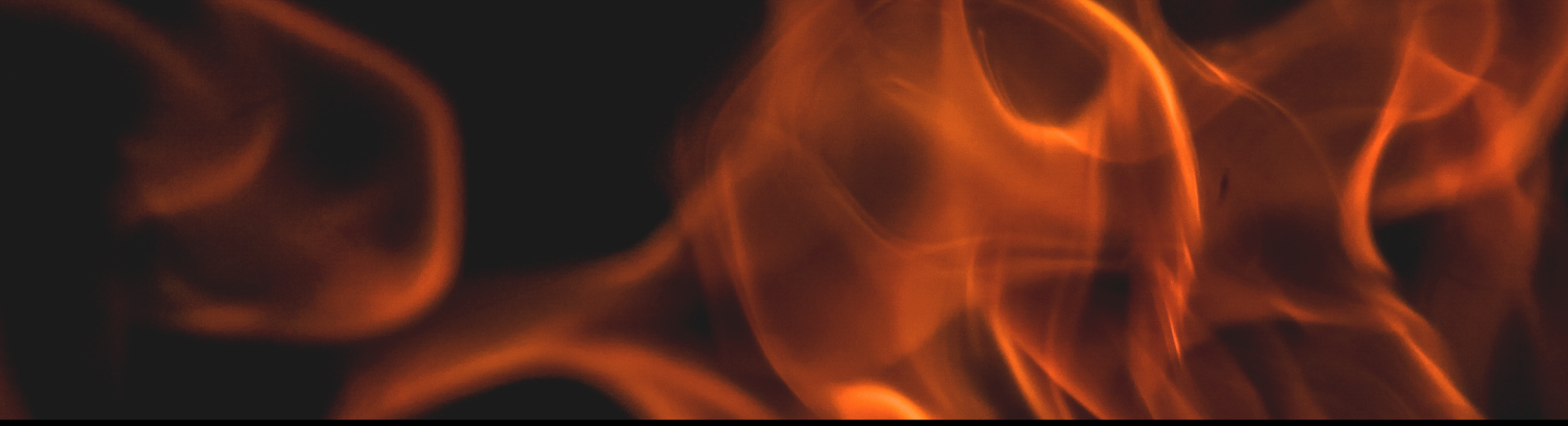

FIRE!

SCIENCE & SAFETY

Exhibit developed by

California ScienCenter

In partnership with

Children's Burn Foundation
Giving New Hope™

EXHIBIT GUIDE

FIRE!

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Introduction

Welcome to the Fire! Science & Safety exhibit at the California Science Center! Our goal is to help visitors explore the science of fire and raise their awareness of fire risks, how to prevent fires, and what to do if a fire occurs. The self-directed exploration approach of this exhibit allows visitors to learn by doing, touching and examining the world around them.

Our Exhibit

The home setting in this setting is not an ordinary apartment! Apartment #911 at Casa Del Fuego is staged as a training ground for Fire Danger Detectives and provides an environment that visitors can explore on their own terms, discovering surprises and encountering vital information about fire prevention and preparation.

Your mission? Discover the science behind what makes a fire. Then, locate fire or burn dangers and find out how to fix them. Fire safety is in your hands. Good luck, Detective!

Children's Burn Foundation

Visit childburn.org for more information and resources from our partner.

FIRE! SCIENCE & SAFETY QUICK ACTIVITIES

Fires can be dangerous and frightening. However, knowing what to do when they happen can prevent injuries and save lives! Understanding the science about fire can also reduce fears. Here are some quick activities to engage young Danger Detectives to connect to the FIRE! Science & Safety Exhibit at the California Science Center.

TALK IT OUT!

Danger Detectives work better as a team. Gather family or classmates to talk about the importance of having a safety plan. Take the time to share and discuss important decisions that can save lives. Talk about:

- What to do when you detect a fire
- What kinds of fires are preventable
- What to do when someone suffers from a burn

"I SPY" FIRE SAFETY

The next time you are out, play an "I Spy" game. See how many fire alarms, emergency exits, fire extinguishers, and evacuation plans you can spy.

FAMILY FIRE PLANNING

Danger Detectives must plan ahead to protect themselves and their families. Pull out a calendar and set some days to practice fire safety preparedness. Think about scheduling:

- Fire evacuation drills
- Fire alarm battery checks
- Days to clear dry plants and brush around your home

GET LOW AND GO!

Danger Detectives need to escape from a fire by staying low to the ground. Practice crawling low to the ground by working with a friend. One person blows bubbles to represent smoke and the other person crawls under the bubbles to escape. Move fast because you don't want the bubbles to land on you!

