

A FIRE STORY

THEME

- Forest Health
- Ecology
- Plant Conservation

TYPE OF LESSON

- Instructor-Led
- Hands-On
- Garden Exploration

POSSIBLE WAYS TO LEAD LESSON

- Outdoors
- Virtual
For a classroom version, visit our website.
- Classroom
- Other:

TEACHING STRATEGY

- Place-Based Learning
- Storytelling
- Nature Play
- Art / Movement
- Other:

STANDARDS

- NGSS, LS4.C: Adaptation.
- NGSS, LS2.C: Ecosystem Dynamics, Functioning, and Resilience.
- NGSS, ESS3.B: Natural Hazards.

GRADES 3–4

DURATION 60 minutes



LESSON GOALS

Learners will gain experience in discussing the importance of fire in an ecosystem through storytelling. They will consider the cyclical nature of fire and how it helps keep forests healthy.

LESSON SUMMARY

The whole group listens to a story about a forest fire and what happens to the ecosystem after the fire. After the reading, learners work individually to draw images from the story to create comic strips or comic books. At the end of the lesson, volunteers can share their comic with the whole group.

WORD BANK

adaptation
ecosystem
forest
germinate
organism
pitch pine (Pinus rigida)
sapling
US Forest Service



PRINTED/DIGITAL MATERIALS

- **Pitch Pine Fire Cycle Diagram** (1 per class)
- **A Pitch Pine Story** (1 per learner and 1 per class)
- **Pitch Pine Slideshow Pictures**
(1 per learner and 1 per class)

SETUP

1. Review the **lesson procedure**.
2. Review and consider the optional **pre-** and **post-lesson explorations** and the **extensions**.
3. Decide whether each learner will draw a 6-panel comic strip on a single sheet of paper or a 6-page comic book using 6 pieces of paper or index cards. Tell learners in advance what materials to have ready. (Optional: Or see the **adaptations** section for another option that uses a simple digital animation site.)
4. Prepare the **lesson materials**.
 - Share digital copies of **A Pitch Pine Story** and the **Pitch Pine Slideshow Pictures** with all learners.
 - Prepare the **Pitch Pine Fire Cycle Diagram** to show during the **lesson opener** (on screen or on paper).
 - Prepare the **Pitch Pine Slideshow Pictures** to show during the reading of the story (on screen or on paper).
 - Have the **lesson opener** and **lesson questions** available so you can read them without showing your whole lesson plan. (You may wish to print them out or have them open on a second screen that you are not sharing.) Most of the questions should be asked after reading the story. Save the last question for after the activity.
 - Prepare a blank model to show learners what the final product will look like (either a sheet of paper divided into 6 panels or a stack of 6 card-sized pieces of paper clipped together).

