Birds and Fire

Submitted By:
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Overview
Students will learn about the impacts fires have on an ecosystem as they research prescribed vs incidental fires and compare different ecosystems. Then they will use the explore feature on the Project eBird database to examine bird habitat preference and use that information to learn more about fire management in different areas and consider how living and non-living things are interconnected in an ecosystem.

Grade Levels
5

Curriculum Correlation
5.L.2.1 Compare the characteristics of several common ecosystems, including estuaries and salt marshes, oceans, lakes and ponds, forests, and grasslands.

5.L.2.3 Infer the effects that may result from the interconnected relationship of plants and animals to their ecosystem.

5.G.1.2 Explain the positive and negative effects of human activity on the physical environment of the United States, past and present.

Duration
1 week of observations, 1 week of working on projects

Location
Classroom

Materials
Computers

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Learning Targets

Students will understand human activity like fires can modify the physical environment, both positively (prescribed burns) and negatively (wildfires).

Students will know that the organisms in an ecosystem have interconnected relationships with other organisms as well as abiotic factors -specifically, bird species and the plants in their ecosystem and how fire affects them both.

Students will know identifying characteristics of types of ecosystems in North America.

Educators Information

Read this article to learn more about how wildfires affect birds.

Procedure

DAY ONE:
Engage –
5 minute Warm Up:
Adapted from the "Smokey Bear Said What?" activity from Project WILD (2005), pg 314

Open-ended probe question "What can fires do to an ecosystem?"

Ask the probing question as a pre-assessment to see what students know about fire in ecosystems. Start by having students think and record on their own all of the things they know or have heard about fires in nature, i.e. what's been in the news about wildfires, damage caused, the way the spread, how they started, etc.

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Explore –
20 Minutes, Continued for Homework

Continuing with adaption from the "Smokey Bear Said What?" activity from Project WILD (2005), pg 314

Split the students into two groups: one to research periodic prescribed fires, one to research accidental/incidental fires. Groups should take notes on what they find.

Self guided research links for each group:

Group One: Periodic prescribed burns: https://smokeybear.com/en/about-wildland-fire/benefits-of-fire/fire-in-nature

https://smokeybear.com/en/about-wildland-fire/benefits-of-fire/fire-in-nature/fire-dependent-ecosystem-without-periodic-fire

Group Two: Accidental/incidental fires:

http://www.sciencemag.org/news/2017/09/who-starting-all-those-wildfires-we-are

https://blueridgemountainlife.com/forest-fires-western-nc/

https://www.nifc.gov/fireInfo/fireInfo_stats_lightng.html

https://www.nifc.gov/fireInfo/fireInfo_stats_human.html

DAY TWO:
Explain –
30 minutes, combined with Math

Group discourse, T chart on whiteboard

What can fire do to an ecosystem?

Starting with the Accidental/incidental Fires group, have them share their research and what

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they learned about the effects of fires on an ecosystem. Record student data on the board, group it without labels into pros and cons of fire on the ecosystem.

Encourage discourse by allowing the Periodic Prescribed Burns group to share information that may agree or disagree with the students' assessment. Also record their data on the board in the same columns.

Critical Thinking Question: What impact can fire have on an ecosystem when we consider the four Earth Systems – Lithosphere, Hydrosphere, Atmosphere, Biosphere

Commented [CW1]: Is this just a question you will ask whole group or will the students have the time to analyze this question with a drawing that might represent their insights? It is a valuable question!

Use the attached Venn Diagram and fill in the circles during the discussion: ESS Diagram

***Accidental fires that burn too hot can destroy most of the plant life, leaving no food or shelter for other animals**

***Cool burning fires can clear out debris and fuel, enriching the soil for seedlings**

***If there is a high temp fire and all the vegetation is burned away, rain can wash away the soil that is left because nothing is there to hold it in place.**

***Ash and soot from the fire creates poor air quality for not only the immediate area, but sometimes for areas 100s of miles away.**

***The ash and soot can also get into the hydrosphere, creating poor water quality for the ecosystem.**

Have the students evaluate the columns to determine how they can be labeled, ie Pro or Con

THEN

Introduce how to look at and interpret data in a spreadsheet; compare the different agency reports to the amount of land managed in the US by each agency.

ASK

What do you notice that you see in the fire data in the graph?

Commented [CW2]: In the fire data?...missing word

Maps: At a glance, which agency appears to manage the most land?