FIRE ISN'T THE ONLY THING THAT BURNS

Burns can come from many hot things, not just fire. Make a list of other things in your home or school that might cause burns. Think about:

- What objects give off heat
- What are other ways to get burned
- What might injure you if you touch it

DANGER DETECTIVE INSPECTION

Always be on the lookout for potential fire hazards. Make a list of anything you notice that could cause a fire at your home or school. Think about:

- Where can fires start
- What can catch fire easily
- What generates heat

NGSS PERFORMANCE EXPECTATIONS: 2-PS1-1, 2-PS1-3, 4-PS3-2, 5-PS1-1, 5-PS1-3
CCSS.ELA-LITERACY.SL: K.4, K.5,K.6, 1.4, 1.5, 1.6, 2.4, 2.5, 2.6, 3.4, 3.5, 3.6, 4.4, 4.5, 4.6, 5.4, 5.5, 5.6

FIRE! SCIENCE & SAFETY

TRAVELING HEAT

Fire can spread rather quickly if the right materials are on fire. Have Danger Detectives carry out this investigation to start thinking about whether or not all materials transfer heat the same.

WHAT TO GET:

- 1 metal material (such as a pan or pot)
- 1 wooden material (such as a spoon or chopping board)
- 2 ice cubes similar in size

WHAT TO DO:

1. Allow Danger Detectives to make observations about the wooden and metal materials. Set them on a flat surface.
2. Predict what would happen if an ice cube was placed on each surface at the same time. Share predictions by recording it or having a group discussion.
3. Place an ice cube on each surface at the same time.
4. Observe what happens to the ice cube.

EXHIBIT CONNECTION: APT #911 BEDROOM

Take a closer look at the ironing board! When the iron makes contact with other materials, the heat energy travels through the material and starts a fire.

WHAT TO ASK:

- What did you observe?
- What do you think could be causing this?
- What does this tell you about how heat moves through different materials?
- How can you prevent a fire from spreading?

WHAT TO TRY NEXT:

Try different materials to compare how quickly heat energy transfers. If you have a stopwatch, time it!

WHAT'S GOING ON?

Metal materials conduct heat very well. The ice cube is cooler than the metal, which causes the heat to transfer from the metal into the cube. This makes the ice melt fast. Wooden materials, on the other hand, do not conduct heat very well. The ice cube will melt slower since the heat transfers slowly from the wood into the ice.

The ice cube requires a lot of energy from its surroundings to melt. The ice melts at different speeds depending on how fast the heat energy transfers from its surrounding into the ice. The transfer of heat through matter is called conduction.

NGSS DISCIPLINARY CORE IDEAS: PS1.A., PS1.B, PS3.A, PS3.B

FIRE! SCIENCE & SAFETY

ELEMENTS OF FIRE

Fire can be dangerous and scary, but understanding the science could help Danger Detectives avoid or stop them. Demonstrate this activity to encourage Danger Detectives to start thinking about what elements must be present for fires to burn.

WHAT TO GET:

- an adult
- 1 candle
- 1 non-flammable plate
- 1 glass jar that you can see through
- match or lighter

WHAT TO DO:

1. Place each candle on a plate.
2. Light the candle with the match. Make some observations.
3. Turn the glass jar over the candle.
4. Watch what happens!

Discover combinations of fuel and ignition to start and stop a fire in the fire pit.

WHAT TO ASK:

- What did you notice?
- Why do you think that happened?
- What started the fire? What kept it burning?
- What has to be present for fires to keep burning?
- How can you stop a fire from burning?

WHAT TO TRY NEXT:

Use a different size or shaped glass jar. Does it make a difference in how long it takes for the fire to go out?

WHAT'S GOING ON?

Fire is a chemical reaction between heat, fuel, and oxygen. Combining heat, fuel, and oxygen in the right amounts will create a self-sustaining fire. This model is known as the fire triangle.

In our demonstration, the flame from the match serves as the source of heat. The candle's wick and wax burns as the fuel, and oxygen is present in the air. However, once we turn the jar over the candle, oxygen is cut off, thus extinguishing the fire. Removing one ingredient from the fire triangle will extinguish the fire.

NGSS DISCIPLINARY CORE IDEAS: PS1.A., PS1.B, PS3.A, PS3.B

FIRE! SCIENCE & SAFETY ESCAPE PLAN

Danger Detectives need to be aware of their location in the event of a fire, especially in their own homes. Getting out of a dangerous situation involves planning ahead and knowing where to go and what to do.

WHAT TO GET:

- grid paper (see attached)
- pencil
- markers or coloring tools

WHAT TO DO:

1. Take a walk around your house.
2. Draw a map to include all rooms and spaces.
3. Draw symbols to show where doors and windows are located.
4. Pick a meeting spot in an open space for your everyone to meet in case of a fire. Mark it with a big X.
5. Use arrows to show two different ways of exiting each room and getting to the meeting spot.

