

Shine “Got a Week?”

By Shira Dickler

Choose from any of the following activities to create a week-long curriculum.

Act 1

I. *Long Time Comin’*/ dinosaur and humanity’s first fire

a. Themes explored in this scene:

- i. Carboniferous Period¹
- ii. Expansion of ancient plants and animals on land²
- iii. Photosynthesis³
- iv. Formation of fossil fuels⁴

b. Discussion/Research Questions

- i. How do plants and animals leave behind fossils?
- ii. How do plants get their energy to grow?
- iii. How do you think “fossil fuels” got that name?

c. Warm Up

i. “Running Through Mud”

- Objective: Warm the group up and generate energy
- Activity: Ask the group to move around the room using the entire space and moving with the music. Give instructions to the group to follow that will change the way they are moving:
 - Walk quickly
 - Slow motion
 - Walking on the heels of your feet
 - Hop on one leg
 - Walk as if you were moving through mud
 - Walk like you are on ice

d. Embodied activities

i. **Costumes:** Create body “capas” of ancient plants and animals

ii. **Movement:**

- First, students will create a physical representation of the historical stages explored in this scene, including: Ancient plants and animals exploring the planet/ photosynthesis/ animals eating plants/ animals dying and getting covered up by dirt and mud and sand/ animals and plants being compressed to form fossil fuels (under brown cloth).

- While under the brown cloth, students will remove their plant or animal costume and roll out from under the cloth, leaving the “fossil” beneath the cloth. On cue, several students will act as dinosaurs walking across stage. Then, two “humans” will come out and act out lighting a fire with sticks. As the fire is lit, release carbon (small pieces of black tissue paper) into the air.

iii. **Materials Needed**

- Pieces of Tyvek (about 36”/45”) for each student to make a “cape” of their ancient plant or animal
- Longer pieces of Tyvek to cut out and design dinosaurs
- Multiple wide-tip colored water-based markers
- Scissors
- Cut up black tissue paper

1. “The Carboniferous period, part of the late Paleozoic era, takes its name from large underground coal deposits that date to it. Formed from prehistoric vegetation, the majority of these deposits are found in parts of Europe, North America, and Asia that were lush, tropically located regions during the Carboniferous” (<http://www.nationalgeographic.com/science/prehistoric-world/carboniferous/>).

2. “Carboniferous coal was produced by bark-bearing trees that grew in vast lowland swamp forests. Vegetation included giant club mosses, tree ferns, great horsetails, and towering trees with strap-shaped leaves. Over millions of years, the organic deposits of this plant debris formed the world’s first extensive coal deposits—coal that humans are still burning today” (<http://www.nationalgeographic.com/science/prehistoric-world/carboniferous/>).

3. Photosynthesis has a direct relationship with historical carbon levels and climate change. See linked website for an excellent description of photosynthesis and its relationship to climate (<http://www.columbia.edu/~vjd1/greenhouse.htm>).

4. “Fossil energy sources, including oil, coal and natural gas, are non-renewable resources that formed when prehistoric plants and animals died and were gradually buried by layers of rock. Over millions of years, different types of fossil fuels formed -- depending on what combination of organic matter was present, how long it was buried and what temperature and pressure conditions existed as time passed. Today, fossil fuel industries drill or mine for these energy sources, burn them to produce electricity, or refine them for use as fuel for heating or transportation. Over the past 20 years, nearly three-fourths of human-caused emissions came from the burning of fossil fuels” (<https://energy.gov/science-innovation/energy-sources/fossil>).

II. *Harvest Song/ Foss Folks*

a. Themes explored in this scene:

- Agriculture⁵
- Settlement of cities due (in part) to grain storage⁶
- Rural vs. urban attitudes towards the Earth/environment

b. Discussion/Research Questions

- What grain allowed for your city to form? Corn, wheat or rice?
- What are some of the characteristics of communal-based agricultural practices? How does the introduction of fossil fuels change these?

c. Warm Up

- “1 by 2 by Bradford”
 - Objective: Fostering concentration and working together

- **Activity:** Have everyone partner up. Start by telling each pair to count to three, but by alternating numbers (person A says 1, person B says 2, person A says 3, and repeat). After a moment of that, tell the groups to continue doing this, but replace 3 with a sound. Let all the groups figure that out for a moment, and then tell them they now need to replace 1 with a movement. After a minute or so, tell each group that they now have to replace 2 with a movement and sound. Let the pairs continue for another minute, and encourage them to experiment with changing the tempo, volume, and energy levels.