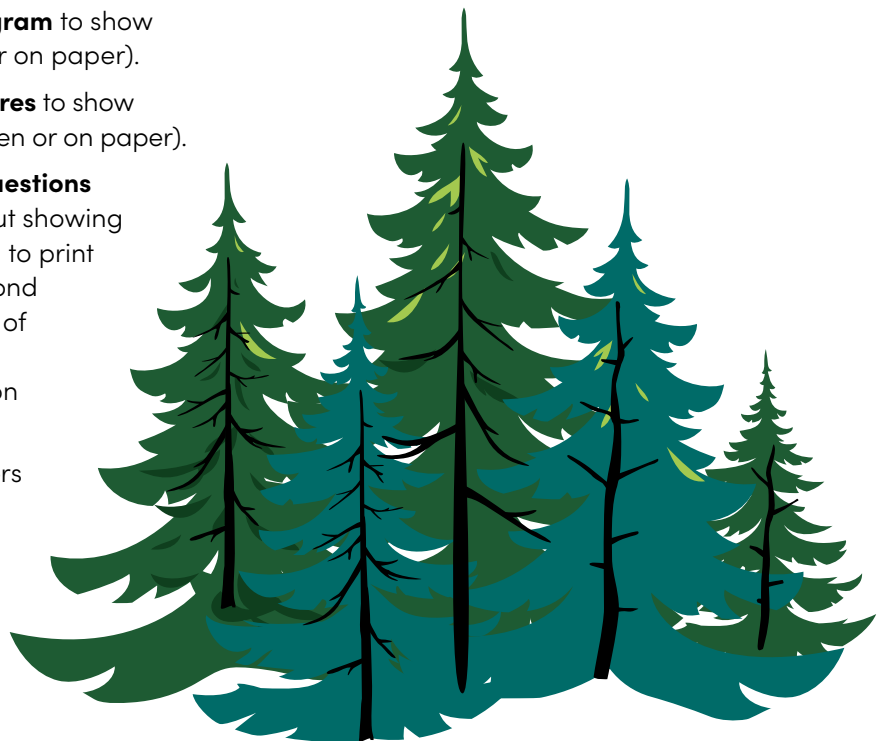
OTHER MATERIALS

Each learner needs the following:

- Blank white sheet of 8.5" x 11" paper
OR 6 blank index cards, or similarly sized pieces of paper, with an optional paper clip or other fastener
- Pencils

Items for the educator to use as a model:

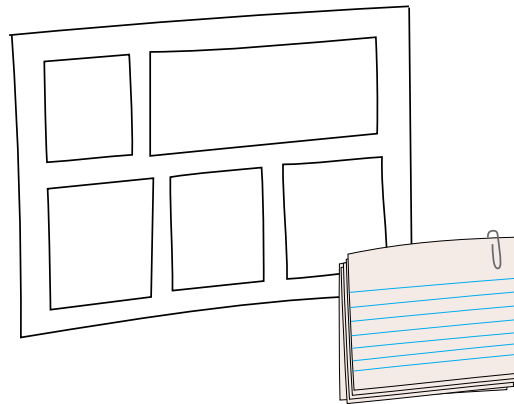
- Blank white sheet of 8.5" x 11" paper
OR 6 blank index cards, or similarly sized pieces of paper, with an optional paper clip or other fastener (match what the learners are using)
- A means of displaying or sharing the examples for the full class to see (projector, screen cast, document camera, folder, etc.)



VIRTUAL EXPLORATION: LESSON PROCEDURE

1. Optional: Complete one or more of the **pre-lesson explorations**.
2. Introduce the topic with the **lesson opener**, and show the **Pitch Pine Fire Cycle Diagram** when appropriate.
3. Read **A Pitch Pine Story** to the class while screen sharing the **Pitch Pine Slideshow Pictures** for each paragraph or by holding printed images up to the webcam.
4. After the story, ask the relevant **lesson questions** (see below) to elicit learner understanding.

5. Explain that each person will draw a pitch pine comic with five pictures, one for each paragraph of the story. Show them the blank model you prepared.



6. Encourage learners to build on the provided images and the story by adding their own, more complex, details as they can.
7. Direct learners to where they can view **the story** and the **Pitch Pine Slideshow Pictures** for reference. (Post a link, for example.)
8. Optional: Have learners add brief captions to their pictures explaining what is happening.
9. Give them time to draw the full sequence.
10. If you are using the comic book approach, have learners stack their pictures in order when they are done and bind them with a paper clip or other fastener.
11. Ask learners to hold up their drawings for everyone to see. If there is time, have volunteers share their comic story with the larger group.
12. Discuss the final **lesson question** (see below).
13. Optional: If time allows and your learners have the technology and skill to do so, have learners take digital pictures of their comic pictures to send to you. Assemble all of the comics to create one big class comic book, and share this during a follow-up.
14. Optional: Complete one or more of the **post-lesson explorations**.

