



Second Grade The Fire Triangle



INTRODUCTION

Hi kids! My name is _____, and I work for the _____ National Forest. We're going to do some neat stuff today, and I want everyone to get involved! We'll be learning about fires, about our forest, and about how people can change the forest.

LESSON

I want to start by asking you a question – how are fires started? (The kids will probably have a lot of answers such as matches, campfires, etc. If they only mention human-caused ways, ask them about how nature can start fires – examples include lightning and volcanoes.) So, people and nature can start fires.



Forest Service employee teaches students about the fire triangle.

Now, who can tell me the three things that are needed for a fire to burn?

First, you need something to burn – we call this fuel. (Have a small limb and a piece of paper to show them.) Can both of these things burn? Yes! So, they are both fuels.

Then, you need something hot to get the fire going. (Have matches and a cardboard cutout of a lightning bolt to show the



FOREST SERVICE MESSAGES

- A:** The Forest Service applies the fundamental principles of science and ecology in order to better understand and manage forest ecosystems.
- B:** People are part of nature, and their actions have effects on the land.
- A-5:** The study of the science of fire and its behavior is important.
- C-3:** Forest conditions now are not natural or healthy.
- C-4:** Because of unnaturally dense conditions, our forests are at risk for destructive wildland fires, insect infestations and diseases.



ACADEMIC STANDARDS



Arizona Standards

HEALTH

- 1CH-F5:** Describe how environmental health and personal health are related
- 2CH-F7:** Identify when and how to seek emergency medical assistance and shelter
- PO 1:** Demonstrate how to contact parents and/or emergency services in emergency situations
- PO 2:** Recall emergency numbers

SOCIAL STUDIES

- 3SS-F2:** Identify natural and human characteristics of places and how people interact with and modify their environment, with emphasis on:
- PO 6:** the ways in which people have used and modified resources in the local region, including dam construction, building roads, building cities, and raising crops

SCIENCE

- 2SC-F3:** Understand that science involves asking and answering questions and comparing the results to what is already known
- PO 1:** Explain how asking and answering questions are part of the process of a scientific investigation
- PO 2:** Compare prior knowledge to the results of a scientific investigation
- 4SC-F1:** Describe and explain cause-and-effect relationships in living systems
- PO 1:** Identify cause-and-effect relationships in living systems

kids. Light the match.) These are both hot, right? So, both of these can be the heat that is needed to start a fire.

Finally, the third thing that you need is oxygen. Oxygen is in the air all around us (wave your arms all around).

So, if you need all of these things for a fire to burn, how do you put a fire out? You only need to take away one of these three things, and the fire will go out. Now, I will show you how this works.

DEMONSTRATION

(Take out the wooden “Fire Triangle” and put it on a table. Get the glass jar with a lid out and place a small, lighted birthday candle in the jar. Mount it in a dab of modeling clay. Seal the jar with the lid to cut off the supply of oxygen. The flame will go out.)



There are three things that have to be present for any fire to burn – heat, fuel and oxygen. If any one of these things is removed, the fire will go out.



Forest Service employee performs some experiments to show students what happens when part of the fire triangle is removed.

What just happened? That’s right! The flame used up all of the oxygen that was available in the jar, so the fire went out. Remember, you only need to take away one of the three parts of the triangle for a fire to no longer be able to burn.

- PO 2:** Explain cause-and-effect relationships in living systems
- 4SC-F7:** Explain the interaction of living and non-living components within ecosystems
- PO 1:** Identify living components within ecosystems
- PO 2:** Identify non-living components within ecosystems
- PO 3:** Describe the interaction among living and non-living components in an ecosystem
- 5SC-F2:** Demonstrate that light, heat, motion, magnetism and sound can cause changes
- PO 2:** Demonstrate that heat can cause change
- 6SC-F5:** Identify major features of natural processes and forces that shape the earth’s surface, including weathering and volcanic activity
- PO 1:** Identify natural forces (e.g., water, ice, wind) that shape the earth’s surface
- PO 3:** Identify natural processes (e.g., earthquake, floods, volcanic eruptions) that rapidly shape the earth’s surface
- 6SC-F6:** Describe natural events and how humans are affected by them
- PO 1:** Identify natural events that affect humans
- PO 2:** Explain how natural events impact human life

New Mexico Standards

HEALTH

- Standard 1:** Students will comprehend concepts related to health promotion and disease prevention.
- 4. Students will describe how physical, social, and emotional environments influence personal health.
- Standard 2:** Students will demonstrate the ability to access valid health information and health promoting products and services.
- 4. Students will demonstrate the ability to locate school and community health helpers.

