

TOPIC 5 - FIRE SCIENCE

Teachers should print this sheet and make it available to each student group allocated to this topic. *Two groups maximum per Topic



Learning Intentions

We are learning about the science of fire.

Students will understand that:

- fire requires three elements to burn and that by removing at least one element a fire can be extinguished.
- there are multiple methods to extinguish a fire available to firefighters and other capable adults.
- fire spreads in multiple ways.
- fabrics and building materials have varying rates of burning.

Essential Questions

1. What is The Fire Triangle and how can understanding it assist us to prevent fires?
2. How might firefighters and others use their knowledge of The Fire Triangle to extinguish fires?
3. What are the main ways fire can spread and how does understanding these help prevent fires and burns and keep us safer?
4. How does understanding that fabrics and building materials have varying rates of burning help prevent fires and burns and keep us safer?

Key Understandings

The Fire Triangle

- The three components required for fire to occur are Fuel, Oxygen and Heat
- Removing one of these components will extinguish a fire

Fire Extinguishers and Classes of fire

- A variety of extinguishers are available for use on fires involving different fuels

Fire Spread

- There are four different ways in which heat and fire may spread – direct burning, convection, conduction and radiation

Flammability of fabrics and building materials

- Different types of fabrics and building materials burn at different rates

Key Skills

Based on their knowledge of the components of the:

1. Fire Triangle
2. Main ways fire can spread
3. Varying flammability rates of fabrics & building materials

students will be able to make basic assessments of their homes and household practices for fire and burn risk and work with their families to reduce or eliminate them.

Students will be able to:

- Identify various fire extinguishers and describe basic methods of extinguishing fires.

Success Criteria – Rubric

I will be successful if I:

- Demonstrate my understanding of an area of fire science by the completion and presentation of a guided inquiry group project.
- Listen and participate when my classmates present their group projects to my class.
- Actively listen, participate and engage with the firefighters during their visit.
- Use the Victorian website references as assigned below.

	Excellent	Good	Developing
Presentation	Work was well presented and easy to understand. The presentation engaged the audience.	Most of the work was well presented and easy to understand. Most of the presentation engaged the audience.	Most of the work was not well presented or hard to understand. Some of the presentation engaged the audience.
Content	All Information was accurate, showed excellent use of listed resources and was written in the student's own words.	Most information was accurate, showed good use of listed references and was mostly written in the student's own words.	Some of the information was inaccurate or incomplete, there was little use of listed references and/or it was not written in the student's own words.
Creativity	The presentation was creative and unique. The visual and/or audible presentation showed that the learner had a lot of pride in his/her work.	The presentation had some elements of creativity. The visual and/or audible presentation showed that the learner had some pride in his/her work.	The presentation had only a few elements of creativity. The visual and/or audible presentation showed that the learner had little pride in his/her work.
Organisation	Information was organised in a clear, logical way. Information followed the project guidelines.	Most information was organised in a clear, logical way. It followed most of the project guidelines for organisation.	The information was not always logically sequenced. Some of the project guidelines for organisation were missing.

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Each group should choose one of the following activities to display their research into the Key Understandings.



A) Fire Triangle Song, Rap or Poem

Write a song, rap or poem to help people understand the science of The Fire Triangle.

Why is the Fire Triangle important to fire safety?

The song or rap should have a chorus and 2-5 verses.
Write your own tune or use a well-known song.

The poem can be written as haiku, cinquain, acrostic or limerick.
It could be written to fit into a triangle.
Try to be imaginative and informative.

Consider adding an illustration to help communicate your ideas and engage the audience. Give a short verbal introduction and remember to rehearse before you perform.

References: CFA [fire-science-and-the-fire-triangle](#)
Cool Australia [cool-burning-fire-triangle-experiment](#)

B) Model

Make a model of The Fire Triangle.

- Research to find out what the Fire Triangle represents.
- Use three colours to show the three different components.
- Think about suitable materials from which to make the model.
- Label each part and provide a written discussion on its role in causing and maintaining a fire.
- How could you remove each of these parts to help put out a fire?
- Display your model in your classroom for others to view.

Provide a short summary of your project, including how it was made, materials used, and how the fire triangle works.

References: CFA [fire-science-and-the-fire-triangle](#)
Cool Australia [cool-burning-fire-triangle-experiment](#)

C) Report and Table

Research and present information about:

1. Types/Classes of fires
2. Fire extinguishers available for use on each type of fire.

Use a table to help you record:

- Different types/classes of fires
- Fuels included in each different type/class.
- Methods for extinguishing each type/class of fire.

Write a report on:

- Why there are different types of fire extinguishers.
 - How understanding the fire triangle assists us to extinguish fires safely
 - Unusual or interesting facts about each fire type
 - How solids, liquids and gases react in different ways to different extinguishers
 - How firefighters extinguish different types of fires
 - How firefighters use science to fight fires
- Provide a short summary of your report to firefighters. Remember to rehearse your presentation before the firefighters' visit.

References: CFA [fire extinguisher guide](#) [extinguishers](#)
[fire-science-and-the-fire-triangle](#)

D) Crossword

Construct a Crossword puzzle using vocabulary about fire science.
You can choose from the words below or decide on your own.

You may use an online crossword generator or create a grid yourself.
Include 15-20 words.

Make sure that you spell the words correctly.

Use a dictionary (hardcopy or online) to help you with definitions.

Your teacher may help you to make copies of your crossword for your classmates to complete.

Fire Science Vocabulary

ACCELERANT, EXTINGUISH, EXPLOSION, CONDUCTION, CONVECTION, RADIATION, FLAME, FRICTION, OXYGEN, FUEL, HEAT, ENERGY TRANSFER, SMOKE, HAZARD, FLAMMABLE, FLASHOVER, TEMPERATURE, PREVENTION, INHALATION, RESUSCITATION, BACKDRAFT, IGNITION, CHEMICAL, COMBUSTION

Make a large, poster size version of your crossword. Display it in your classroom and give a short summary of how the crossword was made to firefighters.

E) Slide Presentation or Posters

Create a slide presentation or series of posters titled 'Safe nightwear for children'.

Include information on the design features of fire-safe nightwear:

- **types of fabric** - why are some fabrics more fire safe than others? What are the safest fabrics?
- **weave of fabric** - what is the 'weave' of a fabric? Does a tight or loose weave make a garment safer?
- **fit of garments** - is a tight or loose garment safer?

What are the fire warning labels that must be on children's nightwear sold in Australia? Use large pictures.

What is **AS/NZS 1249: 2014**?

Bring to school and make a display of examples of safe and unsafe nightwear. Rehearse your presentation that will include all members of your group talking about your slides/posters. Avoid reading text straight off the slides/posters and use your own words when explaining.

References: ACCC [nightwear-for-children](#)
KIDSAFE [Parents-Guide-to-Homes page 10](#)

F) You are the Fire Chief

Create a lesson that a firefighter instructor might use to teach new firefighters the four ways in which fire spreads:

- Direct Burning
- Convection
- Conduction
- Radiation

Provide a definition for each of these four ways.

Research and plan a demonstration or an example for each.

Your example could be an online video clip, a photo, a diagram or a model.

DO NOT USE REAL FIRE.

Use this information to write a paragraph answering these questions:

- How do bushfires spread so quickly?
- How can knowledge of how fires spread help people to respond safely to bushfires and house fires?

Provide a short summary of your lesson to firefighters. Remember to rehearse your presentation before the firefighters' visit.

References: CFA [plan-prepare/radiant-heat](#)