Fire-Ed Up Challenge - Introduction

This Fire-Ed Up challenge is a 6-week design sprint, seeking innovative solutions to a range of bushfire-related challenges. Using the established iSTEM Engineering Design Process, each team will choose from three scenarios and design a solution presented in the form of either a detailed design poster or a 90-second video pitch aimed at potential investors.

Scenario 1: New technologies driving bushfire innovations

🔥 INTRODUCTION

Bushfires, one of nature's most devastating phenomena, have long posed significant challenges to both the environment and human communities. Historically, we've combated these fires with conventional methods – firefighters with hoses, planes dropping water, and controlled burn-offs. But in the age of technology, how can innovation provide us with new tools and methods to better predict, manage, and combat these destructive forces?


🔍 OBJECTIVE

Your challenge over the next six weeks is to explore, conceptualise, and design a technology-driven solution that can contribute significantly to bushfire management. This could be a tool to predict bushfires, a method to control them more efficiently, or even a system to aid recovery efforts after a fire.

📚 RESOURCES & INSPIRATION

Existing Tech: Look into technologies currently in use, such as drones that map out fire-affected areas or apps that provide real-time updates on fire locations.

STEM Principles: How can principles of science, engineering, math, and technology be combined to address bushfire challenges?

Global Innovations: Bushfires aren't unique to Australia. Research international methods and technologies and think about how they can be adapted or improved.
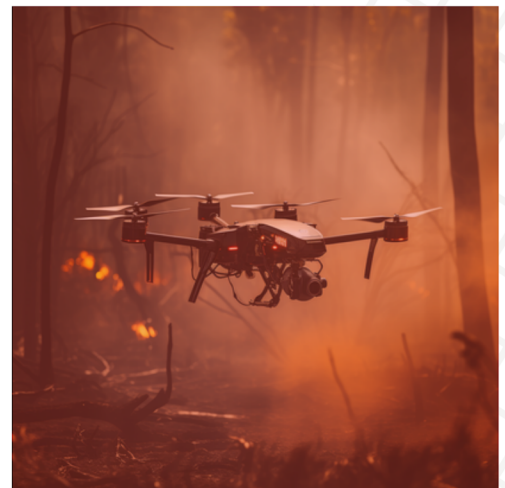
Fire-EdUp

Mission Schedule

The Fire-Ed Up Challenge missions have been designed by subject matter experts and will provide relevant information for the team to complete the challenge in a systematic way using the <u>iSTEM Engineering Design Process</u> as a guide.

Research

Start your journey by researching and developing an understanding the current methods of bushfire management. On the next page are some suggested resources you might use to develop your knowledge.

Mission Guide

Use the following information as a guide to completing the design sprint for this scenario. You can run these missions at your own pace, use as little or as much of the <u>Fire-Ed Up</u> resources as needed. Each heading is linked to the different tasks developed for the Fire-Ed Up program.

1. **Define:**
   - Understand the broader concept of bushfires and their current management methods.
   - Determine the overarching goal: integrating technology into bushfire management.
2. **Identify:**
   - Recognise the limitations of current bushfire management techniques.
   - Specify the technological areas (like AI, drones, etc.) that have potential for this challenge.
3. **Brainstorm:**
   - Generate a list of potential technological innovations that could address the identified limitations.
   - Encourage out-of-the-box thinking and consider various tech fields.
4. **Design:**
   - Choose the most promising technology idea from the brainstorming session.
   - Outline how this technology will function in real-world bushfire scenarios.
5. **Prototype:**
   - Create a tangible mockup or digital representation of the chosen technology.
   - Detail its functionality and potential integration into existing systems.
6. **Evaluate:**
   - Test the prototype in simulated bushfire scenarios.
   - Gather feedback from bushfire experts and technology professionals.
7. **Iterate:**
   - Refine the technology based on feedback and testing results.
   - Ensure it addresses the primary challenges identified earlier.
8. **Communicate:**
   - Prepare a pitch or design poster on the technology, its development process, and its potential impact.
   - Engage with stakeholders, including bushfire management teams, to share and discuss the innovation.

Science Goals and Objectives

Each team must seek to answer one or more of the 14 national goals of the 2014 National Bushfire Management Policy Statement.

Teams will then outline a science objective(s) for their mission. Teams must seek to answer one or more of the most important science objectives:

- Maintain Appropriate Fire Regimes in Australia's Forests and Rangelands.
- Balance the Environmental Impacts of Fire.
- Promote Indigenous Australians' Use of Fire.
- Community Engagement.
- Public Awareness and Education.
- Integrated and Coordinated Decision Making and Management.
- Employment, Workforce Education and Training.
- Bushfire Risk Mitigation.
- Bushfire Response.
- Safety in Fire Operations.
- Bushfire Recovery.
- International Responsibilities.
- Risk Management.
- Investing in and Managing Knowledge.

Example question: 13. What are some potential risks, positive and negative? And what contingency plans have we got in place if those risks arise?

Suggested Resources

- My FireWatch: https://myfirewatch.landgate.wa.gov.au/map.html
- Fighting fires from space: https://reporter.anu.edu.au/all-stories/fighting-fires-from-space-how-satellites-and-other-tech-could-prevent-catastrophic-bushfires
- ANU Report- Measuring the economic impact of early bushfire detection: https://csrm.cass.anu.edu.au/sites/default/files/docs/2020/9/Measuring_the_economic_impact_of_early_bushfire_detection.pdf
- Infographic: https://createdigital.org.au/infographic-minderoo-foundation-bushfires/
- Digital Earth Australia Hotspots: https://hotspots.dea.ga.gov.au/
- XPRIZE Wildfire: https://www.xprize.org/prizes/wildfire
- Bushfire Assessment Apps: https://www.csiro.au/en/research/natural-disasters/bushfires/Bushfire-Assessment
- Bushfire Earth Observation Taskforce Report: https://www.industry.gov.au/sites/default/files/2020-12/bushfire-earth-observation-taskforce-report.pdf