LESSON OPENER

Share the following with learners to orient them to the topic:

- Fire happens naturally in most forests. Fire can be dangerous and scary, but not all fires are bad. In fact, many forests have adapted to survive fires over time, and some species of plants actually need fires for their seeds to germinate (or start to grow). (Display the **Pitch Pine Fire Cycle Diagram**. Keep it visible during the **lesson opener**.)
- Fires can help a forest stay healthy by clearing away dead branches and leaves, which recycles nutrients back into the soil. They also help to make room for new plants to grow and reach the sunlight.
- Natural fires happen every year in some ecosystems. In other ecosystems, fires may happen only every 25 years or more.
- People who manage a forest may start controlled fires on purpose to keep it healthy. Some people who work for the US Forest Service do this. And some Native Americans and other Indigenous peoples all over the world have historically used fire to keep forests healthy and produce more food.
- Although fires can be helpful to forests, it is important to remember they can be dangerous to humans and wildlife. People who manage forests with fire are very careful to create small, controlled fires that they can put out.
- We will follow the story of a forest fire in the Pine Barrens (forests that are in the Northeastern United States) to see how the pitch pine protects itself from fire and how the pitch pine needs fire to grow.



LESSON QUESTIONS

- What happened to the pitch pine after the fire?
- What would happen to the pitch pine seeds if there was no fire?
- What happened to the oak?
- How does the pitch pine protect itself from fire?
- What will happen if there are no fires?
- Discuss *after* creating the comics: What happens if we put all the groups' comics together? What happens when one fire happens after another?

PRE-LESSON EXPLORATIONS

Have learners complete any of these prompts:

- Learn about fire safety with Smokey Bear. Discuss how to keep safe around a fire.
- Read about the fire triangle: heat, fuel, and oxygen. Learn how these elements keep fires going. Write down an example of where each of these elements is present.

POST-LESSON EXPLORATIONS

Have learners complete any of these prompts:

- Learn about ecological succession. Think about which plants grow first after a fire. Label the different stages of development in your comic strip.
- Go outside and find a tree. Is the tree equipped to survive a fire? Assess the tree's fire adaptations. Look at bark thickness, types of seeds, and dead branches on the ground. Say what you think would happen to your tree if there was a fire.

ADDITIONAL RESOURCES

- **Fire in Nature.** Background for educators on fire in ecosystems; from a US Forest Service partnership: <https://bit.ly/ph-smokeybear>
- **Forest Fires: The Good and the Bad.** Background for educators on intentional fires; from World Wildlife Fund: <https://bit.ly/ph-forestfires>





A FIRE STORY

ADAPTATIONS / OPTIONS FOR ACCESSIBILITY

- Instead of using paper, have learners use Flip Anim to make their own individual flip books (<https://flipanim.com/> Flip Anim is free, and users do not need an account to make and save animations.) Have each learner digitally draw 6 pictures using a mouse, track pad, or touch screen After drawing the first picture, use the green plus sign at the top to add the second picture. Repeat until 6 pictures are complete. Select the play button (the green triangle below the drawing area) to play the flip book and show the story of the pitch pine. To save: Select the save button. Make sure the box for "Make this animation public" is not checked. Select the green upload button. This gives the animation a unique web address for learners, or anyone given the link, to view the story. If you want learners to share their animations, they should copy the address and send it to you or the class.
- To modify for your region, choose a fire-dependent species of plant that is close to your location using the Smokey Bear webpage listed in the **additional resources**. Create a story and a slideshow for that species in place of (or in addition to) **A Pitch Pine Story**.
- Adaptation for younger learners: Locate and display pictures showing conditions before, during, and after a fire. Have learners draw their own versions of each stage based on the pictures. Assemble to make a class fire story booklet or poster.
- Bring in samples from a pine tree to use as props so learners can look closely at each part of the.
- Have learners make up their own stories from the pictures.

