Lesson 4

It’s All About The Data

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 **Key Questions**

How can graphs be used to understand patterns and trends in both wildfires and prescribed fires? What information can be gathered from these graphs to help understand fire in the National Parks and public lands?

**Subjects**

Science, Math, Language Arts

**Time Estimate**

One 30-minute class

**Key Vocabulary**

Misconception, predator, bar graph, wet season, dry season

**Sunshine State Standards**

**Science**

**SC.4.L.17.ln.4** Recognize things that people do to help or hurt the environment, such as recycling and pollution.

**SC.4.N.1.Su.5** Recognize ways that scientists collect evidence, such as by observing or measuring.

**Language Arts**

**LAFS.4.RP.3.AP.7a** Identify relevant information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations or interactive elements on Web pages) to answer questions.

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 **Objectives**

In this activity, students will:

1. Read the background material on both wildfires and prescribed fires.
2. Utilize and interpret the provided graphs with Big Cypress Fire data to answer worksheet questions.
3. Discuss and share their answers in small groups.

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 **Materials**

* A copy of the provided graphs and questions for each student.

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 **Background**

Fire is a natural part of the South Florida ecosystem and plays a crucial role in how plants and animals survive in the swamp. Fires can start from a variety of different causes and their outcomes can change based on current weather and fuel conditions. The types of wildland fires that primarily occur in Big Cypress National Preserve are caused by lightning strikes, malfunctioning automobiles that create sparks, vehicle accidents, cigarettes, or prescribed fires ignited by the preserve’s Fire and Aviation park rangers.

In order for a fire to begin, there must be three things present: oxygen, heat, and fuel. If one or more of these three components is missing the fire will not ignite; if one or more of these three components is removed (such as covering the fire with a blanket to remove the oxygen), then the fire will go out. The oxygen side of the triangle is provided by the atmosphere. Fuel is defined as any sort of material that can undergo a chemical or physical reaction to generate heat energy. Fuel for fires is commonly grass, shrubs, trees, and other vegetation. The two most common forms of heat to start a fire are lightning and some type of anthropogenic action (e.g. cigarette, gasoline.).

**Wildland Fires**

A wildland fire is defined as an uncontrolled fire started in an area of combustionable vegetation.

In South Florida, the most common natural source of fire ignition is from lightning. During the transition between the dry (winter) season and the wet (summer) season is when the majority of storms form in the area, releasing lightning strikes. Although nation-wide, the most common months for wildland fires are June-August, in Big Cypress National Preserve, the change season can bring storms, lightning strikes, and wildland fires to the region usually between March-May. Most commonly, lightning strikes that ignite fires occur during the late afternoon or evening.

Currently, our world’s changing climate is affecting wildland fires across the globe, including those in South Florida. Because of increased temperature, earlier snow melts in higher elevations, and increased droughts, wildland fires are occurring more frequently and at a greater intensity nationally. In addition, scientists have found evidence that climate change has encouraged stronger and more frequent storms, which includes lightning strikes.

Because of the unpredictable nature of wildland fires combined with the risk towards humans (including firefighters and civilians) and property, the National Park Service firefighters conduct prescribed fires.

**Prescribed Fires**

Prescribed burning is considered the process of utilizing fire purposefully as a tool to control vegetation. Prescribe fires are started by professional fire fighters and fire ecologists.

The National Park Service and other governmental agencies did not always encourage the burning of a landscape for beneficial purposes. When the agency was created in 1916, the policy regarding fire was to completely suppress all wildland fires and prescribed fires were not lit. In 1988, the huge wildfires in Yellowstone made headlines across the country. The National Park Service reexamined their policy of fire suppression and began moving towards a new policy that was more ecosystem-focused and utilized prescribed fires.

What are the benefits of using prescribed fires in Big Cypress? Fires naturally release nutrients back into the soil and slow some vegetation growth. Prescribed burns can reduce the growth of both native and non-native vegetation. Removing some of the excess fuel and reducing how much vegetation is left will lessen the severity and intensity of wildfires. By creating fire maps, and plants and monitoring the burn closely, park firefighters are able to protect property, structures, and human life. Prescribed fires lower the risk of a fire moving out of control.

Prescribed fires are the culmination of research and careful planning by the fire division within the National Park Service. In order to conduct a prescribed burn; fire fighters researchers and scientists must first collect data on the area they want to burn, which includes fuel type, distance to roads and structures, as well as the typical fire return interval for that habitat. Data from surrounding areas must be monitored as well for safety and success of the burn. A burn plan will be created, complete with maps and charts to monitor the fire, and a burn boss assigned to take charge of the burning process. Prior to the set date for the fire; temperature, humidity, and wind speed and direction are observed; if the weather conditions are not right the day of the scheduled burn, the fire will not be set.