Are windows part of your escape plan? Take a look at our window to see what you have to consider before using it as an exit.

WHAT TO ASK:

- What did you think about when choosing a meeting spot?
- Describe how you would get to the meeting spot from each room.

WHAT TO TRY NEXT:

Think of another place at which you spend a lot of time. Draw a map and make an escape plan for that location.

WHAT'S GOING ON?

If fire breaks out, knowing what to do can prevent injuries and save lives. In a typical home fire, families have only about two minutes to leave, or evacuate, their house. Having a meeting place will let you know that everyone has gotten out safely, and no one will get hurt looking for someone who is already safe. But knowing the steps to escape a burning house is not enough - families must practice the plan regularly.

NGSS DISCIPLINARY CORE IDEAS: PS1.A., PS1.B, PS3.A, PS3.B

FIRE! SCIENCE & SAFETY ESCAPE PLAN

- Draw a floor plan or map of your home.
- Show all the doors and windows.
- Pick a meeting place outside.
- Mark two ways out of each room.

FIRE! SCIENCE & SAFETY

WILDFIRE DEFENSE

Danger Detectives can plan ahead when it comes to protecting their homes from wildfires. Wildfires can spread quickly through flying embers, but creating defensible space around structures and homes can reduce damage and loss.

WHAT TO GET:

- bean bags
- large container (i.e. box, garbage can)
- "Zone" signs (see attached)

WHAT TO DO:

1. The container represents your "structure", and the bean bags are "embers" from a wildfire.
2. Set up your "structure" in an open space. Measure 5 feet zones coming away from the "structure" and mark them Zones 1-3. Optional: Use a basketball court.
3. Aim for the container, and throw a handful of bean bags at once from each zone.
4. Record how many "embers" make it to the "structure" from the different zones.

Interact with the touchscreen monitor to learn about the wildfires today and the wildfires past. Find out if your home or school is at risk from wildfires!

WHAT TO ASK:

- How far do you have to be for the flying embers to miss catching fire?
- What can you do to reduce the risk of flying embers landing on flammable items?

WHAT TO TRY NEXT:

Wind can send lightweight embers in all directions. Try dropping pieces of tissue at different heights to observe how wind can affect the way they move.

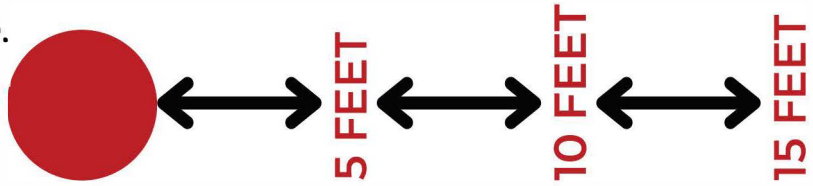
WHAT'S GOING ON?

Flying embers can travel great distances in windy, dry conditions. It is recommended to clear brush and remove flammable items that are within 30 feet from structures; This immediate defense zone is known as Zone 1. Homes in the wildland-urban setting should not have anything within 5 feet of the home that can burn. Other preventative measures include installing fine metal mesh over vents to keep burning embers from getting inside a home, removing pine needles and leaves from gutters, and using fire-resistant materials.

NGSS DISCIPLINARY CORE IDEA: ESS3.B

FIRE! SCIENCE & SAFETY WILDFIRE DEFENSE

1. Print the signs below.
2. Set out a container in an open space.
3. Measure 5 feet zones from the container.
4. Tape or hang the signs at each zone.



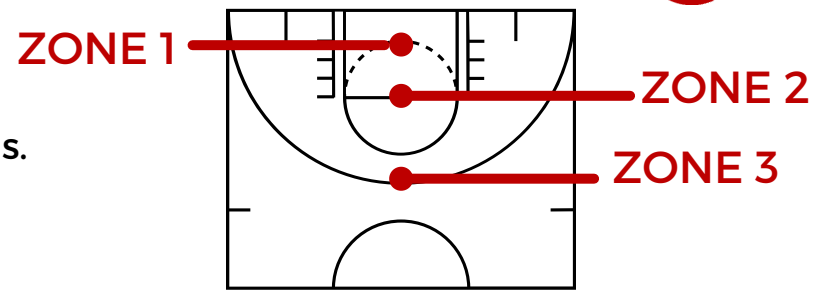
ZONE 1

ZONE 2

ZONE 3

FIRE! SCIENCE & SAFETY WILDFIRE DEFENSE

1. Print the signs below.
2. Set up a basketball court like the diagram (on the right) with the signs.
3. Use the basketball hoop as your container.



ZONE 1

ZONE 2

ZONE 3