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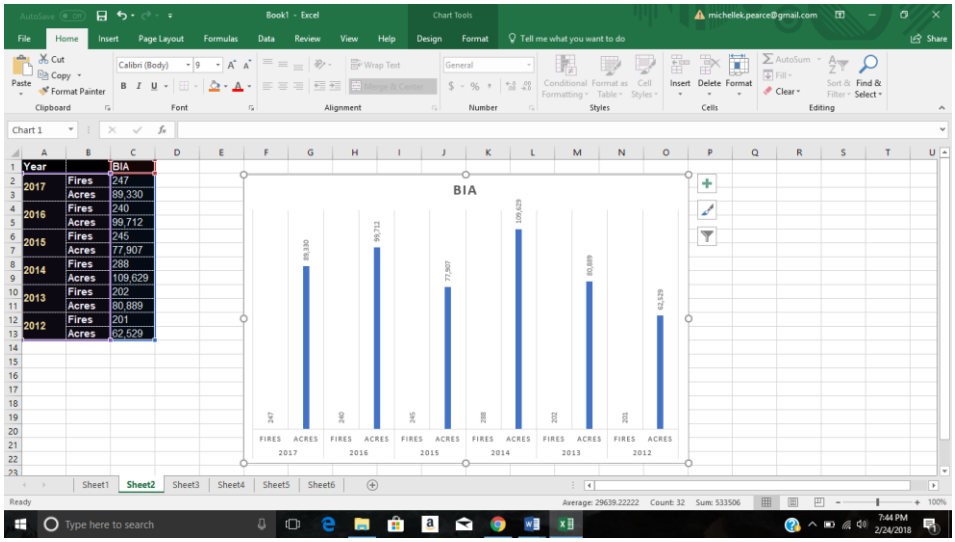
Why do some agencies have more Prescribed Burns than others?

Spreadsheet link:

https://www.nifc.gov/fireInfo/fireInfo_stats_prescribed.html

Have the students copy the data from 2012-2017 into an Excel Spreadsheet. They will have to create a chart for each agency. Then they can select the data to create a chart to show their data. I recommend using a clustered column chart, formatting to style 2 so they can see the numbers for fires and acres listed for comparison. See attached:



Map of Bureau of Indian Affairs Lands

Map of Bureau of Land Management

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US Forest Service Map

US Fish and Wildlife Refuge Map

National Parks Map

DAY THREE AND FOUR
Elaborate

Warm up video: Fire Lover

Create 7 small groups, introduce the class to the eBird database.

Assign each small group a bird species; do not tell them the affiliated habitat just yet.

1. White-headed Woodpecker/Stanislaus National Forest (CA)
2. Kirtland's Warbler/Grayling State Forest Area (MI)
3. Red-cockaded Woodpecker/Croatan National Forest (NC)
4. Pine Warbler/Kisatchie National Forest (LA)
5. Ruffed Grouse/Acadia National Park (ME)
6. Lesser Prairie Chicken*/Black Kettle National Grassland (OK)
7. Black-backed Woodpecker/White Mountain National Forest (VT)

*The Lesser Prairie Chicken is a sensitive species, so it will be difficult to find a precise location on the map. The nat'l grassland listed provides habitat management for this species.

During this portion of the activity the students will be using eBird data of specific bird species found around the US and details about a park or protected land easement that is

their ecosystem. As they zoom in on specific areas, they will find clustered of observations in the assigned areas.

Commented [CW3]: Love how you wove this in – esp. that it is a citizen science data bank and that students are immersed again in relevant data.

https://ebird.org/explore

1. Go to the main Explore Data page and select Species Maps
2. Have the students do a search of their bird species on the map, zooming in on areas with the highest concentration of sightings (25-100%), looking for a connection to a public land, national forest, national park, etc. Have them find the assigned park/ecosystem that connects with their bird. For example a large concentration of White-headed Woodpecker sightings occurs in Stanislaus National Forest in the Sierra Nevada range of California.

Project Assignment: Have the students research their bird's preferred habitat/protected land and its connection to fire; start with the Cornell All About Birds or the Audubon Bird Guide site. Also have the students search for the ecosystem details and fire management plan for the public land where their bird lives. A search of the land area name combing with "fire ecology" generally directs you to the park's fire management info.

Exit Ticket: What is the interdependence of their bird to fire? Provide two pieces of evidence to support your claim.

Commented [CW4]: Will they be asked to support their findings with what they found in the data?

Research that is not finished during class should be finished at home.

DAY FOUR AND FIVE

Evaluate

Continuing with the Project WILD "Smokey Bear Said What?" activity.

Have students creating a mural display showing four different stages of their ecosystem:

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Before fire, during fire, post fire early growth, and post fire secondary growth. They should include their bird in the appropriate stage(s) of their forest in relation to the fire.

Post-assessment probe: What can fire do to an ecosystem?

Exit Ticket: Students will be able to summarize conditions in which fire can and cannot be beneficial to some ecosystems and wildlife species.

Extensions

A bulletin board with the Earth Spheres on it could go right along with this --- making it interactive as students move through their thinking and conclusions