d. Embodied activities

i. **Costumes/Props:**

- Harvesters- Create stalks of plants out of newspaper/cardboard
- Foss followers- Create “bling” sashes to wear across their chest

ii. **Movement:** Students will demonstrate the following activities, based on the group they are a part of

- Harvesters- tilling soil, planting (using tissue paper seeds) and harvesting
- Foss followers- Strutting around the room, knocking over stalks with disregard, performing their urban style
- Both groups- In the second part of the song, both will demonstrate how the two approaches to life can coexist with vitality

iii. **Materials Needed**

- Tissue paper (yellow, orange, and green)
- Newspaper
- Rubber bands
- Scissors
- 4”/40” strip of Tyvek for each “Foss follower”
- Stapler
- Wooden bowl (to hold tissue paper “seeds”)

5. “The history of agriculture is the story of humankind’s development and cultivation of processes for producing food, feed, fiber, fuel, and other goods by the systematic raising of plants and animals. Prior to the development of plant cultivation, human beings were hunters and gatherers. The knowledge and skill of learning to care for the soil and growth of plants advanced the development of human society, allowing clans and tribes to stay in one location generation after generation. Archaeological evidence indicates that such developments occurred 10,000 or more years ago” (http://www.newworldencyclopedia.org/entry/History_of_agriculture).

6. “The concept of the ‘urban revolution’, first identified by V. Gordon Childe (1892-1957 CE), describes a series of social changes that brought about the development of the earliest cities and states... These changes (such as the origin of social classes and the production of an agricultural surplus) provided the social context for the earliest cities. Once class-structured state societies took hold in a region, individual cities rose and fell in response to a variety of forces” (<http://www.ancient.eu/city/>).

III. *Weaving*

a. Themes explored in this scene:

- i. Fabric of community⁷
- ii. Early machines using human energy⁸
- iii. How communities come together and distinguish themselves

b. Warm Up

i. “Instant Images”

- Objectives: Communication, tackling an issue, and building a discussion
- Activity: Decide on a theme to work on with the group related to the lesson unit. Everyone stands in a circle facing outwards. The leader shouts out a key word that is related to the issue, counts to three, and then claps. On the clap, the players turn into the circle and make frozen images of the word using their bodies. After giving everyone a few minutes to look at each others’ image, ask for volunteers to talk about their images and why they choose them. This helps facilitate discussion on a certain issue and lets the players express themselves in their bodies.

c. Discussion/Research Questions

- i. What are some characteristics of the community you live in? What brings people together?
- ii. How does the weaving process make fabric stronger?

d. Embodied activities

i. **Costumes/Props:**

- Students will decorate long pieces of paper with images that represent their city, making up the “fabric of their communities” when woven together, such as monuments, schools, nationalities, religions, sports, bodies of water, businesses, popular pastimes, favorite foods, types of transportation, flags, etc.

ii. **Movement:** Students will create a human loom by doing the following:

- Arrange 16 students into a square, with 4 along each side. The students on the top and left sides (8 in total) will each have a roll of paper.
- Students holding rolls will weave them together, alternating between the top and left sides. Students will hand the end of the rolls to their partners on the opposite sides.

- Once the weaving is complete, students on the bottom will kneel down and slant the fabric at an angle so allow spectators to see the finished product

iii. **Materials Needed**

- Set of 8 20 foot/1 foot strips of paper in various colors
- Multiple wide-tip colored water-based markers

7. Humanity, wanting to protect itself from the weather, began weaving cloth during Neolithic times. Soon, they introduced technology to help them do it more effectively, eventually using fossil fuels to fuel weaving machines (<http://www.historyworld.net/wrldhis/PlainTextHistories.asp?ParagraphID=cas>).

8. Textiles are associated with the very beginning of the Industrial Revolution—the social shifts that follow the development of weaving can elucidate the many changes occurring in human society during this rapidly changing time. Weaving went from being a family activity, to a skilled craft, to a mechanized process done in factories (<http://www.weavedesign.eu/weaving-history>).

IV. *Progress*

a. Themes explored in this scene:

- Mining fossil fuels
- The Industrial Revolution⁹
- Use of fossil fuels to fuel machines¹⁰
- Disruption of carbon cycle through carbon emissions from fossil fuel use¹¹
- Who is impacted the most by climate change?¹²

b. Warm Up

i. “Telephone with a Twist”

- Objective: Generates energy and encourages communication
- Activity: Start with everyone in a line. The person on one end of the line starts the telephone. Instead of passing down a phrase, they pass down an explanation of a movement (such as “hop on one foot in a circle”). The line continues to pass down the instruction until it gets to the end. The last person in the line then has to do the movement that was instructed, and see how close they were to the original.

