

STUDENT WORKSHEET 1

The importance of detecting a fire quickly



Unfortunately it is all too common to hear stories in the news of people, often young children, dying in house fires. In most cases there is a short but vital period between the start of a fire and its spread which traps and kills people.

Death is usually a result of the inhalation of hot, toxic gases such as carbon monoxide, carbon dioxide, sulphur dioxide, and other more lethal substances such as cyanide. Oxygen levels fall as it is replaced by other gases in the air and it is consumed by the fire, so asphyxiation may also result. People are rarely killed by burns as they have died before the flames reach them.

The majority of deaths could be prevented by early detection alarm systems. If a house catches fire at night, by the time the smell of the fire, the sounds caused by burning or the increase in temperature wake the occupants; the fire will have spread to the point where escape may be impossible. The damage caused by smoke and ash, leaving a fine, smelly, greasy black film on everything it touches has a devastating effect on those lucky enough to escape a fire when they return to their homes.

Domestic smoke alarms work very well, but even when they have been installed, things can go wrong. They are not a very sophisticated device. Many do not warn people when their batteries run out. They use sound to alert those in the house which may not be effective for the hard of hearing. They do not alert people outside the building who may be in a better position to help those inside. They tend to be located in a specific position in the house and may not be triggered by a fire in a different location. There is a vast range of sensors available which can detect the gases listed above as well as many other changes caused by burning. This data can be made available to the first respondents (the fire brigade) who attend to put out the fire and also to a wider audience via the IoT. It is extremely valuable to those researching fires and their effects.

Your challenge will be to make a device to detect fire that could be connected to the IoT.

From the information that you have just read, make some notes to answer the following questions.

- what would be changed by the fire?
- how could the changes be detected?
- is there a change that could be measured/quantified?
- how might the data generated by fire detection devices be transmitted via the IoT?
- how might this data be used more widely than the first respondents?

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