

SKILLS EXPLORATION DAYS DESIGN CHALLENGE

Alternative Dwellings



Overview

If you take a walk through your community, you may notice that many of the houses look the same. While some might be built from brick or stone and others from wood, most houses have similar designs and are constructed from the same handful of materials and natural resources. While these natural resources still have a place in building today, the overuse of them has contributed to several environmental issues including deforestation, greenhouse gas emissions, and air and water pollution. ¹

Design Rationale

Many builders are beginning to question how they might use alternative materials and designs to construct homes within our communities. Creative engineers, builders, and inspired homeowners have already taken on the challenge of constructing more sustainable dwellings through designs such as tiny homes, Earthships, and shipping container homes. Most of these designs aim to reduce environmental impact and some even take it a step further by implementing principles of regenerative infrastructure to help restore balance to the ecosystem. ²

Sustainability isn't the only issue we face when it comes to housing. As our population grows and day-to-day life becomes more expensive, traditional housing is becoming increasingly unaffordable for many people. While there are many factors that contribute to the affordable housing crisis, innovative housing solutions could be a big step forward in providing more sustainable, cost-effective housing to more of our world's population.

Problem Scenario

Your team has been selected to develop a prototype or scale model of a dwelling that might be unique to your community and can withstand the climate and geography of your area. Your team needs to consider the availability of materials, local and traditional designs, the environmental impact of the dwelling, and the needs of the ideal people who might live in the structure.

In addition to the above requirements, your prototype or scale model must satisfy **at least two** of the following identified concerns:

- Be moveable/portable
- Be easily replicated
- Primarily use sustainable building materials/techniques/design principles
- Be energy efficient (consider eco-friendly options for heating/cooling, sustainable/renewable energy sources, water recycling)
- Implement regenerative infrastructure practices to restore the surrounding ecosystem/environment
- Provide an affordable alternative to traditional housing

Success Determinants

Success will be determined by the degree to which your design solution:

- Addresses the design challenge
- Addresses an identifiable need
- Is original** (not an exact copy of something that already exists) **and as realistic as possible.**
- Utilizes the tools and materials provided in a creative and safe manner
- Aligns to the design motto: *Make it smaller, stronger, do more, be easier to use, be cheaper.*

***Prototype:** a model that illustrates the functionality of an idea or design. It may be life sized or scaled to a model that fits in your hand.

***Sustainable Housing:** Housing that is built, operated, and maintained in ways that reduce the owner's carbon footprint and the impact of climate change ³

***Regenerative Infrastructure:** Infrastructure designed to restore balance to ecosystems, rather than just minimize the impact ²

SUGGESTED RESOURCES TO GET YOU STARTED

Design Challenge Background Information

The Negative Impacts of Traditional Construction Methods in the 21st Century ¹	https://theoffsiteguide.com/articles/the-negative-impacts-of-traditional-construction-methods-in-the-21st-century
Could Tiny Homes Be the Adorable, Affordable, and Sustainable Housing that Our Planet Needs?	https://ideas.ted.com/impact-of-tiny-homes-on-the-environment-and-affordable-housing/
What Is Sustainable Architecture?	https://www.thespruce.com/what-is-sustainable-architecture-4846497
Regenerative Infrastructure to Mitigate the Effects of Climate Change ²	https://www.activesustainability.com/construction-and-urban-development/regenerative-infrastructures/?_adin=11734293023
How to Become a Sustainable Architect	https://qrco.de/bfFG8P

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10 Eco-Friendly and Sustainable Houses	https://qrco.de/bfFGAb
Sustainable Housing Options Are Here: Why Aren't They More Popular? ³	https://earth.org/sustainable-housing/
The Top 10 Sustainable Home Design Trends (2024)	https://www.novatr.com/blog/sustainable-home-designs-trends
Solar Water Bottle Bulbs	https://tinyurl.com/yafezeun
A Guide to Green Roofs	https://greenbuildingcanada.ca/guide-to-green-roofs/
9 Ways to Make Your Home More Sustainable	https://greenbuildingcanada.ca/6-ways-make-home-more-sustainable/
Sustainable From the Bottom Up: Green Materials for an Entire Building	https://greenbuildingcanada.ca/construction-and-building-materials/
10 Eco-Friendly Building Materials	https://qrco.de/bfFGFr
Tips For Turning Your Tiny House into A Net-Zero Energy Efficient Structure	https://tinyhouseexpedition.com/tips-for-turning-your-tiny-house-into-a-net-zero-energy-efficient-structure/
What is an Earthship?	https://www.thespruce.com/what-is-an-earthship-5248772