



Level 2 Award in Principles of Fire Safety

Student notes (sample)

A1

How fires are caused

Did you know?

Arson is the largest single cause of fire in England and Wales. 30% of all fires in non-domestic buildings are intentional.

Every year there are more than 3,000 arson attacks on shops, cafés and small businesses.

The annual cost of arson to the economy is estimated at £2.53 billion.

Fire is a constant hazard both at home and in the workplace.

Fires can be caused by a number of things including:

- Poorly maintained electrical equipment
- Misused electrical equipment (overloaded sockets for example)
- Hot surfaces/friction
- Poor storage of flammable materials
- Discarded smoking materials
- Arson

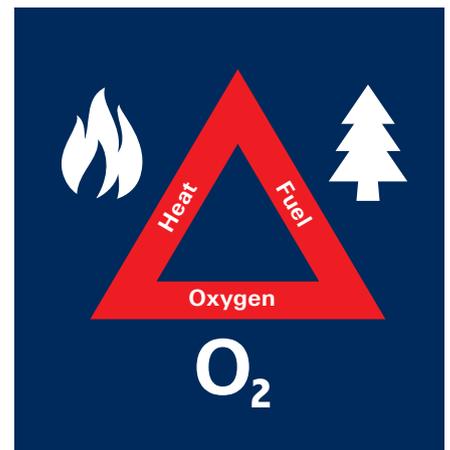
Fires start when three things come together in the right amount at the same time. These three things are:

- A source of **fuel** (something that will burn)
- A source of **heat** (or ignition)
- **Oxygen** (present in the air around us)

These three things are known as the '**fire triangle**'.

All three elements must come together. If the fire triangle is not formed, or is broken, then fire cannot occur.

The important thing is to identify sources of fuel and heat and **keep them apart**.



Sources of fuel	Sources of heat	Sources of oxygen
<ul style="list-style-type: none">• Flammable liquids such as petrol, paints and thinners• Plastics and foam• Wood and paper• Waste materials such as cardboard and shavings• Textiles and furnishings• Flammable gases such as liquified petroleum gas	<ul style="list-style-type: none">• Faulty electrical equipment• Cigarettes/matches• Naked flames• Electric, gas and oil heaters• Hot processes, such as welding• Cooking equipment• Machinery	<ul style="list-style-type: none">• Air• Oxidising chemicals• Oxygen supplies from cylinders/piped systems• Air conditioning systems• Open doors and windows

A2

How fires spread

Did you know?

If you get caught in a fire, you may be dead before the fire even reaches you due to smoke and toxic gases. Smoke injuries account for 75% of fire-related deaths, although some people die due to burns.

The main products of fire are heat, flames, smoke and toxic gases. The smoke and toxic gases can be as deadly as the heat and flames. Indeed, the majority of people who die as a result of a fire are overcome by smoke and toxic gases, rather than being burnt.

Fires can spread very quickly, particularly when fire-fighting is delayed by a lack of detection system and a lack of alarm system.

There are four ways by which fire (and heat and smoke) spread. During a fire all four are likely to be at work.

Conduction

Through solids. A common example is a teaspoon left in a hot drink; the handle becomes hot. This is due to conduction.

Convection

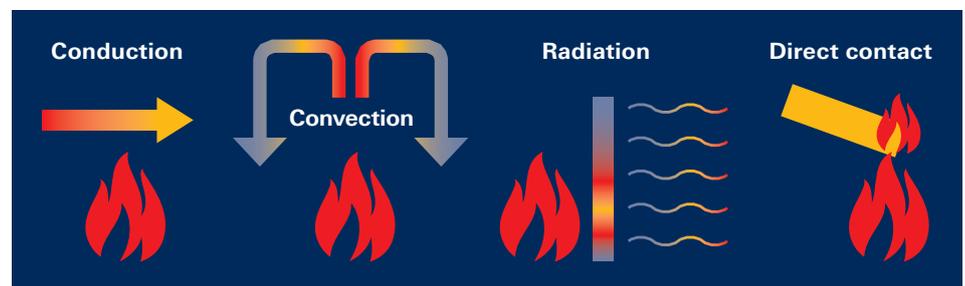
This is based on the principle that heat rises. In a fire the heat and smoke will rise, for example up staircases.

