards: *HS-LS2-4:* Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.

Time Length: (1 long period or 2 shorter periods). *If you want to show the videos to the class, that will happen on a separate day and require even more time.*

Procedures:

1. The 1st half of period a few students are writing the script on what they will do, and the other students will build the props out of paper and tape.
2. The 2nd half of the period, students will go outside and record their 1-minute video.
3. As homework, one student will edit and upload the video to YouTube.

Prerequisite Knowledge: Students should have already been introduced to the following concepts: carbon cycle, carbon reservoirs, food chain, photosynthesis, cellular respiration.

Materials:

- Construction paper
- Tape
- Student with a smartphone that can record videos and be willing to put that video on YouTube

Accommodations: Students with an IEP could be the sun actor.

Editable DOCX File and Answer Key:
Available at www.ngsslifescience.com

Name: _____ Period: _____
Name: _____
Name: _____
Name: _____

Matter & Energy Flow Video

Purpose:
Demonstrate how carbon atoms move and energy flows in the biosphere.

What to Model:
You and several partners will model how a carbon atom makes a round trip from the atmosphere through a plant and then animal and finally back in the atmosphere.

Group Members:
1 student will be the video recorder and narrator.
3 students will be the plants, animals, and sun.

Procedures:
1. The 1st half of period a few students are writing the script on what they will act out (physically do in the video) and the other students will build the props out of paper and tape.
2. The 2nd half of the period, students will go outside and record their video.
3. As homework, one student will edit and upload the video to YouTube.

Props:
- Flash light, cup of water
- Paper cutouts many carbon atoms, a lightning bolt, and labels: 10000 kCal, 1000 kCal, 100 kCal, 900 kCal. Each plant & animal need a prop: large label, mask/diagram on body

Concepts Required to Demonstrate in Video:
1. Photosynthesis
2. Cellular respiration
3. Consumption
4. 10% rule for energy flow (use kCal, example plants have 1000 kCal after photosynthesis)
5. Different reservoirs (biosphere, atmosphere)

Video:
Your group will record a max 1-minute video of students acting out the food chain. Quality of the video is more important than the amount of time.

Requirements:
- Each actor needs to pass the carbon atom prop to the next actor to demonstrate transfer.
- Publish the video on YouTube with the privacy settings as "Unlisted".
- Email the teacher the link to the video before next class the next day.

Ideas in your script:
- Who will be which actor / narrator
- What will they do to demonstrate the science concept?
- What will the narrator say when each student is demonstrating their concept?

Your Script: *Who will perform and what are the main ideas the narrator will say*

- Your script should be like bullet point notes, not sentences.

Part 1: Person:_____Main Concepts: _____

_____

Part 2: Person:_____Main Concepts: _____

_____

Part 3: Person:_____Main Concepts: _____

_____

Part 4: Person:_____Main Concepts: _____

_____

Part 5: Person:_____Main Concepts: _____

_____

Part 6: Person:_____Main Concepts: _____

_____

Part 7: Person:_____Main Concepts: _____

_____

Part 8: Person:_____Main Concepts: _____

_____

Part 9: Person:_____Main Concepts: _____

_____

Group Grading Rubric:

A	B	C	D
• All concepts are well explained (narrated) in the video • All concepts are demonstrated by acting them out in the video • Each student participated equally and the actors used props	• All concepts are explained in the video • All concepts are demonstrated by acting them out in the video • Some students did not participate equally OR some actors did not use props	• One concept is missing in the video • Each student participated equally and the actors used props	• One or more concepts are missing in the video • Some students did not participate equally OR some actors did not use props

Zero grade is awarded for incomplete or missing video.