



## STEM Project 1C - House Design

# Landscapes, Life & Fire

### *The Challenge*

To create solutions to reduce the impact of bushfires on landscapes and life



Write your  
name on the  
tree

### *Ways to Meet the Challenge*

This project has many different parts to it, and you will be looking at one area in particular.

**Design and build a model of a house that will survive a bushfire.**



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### *Find Out More and Get Thinking*

Here are some points you might like to consider in your design process:

1. Consider what fire-resistant materials would be most suitable to use for:

- the house frame e.g. wood or steel or something else
- the base or pad
- the walls
- the roof
- insulation in the ceiling and walls

You may not be able to get the exact materials for your model that you would use to build a house but could substitute another material that is similar.

2. Will the shape of the roof affect how fire-resistant the house is?
3. Should the house be built on or off the ground (on stilts)?
4. Consider if the design of the house eaves and gutters could affect the fire resistance.
5. Are there any additional fittings that could be added such as shutters or sprinklers on the roof?
6. Will your design include water tanks and drainpipes that could fill the tanks when it rains?
7. How about the windows in your house design - do they need to be made from a special material or be a certain thickness? Will the size of the windows affect the fire resistance?





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8. Consider how close trees and plants should be to the house and whether you will include a pool.
9. Will you include a generator or other way to get power if the electricity is cut off?
10. How will the landscape where your house will be located affect your design?
11. What scale will you make your model? It's obviously not possible to build a full-size house!
12. How will you test your design? You need to discuss this with your teacher as there are many safety considerations that need to be considered.

**SAFETY NOTICE:** Any testing of solutions involving burning should be done in controlled situations by adults, only after appropriate risk assessments have been conducted.





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In the space below, brainstorm all the ideas you have about how you could investigate the project area.

When you were brainstorming, were there some things that you found you need to know more about? Write those down here. You may like to use the [PALMS STEM Research Guide - Digital](#) to find out more about these things.





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Scientists all over the world organise the way they think about and carry out their work in the same way - we call this the scientific method. They also write quite formally in the 'third-person' style (not using phrases such as 'you', 'we' or 'I').

To try and solve your part of the STEM problem and meet the challenge, you will need to design and build a model. The [STEM Project Design Process Worksheet](#) on the following pages will help you with this process.

It is important that you include as much detail as possible so your design could be built by anyone who reads it. If you have trouble attaching pictures or need to submit your work in a different format, contact your teacher.



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### *STEM Project Design Process Worksheet*

Do I have a clear understanding of the problem I need to solve? Write the problem in one or two sentences.

How will I test my solution? Remember that you may only be able to build a smaller model of your real-life design.

What materials will I need to work towards a solution and test it?

List any special tools you may need to use. e.g Brush, hammer, clamp





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What do I need to do or use to make sure I work safely?

Draw a first draft of a diagram to show your planned design and take a picture. Upload the picture by clicking on the icon here:

If that doesn't work, send the picture separately but write here what the name of the file is:





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How much will your planned model cost and are all the materials and tools available to you? Where will you get them from? You may need to check with adults at home.

Review your design and make any changes needed. Make sure it is well labelled! Take a picture. Upload the picture by clicking on the icon here:

If that doesn't work, send the picture separately but write here what the name of the file is (it should be different to your draft):





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How will you record your progress? (choose an option)

**Check your design with your teacher before starting to build it.**

Once your design is approved by your teacher, go ahead, and gather your equipment and build a prototype model!

Take pictures or a video if you can, to show your model.



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### *Could It Be Better?*

Once you have built and tested your design, you need to review your ideas and work. In this section, you can identify any problems or difficulties you encountered and suggest ways you could improve your project if you were to start again.

These questions will help with your review process. Write or draw your ideas for improvement in the table below.

- Do you currently have access to enough of the materials you used to make a full-size model? Is there enough of it available in Australia? On Earth?
- Will current materials or technology be useful, or do you need something more, something stronger, or more fire resistant?
- Estimate how much it would cost to build your house design.
- Estimate how long it would take to build your house design.
- Can you do all of this yourself or do you need to bring in some experts? Who might these experts be?
- Did your design give you enough information to start building a bushfire-resistant house tomorrow? What further experiments or tests might you need to do?





## STEM Project 1C - House Design

Problem encountered	Possible Solution
Any other ways to improve your solution if you have unlimited resources, time and access to the best people!	





## STEM Project 1C - House Design

### *Report Back To Base*

To finish off your STEM Project, you need to let everyone know what you found out and what solution you came up with for your problem.

There are many ways you could present this, and your teacher may ask you to do it a particular way or have you come up with your own ideas. When writing or making your presentation, make sure you think carefully about who your audience is and how much detail you need to include. More visual presentations (colourful or with lots of pictures) are always more interesting.

Whatever kind of presentation you end up doing, you should cover the following things:

- What you found out or discovered that you didn't know before
- What you designed, built or tested
- What STEM skills you used (problem solving, creativity, critical analysis, teamwork, independent thinking, communication, digital literacy)
- How you could better investigate the challenge if we had no limit on resources or time
- The most challenging aspect of the project

### Don't forget!

- Save this file as a PDF and submit it to your teacher. Don't forget to include your name!
- Check that any photos have uploaded or send them to your teacher separately (tell them the file name)
- Submit your Report Back To Base presentation to your teacher.