WORD BANK

adaptation: a characteristic of an organism that helps it live in a particular environment

ecosystem: a collection of living organisms (such as plants, animals, and fungi) and the environment they live in

forest: an ecosystem where the land is covered mostly with trees

germinate: to start to grow from a seed

organism: an individual life-form, such as an animal, plant, fungus, or bacterium

pitch pine (Pinus rigida): a small-to-medium-size species of pine tree that lives in eastern North America

sapling: a young, slender tree that is more than about 3 feet (0.9 meters) tall

US Forest Service: a part of the United States government that is in charge of national forests and grasslands

Pitch Pine Fire Cycle Diagram



1.
Oak trees grow
in the shade of
adult pine trees.



2. A fire burns!
It clears away all the dead
branches and leaf litter.

3.
A pine cone catches
fire. The seeds
are released onto
ashy soil, and they
germinate.



4.
A seed
grows into
a sapling.



5.
The forest returns
as saplings grow
into adult trees.



A Pitch Pine Story

1. It is a cloudy day in a Pine Barrens forest in New Jersey. It is quiet. A tall pitch pine tree sways in the wind, which makes the tree drop a few of its pine cones. The cones roll away from the tree, but they do not open up to let out the seeds they are protecting inside.

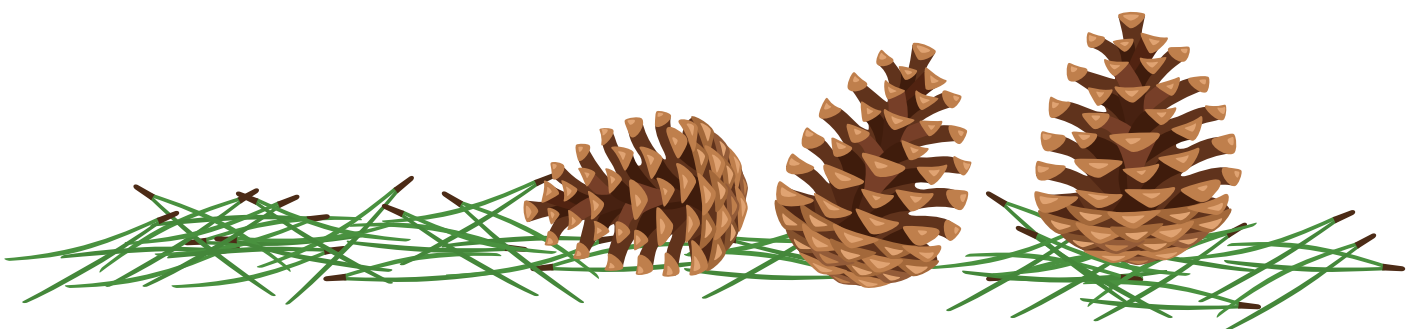
The forest floor covering the tree's large roots is littered with dead branches, twigs, and dry pine needles that have fallen from the pitch pine and its neighbors. An oak tree is growing under the pitch pine. Its branches and leaves are so thick they shade the forest floor beneath.

2. Suddenly, there is a loud crack as a bolt of lightning strikes a nearby tree. It catches fire. Soon the whole tree burns, and the dry fallen branches near the tree's roots also catch fire. Then the dry pine needles on the forest floor burst into flames, and the fire spreads. A gust of wind blows, and the fire moves quickly throughout the forest. Almost everything burns.

3. The pitch pine tree is better adapted to fire because its thick bark acts like a coat and helps protect the inside of the tree. The oak tree is not as lucky. Its outer bark is thinner, and the oak burns. The fire clears away the old pine needles and twigs on the ground. The fallen pine cones get so hot that the sticky resin inside melts. The cones open up and drop seeds onto the forest floor.

4. The fire leaves burned plant matter and ash on the ground, providing nutrients for the soil. There are no leaves on the oak tree anymore, so the sun's light can now shine all the way down to the ground. A few weeks pass, and then months. Over time, the pine seeds germinate (or sprout) and grow into saplings.

5. The small pine saplings have everything they need to thrive. They have soil nutrients from the ashes. They have space to grow now that the branches, twigs, and dead leaves are gone. Enough sunlight and rainwater reaches them because the oak trees no longer shade this part of the forest floor. Other grasses and small shrubs also start to grow. The forest is quiet once again.





A PITCH PINE FOREST

1. Pitch pine with oak covering the ground.



2. A fire starts.



**3. Fire melts
the resin of
pine cones,
and the
cones open.**



4. Ashy soil with lots of space for trees to grow.



5. Regrowth after a fire.



A PITCH PINE FOREST

