

Fire: Friend or Foe?

Fire Ecology as a Management Tool for a Tallgrass Prairie Ecosystem

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Grade Level	10th – 12th Grade	**Time Frame**	120 minutes
Subject	Science	**Duration**	2-3 class periods
Course	Biology, Environmental Science		

Essential Question

How does fire impact prairie ecosystems?

Summary

In this lesson, students explore the Tallgrass Prairie ecosystem and fire ecology as a management tool. They evaluate the prairie ecosystem's response to the impact of burning.

Snapshot

Engage

Students explore various prairie ecosystem photos and images of prairie fires. They then write whatever descriptive words that come to mind as they look at them.

Explore

Students view a map of North American prairies and complete an I Notice, I Wonder activity. Students explore articles to begin a CER that will answer the essential question: *How does fire impact prairie ecosystems?*

Explain

Students participate in an activity to sort goods and services based on their knowledge of grasslands.

Extend

Students view an Individual Career and Academic Plan (ICAP) video to learn about the importance of using fire to improve plants and ecosystems.

Evaluate

Students complete their CER using their notes from the lesson and a list of prescribed vocabulary terms.

Standards

ACT College and Career Readiness Standards - Science (6-12)

IOD203: Find basic information in text that describes a simple data presentation
IOD402: Compare or combine data from a simple data presentation (e.g., order or sum data from a table)
EMI401: Determine which simple hypothesis, prediction, or conclusion is, or is not, consistent with a data presentation, model, or piece of information in text

Oklahoma Academic Standards (Biology)

B.LS2.6 : Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
B.LS2.6.1: A complex set of interactions within an ecosystem can keep its number and types of organisms relatively constant over long periods of time under stable conditions.
B.LS2.6.2: If a modest biological or physical disturbance to an ecosystem occurs, it may return to its more or less original status (i.e., the ecosystem is resilient) as opposed to becoming a very different ecosystem.
B.LS2.6.3: Extreme fluctuations in conditions or the size of any populations, however, can challenge the functions of ecosystems in terms of resources and habitat availability.

Attachments

- Card Sort Place Mat—Fire, Friend or Foe.pdf
- Card Sort Place Mat—Fire.docx
- Card Sort—Fire, Friend or Foe.docx
- Card Sort—Fire, Friend or Foe.pdf
- Claim, Evidence, Reasoning (CER)—Fire, Friend or Foe.docx
- Claim, Evidence, Reasoning (CER)—Fire, Friend or Foe.pdf
- Lesson Slides—Fire, Friend or Foe.pptx
- Three Sticky Notes—Fire, Friend or Foe.pptx

Materials

- Lesson Slides (attached)
- Card Sort Place Mat (attached; one per student)
- Card Sort cards (attached; one set per student)
- Claim, Evidence, Reasoning (CER) (attached; one per student)
- Three Sticky Notes slides (attached; one per class)
- Wakelet (linked)
- Sticky notes
- Pens or pencils

Preparation: Card Sort and Slides Setup

Before beginning this lesson, print and cut out the attached **Card Sort** cards (one set per pair of students) for the Explain activity. Printing the cards on heavier paper, such as card stock, and laminating them will ensure that they last longer than just this one lesson!

Attached is a copy of slides that can be used for the **Three Sticky Notes** activity. Add the slides to an online space, such as your school's LMS or a Google Drive, then ensure students can edit them. Create a QR Code or share a link with students.

Engage

Paper Alternative to Google Slides

If you'd prefer, you may print the images from the Google Slides, hang them around the room, and have students jot down answers on their own notebook paper.

Introduce the lesson using the attached **Lesson Slides**. Display **slides 3–4** to share the lesson's essential question and learning objectives.

Move to **slide 5** and share your link or QR code to the Three Sticky Notes slides. Share the Three Sticky Notes strategy. Ask students to look at images on slides 2–5 of the slides and add three sticky notes of adjectives that come to mind as they are doing so.

