



SMOKY HOMES

Teacher's guide



practicalaction.org/schools/smoky-homes

**Practical
ACTION**

Smoky Homes is based on Practical Action's work in Nepal. It offers pupils aged 8-11 years a real life context to explore the problems associated with household air pollution caused by the use of 'traditional' stoves and open fires to cook food.

The World Health Organisation (WHO) report that 3 billion people in the world today cook or heat their homes with open fires or traditional stoves. It's estimated that over 4 million people die per year from respiratory conditions linked to indoor air pollution.

Smoky homes enables pupils to use their STEM skills to design and model an improved cook stove with the aim of reducing indoor air pollution.

The range of activities within Smoky homes can be used to deliver parts of the Science, Design and Technology and Maths (STEM) curriculum in regular lessons, as an enrichment day or in a STEM/science club. The activities also support pupils' learning about global issues, with particular reference to the Sustainable Development Goals (SDGs) also known as the Global Goals.

Through this project pupils can also gain a CREST Award. See page 5 for more details.

This teacher's guide is supported by a PowerPoint presentation and pupil activity sheets. They can be downloaded for free from practicalaction.org/schools/smoky-homes

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Learning objectives

Through engaging with Smoky homes pupils will:

- gain an understanding of how indoor air pollution affects health
- develop problem solving, team working and presentation skills
- discover how STEM can help solve global issues around food security and achieve the UN Sustainable Development Goals.

Curriculum links

STEM subjects provide great opportunities for teachers to include authentic global contexts and global learning in their teaching.

To see where the Smoky homes supports the delivery of the formal science curriculum for England, Northern Ireland, Scotland and Wales please go to: practicalaction.org/schools/science-curriculum.

Within the D&T curriculum pupils will gain technical skills and knowledge.

Overview of Smoky homes

Outline	Teaching material	Timing (min)
Introduction to the project and a family who live in Makwanpur, Nepal	PPT slides 1–3	10 mins
Starter activities		
a. What do you see?	PPT slide 4 Pupil activity sheet (one per small group) - <i>What do you see?</i>	10 min
b. Killer facts: True or false?	PPT slide 5 Pupil activity sheet (one per small group) - <i>Killer facts: True or false?</i>	10 min
c. The Sustainable Development Goals	PPT slides 6-8 Pupil activity sheet (one per pair) - <i>Sustainable Development Goals</i>	10 min
Main Activity – Smoky homes	PPT slides 9-11 Pupil activity sheet (one per small group) - <i>What is important to the community?</i> - <i>Smoky homes project (Your tast, evaluate cook stoves and smoke hoods, Design ideas, Final design, Evaluation web)</i>	10 min 60 - 180 min
Design and make		
Evaluation and feedback	PPT slides 12 Pupil activity sheet (one per pupil) - <i>Team feedback</i>	60 min
Ingenious solutions	PPT slides 13-14	10 min
Smoky homes quiz	PPT slides 15 Pupil activity sheet (one per pupil) - <i>Smoky homes quiz</i>	10 min
Celebrating success	PPT slide 16	5 min

Introduction to the project

Introduce your pupils to Smoky homes by telling them that they will be using their STEM skills to develop a solution to a real life problem.

Use PPT slides 1-3 to introduce the two sisters Shanoli and Rensi who live in Makwanpur District in Nepal.

Starter activities

We recommend that you work through the starter activities to help pupils understand the main problems that they will be addressing throughout the project.

a. What do you see?

This activity helps pupils to visualize the region where the two sisters live. Organise the class into pairs or small groups and introduce the activity with PPT slide 4. Then hand out the *What do you see?* sheets.

Allow time for pupils to look at the photographs and identify anything that they think could be problems for people and /or the environment. Some pointers could include:

For people: Health issues caused by smoke inhalation; risk of burns (more often to women and children); burden and time taken to collect firewood and cook meals.

For the environment: Deforestation caused by large amounts of wood needed for the fires.

b. Killer facts: True or false?

This group activity introduces pupils to some of the facts around the impacts of open fire cooking.

Hand out the *Killer facts: True or false cards*. Now ask the pupils to decide whether the information on the cards is true or false. The answers are on PPT slide 5.

Conclude this activity by showing the first 1.27mins of a video that shows some of the problems caused by traditional cooking methods in Nepal youtube.com/watch?v=yoHXGqHvbUM.

Extension/homework activity

Set pupils the task to find out things about the country of Nepal and its people.

c. Sustainable Development Goals

Today over 3 billion people in the world who do not have access to electricity cook or heat their homes on open fires or traditional stoves. The consequences are often lethal especially for women and children. The World Health Organisation reports that 4.3 million people die each year from respiratory problems caused by indoor smoke.