SOCIAL STUDIES

Strand: Geography

- Content Standard II:** Students understand how physical, natural, and cultural processes influence where people live, the ways in which people live, and how societies interact with one another and their environments.
- K-4 Benchmark II-B:** Distinguish between natural and human characteristics of places and use this knowledge to define regions, their relationships with other regions, and patterns of change.
- Grade 2 Performance Standards**
 1. Describe how climate, natural resources, and natural hazards affect activities and settlement patterns.
 2. Explain how people depend on the environment and

(Open the jar, re-light the candle and put the lid back on. As the flame starts to go out, reopen the lid to let more oxygen in. The candle should re-ignite.)



Now what just happened? When air was allowed back in, the fire was able to keep burning because it had access to an oxygen supply again.

(Take the lid completely off and allow the candle to burn until all the fuel – wax – melts and the flame goes out.)

What happened this time? Why did the fire go out? The fire burned all of the fuel. Do you remember that fuel was one of the components of the fire triangle? If there is no fuel, a fire can't burn. Fire fighters use that fact to their advantage. By reducing fuels – not wax, but trees and pine needles – fire fighters can help to stop a fire from burning. There are a lot more trees in the forest than there used to be. That means that there is a lot more fuel that can burn. Have any of you heard of cutting down trees in the forest in order to reduce fire risk? We call that thinning. Because there are too many trees in the forest that can fuel a fire, we need to cut some down to make the forest healthier. What kind of things can we make with the trees that we cut down? We can build houses, make furniture (do any of you have a wood table at home?), make paper, and more. There sure are a lot of things we make from trees!

(Light another candle and put it in the jar with the lid off. Let it burn for a few seconds. Then, extinguish the flame by sprinkling some water on it.)

Now what just happened? The water took the heat away. Do you remember that heat was the third component of the fire triangle? Fire fighters use water to help put fires out. Have you seen them do this?

ACTIVITY

(Note: This activity was adapted from the “Living With Fire” chapter of “Ecosystem Matters, Activity and Resource Guide for Environmental Educators,” Pre K-2 Fire Tag.)



its resources to satisfy their basic needs.

K-4 Benchmark II-C: Be familiar with aspects of human behavior and man-made and natural environments in order to recognize their impact on the past and present.

Grade 2 Performance Standards

1. Identify ways in which people depend on natural and man-made environments including natural resources to meet basic needs.

SCIENCE

Strand I: Scientific Thinking And Practice

Standard 1: Understand the processes of scientific investigations and use inquiry and scientific ways of observing, experimenting, predicting, and validating to think critically.

K-4 Benchmark I: Use scientific methods to observe, collect, record, analyze, predict, interpret, and determine reasonableness of data.

Grade 2 Performance Standards

1. Conduct simple investigations (e.g., measure the sizes of plants of the same kind that are grown in sunlight and in shade).
3. Make predictions based on observed patterns as opposed to random guessing.
4. Follow simple instructions for a scientific investigation.

Strand II: Content of Science

Standard I (Physical Science): Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

K-4 Benchmark II: Know that energy is needed to get things done and that energy has different forms.

Grade 2 Performance Standards

1. Describe how heat can be produced (e.g., burning, rubbing, mixing some substances).
3. Describe the usefulness of some forms of energy (e.g., electricity, sunlight, wind, sound) and how energy (e.g., heat, light,) can affect common objects (e.g., sunlight warms dark objects, heat melts candles).

Strand II: Content of Science

Standard II (Life Science): Understand the properties, structures, and processes of living things and the interdependence of living things and their environments.

K-4 Benchmark II: Know that living things have similarities and differences and that living things change over time.

Grade 2 Performance Standards

3. Observe how the environment influences some characteristics of living things (e.g., amount of sunlight required for plant growth).

Alright, I want everyone to get up and stretch now because we're going to play a game called Wildfire Tag! This will show you how fires burn trees, how the trees can be protected from fire, and how the trees grow back. Are you ready?