Radiation

Heat travels through the air. The most common example (apart from the sun) is the heat given off from a radiator.

Direct contact

If combustible material is close to a fire then it will catch fire. An example is lighting a gas hob with a match.



B1

Detection, alarm and means of escape

Example

A landlord was fined £36,000 after being convicted of multiple fire safety failures, including failure to maintain the fire detection and warning system, failure to provide a suitable fire evacuation plan, failure to provide fire-fighting equipment and failure to maintain fire resisting doors.

The main purpose of a fire detection and alarm system is to protect life and property by giving early warning of a fire. This enables occupants to evacuate the building and the emergency response plan to be initiated. For a detection and alarm system to be effective it must be able to detect a fire and notify people.

Fire detection systems

- Heat detectors (detect a rise in ambient temperature)
- Flame detectors (detect ultraviolet or infrared radiation emitted by fire)
- Smoke detectors (detect smoke particles in the air)
- Multisensor detectors (combine features of smoke and heat detectors)

Alarm systems

- Automatic detection and alarm system
- Call points connected to an alarm system
- Hand-operated gongs or bells
- Voice systems

Means of escape

It is a legal requirement for employers to provide employees and others with a suitable means of escape from a fire. A route, or routes must be identified that take people away from the fire to a place of safety. The place of safety is usually an assembly point away from the building.

Means of escape	Assembly points
<ul style="list-style-type: none">• Two escape routes where possible• Routes kept free from obstructions• Escape routes fire protected• Self-closing fire doors• Provision of emergency lighting• Adequate signage	<ul style="list-style-type: none">• Safe distance from building• Not obstructing emergency services• Clearly signed• Responsible person in charge• More than one may be needed

B2

Fire-fighting equipment

Example

A hotel was fined £14,420 after being convicted of six fire safety failures, including failure to conduct a suitable and sufficient fire risk assessment, failure to provide means of detection and give warning in the event of a fire, failure to provide adequate means of fighting a fire, failure to provide adequate means of escape from the premises and failure to protect the means of escape from the effects of fire.

Fixed fire-fighting equipment

Some buildings and installations have fire-fighting equipment that is designed to activate automatically on a signal from a detector or control panel.

This type of system is often used in areas of high risk (commonly refineries and chemical factories) or where the area is largely unattended (typically underground car parks and large warehouses).

The most common type is a water sprinkler system which is designed to spray water over a particular area. Other types include foam and inert gas systems which are typically used for flammable liquid stores (foam) and restricted areas such as computer server or electrical switch gear rooms (inert gas).

Fire extinguishers

To determine which type of fire extinguisher to use, fires are classified by the type of fuel that is burning. The fire classifications in the UK are:

Class	Type of fuel	Fire extinguisher
A	Solid fuels such as wood and paper	Water, foam, dry powder
B	Flammable liquids such as petrol and solvents	Foam, CO ₂ , dry powder
C	Flammable gases such as propane and butane	Dry powder
D	Flammable metals such as sodium and magnesium	Dry powder
F	Fires involving cooking oils and fats	Wet chemical
	Fires involving electrical equipment	CO ₂ , dry powder

Note: There is no classification for electrical fires (no class E) as this is a form of ignition rather than a fuel. It is common to refer to this type of fire as 'a fire involving electrical equipment'.

It is important that only those extinguishers suitable for the fuel are used. For example, water extinguishers should not be used on flammable liquid fires or fires involving electrical equipment.

Fire extinguishers should be visible and unobstructed, and sited on escape routes, near exits. They should be inspected regularly and maintained annually by a competent person.