Share **slide 6**, if needed, to review what an adjective is. Move back to slide 5 with the instructions, reminding them to stop at the image on slide 5. Once all students have made it through the first set of images, have a class discussion to address any misconceptions.

Display **slide 7** and instruct students to move on to slides 8–12 following the same instructions as before. Again, once students have completed this set of images, have had another class discussion, again addressing any misconceptions they might have.

Explore

Display **slide 8** and share the I Notice, I Wonder strategy with students. Tell students they are looking at prairies in the U.S. The map of original and current North American prairies should elicit student conversation. Instruct them to write down their observations prior to them sharing their answers with the entire class or perhaps with an elbow partner.

Display **slide 9** and play the animated video that explains the Claim, Evidence, Reasoning (CER) instructional strategy. Stop the video at the 0:50 timestamp.

Display **slide 10** and pass out the attached **Claim, Evidence, Reasoning (CER)** handout or post to Google Classroom. Pose the question "How does fire impact prairie ecosystems?" and instruct them to respond to the question in the "claim" box.

Display **slide 11** and play the remainder of the animation before moving to **slide 12** and sharing the linked Wakelet. Instruct them to use the articles to gather evidence that supports their claim.

Teacher's Note

The map legend is intentionally too small for students to read, but the light green was the original range of all the prairies and the dark green is the remaining prairie habitat. If students are familiar with CERs, you may wish to skip slide 8. In the Wakelet documents and videos, note that the term "*grassland*" is sometimes used interchangeably with the term "prairie."

25 minutes

Explain

Display **slide 13** and share the Card Sort strategy with students. Place them in groups of 2 and pass out the attached **Card Sort** cards and a **Card Sort Place Mat**. Instruct them to make their choices and place the cards on their placemat before moving on. Ask students to leave their placement paper intact.

Display **slide 14**. Tell students that prairies are responsible for everything they just placed on their card sort placement. Ask them to check their placements against the key on the screen. Discuss some of the differences and/or some of those that most frequently were placed in the wrong category. Mention that both goods and services are all vitally important to us as humans (point out the circle at the bottom of the diagram) and that, just like oceans, rainforests, deserts, etc., prairies provide humans with goods and services, too.

Extend

Display **slide 15** and share the Surprising, Interesting, Troubling (SIT) strategy with students. Ask them to summarize what they will view in the following two videos.

Display **slide 16** and show the Individual Career Academic Placement (ICAP) video with Andrew Warrior (5:41). Andrew Warrior is the agriculture coordinator for the Absentee Shawnee Tribe of OK. One portion of his job is controlled burns on tribal lands. If closed captions aren't on, you may want to activate it as he does speak softly.

Display **slide 17** and share the second video about Prairie Fire Controlling Invasive Species (4:52). This is actual footage of a controlled burn.

Display **slide 18** and hand out three sticky notes to each student. Instruct them to write their surprising fact on one sticky note, their interesting fact on another, and their troubling fact on the last sticky note. You may want to color-code the sticky notes to make it easier for students and yourself. Select a spot in the classroom for them to place their sticky notes. As the facilitator, at each of the three areas, select a few to read aloud to the entire class. Allow time for student discussion and encourage them to take notes and add evidence to their CER handout.

Teacher's Note

The second video was produced in 360 degrees. If the students are viewing it on their laptop, tablet or phone, they can move the image around using their mouse arrow (click and drag) or their finger. Alternatively, if you have VR headsets, they can use those to also create a fully immersive experience.

Evaluate

Display **slide 19** and instruct students to review their notes from the lesson. Using the CER handout from earlier, they should review their original claim, organize their evidence into complete sentences that support the claim, and provide reasoning that explains why their evidence supports their claims.

Move to **slide 20** and share that they need to use the following terms in their final CER write-up. Display **slide 21** and highlight that bulleted words are in the right-hand column.

Teacher's Note

For students interested in learning more about fire ecology in Oklahoma, these are resources available to share:

- Oklahoma State University Fire Ecology program
- Oklahoma Prescribed Fire Council

Resources

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