In Big Cypress National Preserve prescribed fires are set during the dry season in order to better manage and maintain the burn. The dry season provides a time where the water levels are lower and there is a lower chance of lightning strike ignited fires. Plants are also dormant during the dry and transition seasons. This also impacts fire behavior. Prescribed fires ignited during this time of dormancy will burn differently that fires that burn in the wet season. Burning during the dry season allows for cooler temperatures and lower water levels (though this can vary year to year).



 **Advance Preparation**

1. Make a copy of the Worksheet(s) for each student.
2. If handing out a map to each student or group for worksheet 3, print (in color) the number of map pages needed.



 **Procedure**

1. Go over information (provided in background section above) students may need to finish the worksheets. Indicate proper ways to read and interpret maps and graphs. Instruct students on the difference between wildland fires and prescribed fires. Prepare information on Big Cypress National Preserve, if needed.
2. Pass out worksheets. Instruct students to work either individually or with groups.
3. If desired, students can share their answers with their group members or with the class. Worksheets may be collected for assessment.
4. Regroup students to assess learning gain and ensure correct understanding of graphs and map.

 **Worksheet 1**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Directions: Look closely at the graph provided and then answer the questions below in complete sentences.

**Questions:**

1. What is on the **X axis**? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is on the **Y axis**? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What month had the most **prescribed** fires? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Which month has the most **wildland** fires? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Which month(s) had the most fires **total** and how many fires were there? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Which month(s) has the least fires and how many fires were there?

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1. List the five months when wildland fires burned.

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In Big Cypress National Preserve, the winter (dry) season is from October to March/April. The summer (wet) season begins in April and lasts until October. When the dry season is ending and the wet season is beginning, Big Cypress National Preserve receives many thunderstorms. Prescribed fires are set when there are lower water levels and there is less chance to have a wildland fire. Using this information, write an answer for question 6.

1. Explain why you think March – July had the most wildland fires, while September, November, December, and January have the most prescribed fires. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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 **Worksheet 2**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Directions: Look closely at the graph provided and then answer the questions below in complete sentences.

**\* Note: This graph only displays data from January to August!**

**Questions:**

1. How many **total** fires have there been in 2015? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What month had the most **prescribed** fires? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Which month has the most **wildland** fires? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Which month(s) had the most fires **total** and how many fires were there? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Which month(s) has the least fires and how many fires were there?

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In Big Cypress National Preserve, the winter (dry) season is from October to March/April. The summer (wet) season begins in April and lasts until October. When the dry season is ending and the wet season is beginning, Big Cypress National Preserve receives many thunderstorms. Prescribed fires are set when there are lower water levels and there is less chance to have a wildland fire. Using this information, write an answer for question 6.

1. Explain why you think there are no prescribed fires from April to August.

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 **Worksheet 1 Teacher Answer Key**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Directions: Look closely at the graphs provided and then answer the questions below in complete sentences.

**Questions:**

1. What is on the **X axis**? **Month**

What is on the **Y axis**? **Number of fires**

1. What month had the most **prescribed** fires? **January (with 6)**

 Which month has the most **wildland** fires? **June (with 11)**

1. Which month(s) had the most fires **total** and how many fires were there?

**June had the most fires. There were 15 total fires.**

1. Which month(s) has the least fires and how many fires were there?

**October had the least fires. There were no fires in October.**

1. List the five months when wildland fires burned.

**Wildland fires burned in March, April, May, June, and July.**

In Big Cypress National Preserve, the winter (dry) season is from October to March/April. The summer (wet) season begins in April and lasts until October. When the dry season is ending and the wet season is beginning, Big Cypress National Preserve receives many thunderstorms. Prescribed fires are set when there are lower water levels and there is less chance to have a wildland fire. Using this information, write an answer for question 6.

1. Explain why you think March – July had the most wildland fires, while September, November, December, and January have the most prescribed fires. **March – July is the beginning of the rainy season, which brings many thunderstorms (and lightning) to Big Cypress National Preserve. Because September-January is the dry, winter season, it is better to burn at this time. During the dry season, there is a lower chance of having a wildland fire start.**

 **Worksheet 2 Teacher Answer Key**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Directions: Look closely at the graphs provided and then answer the questions below in complete sentences.

**\* Note: This graph only displays data from January to August!**

**Questions:**

1. How many **total** fires have there been in 2015? **70**
2. What month had the most **prescribed** fires? **February**

Which month has the most **wildland** fires? **May**

1. Which month(s) had the most fires **total** and how many fires were there?

**May and there were 17 fires**

1. Which month(s) has the least fires and how many fires were there?

**August and there were 2 fires**

In Big Cypress National Preserve, the winter (dry) season is from October to March/April. The summer (wet) season begins in April and lasts until October. When the dry season is ending and the wet season is beginning, Big Cypress National Preserve receives many thunderstorms. Prescribed fires are set when there are lower water levels and there is less chance to have a wildland fire. Using this information, write an answer for question 6.

1. Explain why you think there are no prescribed fires from April to August.

**April – August is wildland fire season in Big Cypress National Preserve. Firefights would be too busy working on wildland fires that started in the preserve to work on setting their own prescribed fires.**