To address this and other global problems the United Nations (UN) called for an action plan to address such global inequalities.

In 2015, the Sustainable Development Goals (SDGs) were launched. This set of 17 Goals each have a set of targets to be achieved by 2030.

Use PPT slides 6-8 and the *Sustainable Development Goals* sheet to introduce pupils to the SDGs.

You might choose to prompt questions on which of the SDGs could most help Shanoli and Rensis' family in Nepal. They could include:

Global Goal 1 No Poverty

Measured as people living on less than \$1.25 a day. Many families who are cooking on open fires live in poverty.

Global Goal 3 Good Health and Wellbeing

Includes a target to reduce the number of deaths and illnesses from air, water and soil pollution.

Global Goal 5 Gender Equality

Women and children are mostly likely to be responsible for domestic chores in Nepal and therefore affected by poor health related to indoor air pollution.

Global Goal 7 Affordable and Renewable Energy

With no access to grid electricity, this community in Nepal would benefit from access to renewable energy.

If you wish to explore the SDGs in more detail, there are some great activities and display materials here practicalaction.org/schools/sdgs.



Main activity – Smoky homes

By now your pupils should have a good understanding of the impact of indoor air pollution on health.

Introduce PPT slide 9–10 where Rensi explains what she would like to improve her and her family’s life. On PPT slide 9 your pupils are asked to think what might be the reasons why her family don’t have a cook stove already.

Explain that the main reason why few people have them in this region is due to the cost of buying an improved cook stove and hood in relation to people’s income.

Design and make

Depending on the time available, you might decide to run the activity as a design only project, or allow time for pupils to make a model stove and/or hood.

Use PPT slide 11 to introduce the design and make task and the things they need to do to complete their project.

Now hand out the *What is important to the community?* sheet to help pupils to learn more about the needs of the people they are designing for. Use these as pointers to help them develop their ideas for the features (also known as design criteria) they want their stoves and/or hoods to have.

Hand out the *Smoky homes project-Task Sheet* and ask pupils to complete the questions. They include who they are designing for and design criteria.

Extension/homework activity

Ask pupils to research into different types of cook stoves and to record their findings on their *Evaluate cook stoves and hoods* sheet.

To support this activity a set of stove and hood photographs can be found here [flickr.com/photos/practicalaction/sets/72157675104485235](https://www.flickr.com/photos/practicalaction/sets/72157675104485235)

Allow pupils time to feedback on any interesting design features that they have discovered from their research.

Now either through sketching and/or model making encourage pupils to record any design ideas on their *Smoky homes project - Design ideas* sheet.

For model making, we suggest pupils have access to a range modelling materials including clay, card, foil trays, plastic bottles, etc.

Once they have experimented with making a model, ask them to draw up their final design on their *Smoky homes project - Final design* sheet



Evaluation and feedback

To evaluate their own design and/or model we suggest using the *Design web* sheet. Pupils can evaluate their design and final model against their original design criteria.

If you are planning for your pupils to gain a CREST Discovery Award they will need to present their work and get feedback. PPT slide 12 reminds pupils of the areas to include in their presentations.

If you decide to ask the pupils to present their projects you might like to use the *Feedback* sheet. It enables class members to record and give feedback on each group's presentation.

Ingenious solutions

Now is a good chance to reflect on how improved cook stoves and hoods are helping people in real life.

PPT slides 13–14 show some of the solutions that have been developed by Practical Action with the communities in the Makwanpur District of Nepal.

This video clip from 1.27mins to 3.50mins also shows the improved cook stoves and hoods in action [youtube.com/watch?v=yoHXGqHvbUM](https://www.youtube.com/watch?v=yoHXGqHvbUM).

Smoky homes quiz

You might like to conclude the project with the Smoky homes quiz.

Use the PPT slide 15 to feedback the answers and also to reflect on issues such as which of the Sustainable Development Goals they think the improved cook stoves helps to reach.

Celebrating success

CREST Awards

Taking part in the Smoky homes project is a great way for pupils to gain a CREST Award. The challenge is aligned to the Discovery Award, but can be used towards achieving a Superstar Award.

The CREST Discovery Award is generally undertaken by 9–14 year olds. It can be achieved in 3–5 hours.

practicalaction.org/schools/smoky-homes

For more information on CREST Awards go to: crestawards.org



British Science Week

Smoky homes would be a great activity for your class or year group to do during British Science which takes place in March each year. To find out more go to: britishscienceweek.org.

To find out if your school is eligible for a grant go to: britishscienceweek.org/about-us/grants



Great Science Share for Schools

Having taken part in the challenge, pupils are encouraged to join in the annual Great Science Share for Schools campaign. It's their chance to share their project with new audiences in or beyond their own schools. To find out more and register your school to take part visit: greatscienceshare.org