c. Discussion/Research Questions

- What are some ways that you use fossil fuels in your life?
- How is the use of fossil fuels a double-edged sword?

d. Embodied activities

i. **Costumes/Props:**

- Students will decorate large black banners as flags that represent the many ways in which their city uses fossil fuels (ie heating homes and businesses, power plants, transportation, street lights). Both sides of the flags will be decorated and taped to 5’ wooden poles.

ii. **Movement:** Students who are not playing the role of weavers will do the following:

- Hold flags and circle around the weavers (who are still holding the fabric of community)
- Portray the march of progress with strength and determination, pantomiming the digging up of the fossil fuels
- Once the storm starts, circle the weavers as though caught up by the wind of the storm, allowing the flags to represent the strong winds
- At the last “clang” of the storm, 2 or 3 should rip through the fabric of community destroying it
- One of the weavers is hurt and falls to the ground into Foss’s arms just as the storm stops. As Foss looks up to Sol and asks “what now?” that is the final tableau of Act 1.

iii. **Materials Needed**

- 9 pieces of Tyvek cut in rectangles 36”/45”
- Multiple wide-tip colored water-based markers
- 9 5-foot wooden poles
- Black duct tape (for affixing banners to poles)

9. “The Industrial Revolution, which took place from the 18th to 19th centuries, was a period during which predominantly agrarian, rural societies in Europe and America became industrial and urban. Prior to the Industrial Revolution, which began in Britain in the late 1700s, manufacturing was often done in people’s homes, using hand tools or basic machines. Industrialization marked a shift to powered, special-purpose machinery, factories and mass production. The iron and textile industries, along with the development of the steam engine, played central roles in the Industrial Revolution, which also saw improved systems of transportation, communication and banking. While industrialization brought about an increased volume and variety of manufactured goods and an improved standard of living for some, it also resulted in often grim employment and living conditions for the poor and working classes” (<http://www.history.com/topics/industrial-revolution>).

10. “The new form of mineral-intensive economy pioneered in Britain during the late 1700s, and imitated in the U.S. and beyond in the centuries since, encountered no such limits. Instead of drawing upon limited flows of energy through surface ecosystems, mineral-intensive economies accessed much greater supplies of energy by extracting ancient stocks of energy from beneath the earth in the form of coal, petroleum, and natural gas. Fossil fuels essentially enabled Americans to harness the power of ancient suns. Coal-powered technologies magnified the strength, stamina, and precision of American workers, making the U.S. labor force the most productive in the world” (<http://teachinghistory.org/history-content/beyond-the-textbook/23923>).

11. “Without human interference, the carbon in fossil fuels would leak slowly into the atmosphere through volcanic activity over millions of years in the slow carbon cycle. By burning coal, oil, and natural gas, we accelerate the process, releasing vast amounts of carbon (carbon that took millions of years to accumulate) into the atmosphere every year. By doing so, we move the carbon from the slow cycle to the fast cycle. In 2009, humans released about 8.4 billion tons of carbon into the atmosphere by burning fossil fuel” (<https://earthobservatory.nasa.gov/Features/CarbonCycle/page4.php>).

12. “Many women around the world must adapt their lives to a changing climate. Increases in extreme weather conditions—droughts, storms, and floods—are already altering economies, economic development, and patterns of human migration, and are likely to be among the biggest global health threats this century. Everyone will be affected by these changes, but not equally. Vulnerability to climate change will be determined by a community or individual’s ability to adapt. Studies have shown that women disproportionately suffer the impacts of disasters, severe weather events, and climate change because of cultural norms and the inequitable distribution of roles, resources, and power, especially in developing countries” (<http://www.prb.org/Publications/Articles/2012/women-vulnerable-climate-change.aspx>).

Discussion Questions for Further Learning

1. Science-based questions

- How do plants and animals leave behind fossils?
- How do plants get their energy to grow?
- How do you think “fossil fuels” got that name?
- What are some of the characteristics of communal-based agricultural practices? How does the introduction of fossil fuels change these?
- What is the carbon cycle? How can it be “disrupted”, as discussed in the show?

2. Literature-based questions

- Why is “Foss” considered the brother of “Sol”?
- What does Sol think of carbon emissions at the beginning of *Shine*? How does her perspective change throughout the musical?
- How do the “Foss Folks” influence the Harvesters and their lifestyle?
- Why does Foss’s ideas make Sol so concerned?
- How is metaphor used in this play? Is this an example of literary metaphor or dramatic metaphor?
- What is the effect of having anthropomorphized characters? How does this impact your understanding of the scientific concepts presented?

Questions? Contact Beth Osnes beth.osnes@colorado.edu

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