Wildfire Tag Instructions:

1. Choose one student to become the wildfire that burns the trees. He or she wears a red headband. Give them a long, red rope or long piece of red flagging.
2. Choose four students to be Smokey Bear rangers. They wear green headbands. Give each ranger a long, green rope or long piece of green flagging to hold.
3. The remaining students pretend to be trees. They scatter to different parts of the room and stand still.
4. The Smokey Bear rangers gather around the wildfire in the middle of the room.
5. The game starts when the teacher/presenter yells "Fire!" Then, the wildfire runs to tag the trees. When a tree has been tagged, he/she holds onto the red rope/flagging and becomes part of the wildfire, and the two of them run to tag another tree. Thus, the fire builds and spreads with more and more "trees" holding onto the rope or flagging.
6. At the same time, the Smokey Bear rangers run to protect the trees by tagging them and having them hold onto the green rope/flagging. They can protect only trees that have not yet caught on fire.
7. When a tree is tagged by a Smokey Bear ranger, it joins the other protected trees to make a "fire break" (line of protection that the fire cannot penetrate). In reality, this could be a strip of wet or bare earth. (The protected trees are all holding onto the green rope/flagging.)
8. When the fire runs out of fuel, it burns out. Wildfire students drop the red rope/flagging and fall to the ground.
9. Slowly, the wildfire students rise up from the ground and stretch out their arms. This is to show that new trees will grow in the soil that has been enriched by wildfire. Once again, there is a forest.
10. Before dismissing the group, discuss the meaning of Smokey Bear's slogan "Only you can prevent forest fires."



**FOREST SERVICE CONSERVATION
EDUCATION LEARNER GUIDELINES**

Program title: The Fire Triangle
Target audience: Second Grade
Primary topic: The three things every fire needs to burn.

Length of program: 1 hour

Setting: indoors or outdoors

Guidelines addressed are referenced here:

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|--|
| K-4 |
| I. Questioning and Analysis Skills |
| A1, A2, B2, F1 |
| |
| II. Knowledge of Environmental Processes and Systems |
| 1. |
| 2. C2, D3 |
| 3. |
| 4. A1, A2, C3 |
| III. Skills for Understanding and Addressing Environmental Issues |
| 1. |
| 2. |
| IV. Personal and Civic Responsibility |
| |

LESSON CONTINUED

What did you learn from that game? What did the fire do to the trees? Yes! The fire burned some of the trees but not all of them, right? And, new, healthy trees started to grow because they had more room and because the soil had been enriched with nutrients by the wildfire. How were some of the trees saved from the fire? Right! By the Smokey Bear Rangers. Way to go Rangers, good job! Good job everyone!

CLOSING

I really enjoyed helping you learn how fires burn and how to protect our forest. Now I'm going to give you a really fun handout that you can work on. You can do the coloring and then have someone from your family or your teacher read the words with you!

(For Kaibab National Forest only: I'm also going to pass out the Kaibab National Forest Junior Naturalist quiz. To become a Junior Naturalist, you need to have attended a Forest Service program – which you did today! – and then complete this quiz and help to keep the environment clean by picking up litter you find. It is that easy! If you become a Junior Naturalist, we will give you a certificate and a cool patch to wear. Show them the certificate and the patch. When you have completed your quiz, you can turn it into your teacher. Then, he/she can send them into us, and we'll be sure to get a certificate and patch to you. The only chances you get to become a Junior Naturalist are in the second and the fifth grades, so good luck!)

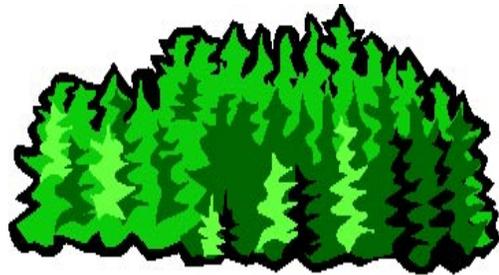
HANDOUT

“Smokey’s Fire Safety Tips Learning and Coloring Book” (one per student)

(Kaibab National Forest only: Kaibab National Forest Junior Naturalist Quiz, Grades 1-3; one per student)

SUPPLIES

- Small tree limb
- Piece of paper
- Matches
- Cardboard cutout of lightning bolt
- Wooden fire triangle
- Glass jar with lid
- Small, birthday candles
- Model clay
- Water
- Red headband (one)
- Long, red rope or long piece of red flagging
- Green headbands (four)
- Long, green rope or long piece of green flagging (four)
- “Smokey’s Fire Safety Tips Learning and Coloring Book” (one per student)
 - Available through Syndistar Publishing, 1-800-841-9532;
http://www.syndistar.com/media/activity_books/fire/prevention/pbfp06.html
 - Children learn valuable match safety rules from Smokey and his lovable Animal Fire Patrol. This coloring book correlates with the Smokey’s Fire Safety Tips video – carrying the same story and message. Students are able to bring important prevention messages with them so they are sure to remember what they learned.



Kaibab National Forest only:

- Kaibab National Forest Junior Naturalist Quiz, Grades 1-3 (one per student)
- Junior Naturalist patch (one)
- Junior Naturalist certificate (one)