

# Designing for Extreme Environments

Frank Lloyd Wright designed and drew over 1,000 homes and buildings for all kinds of different harsh environments. Wright's designs all found harmony within the environments he built—the concept of organic architecture. Wright's buildings provided function and beauty with the top priority of keeping people safe.

In this activity, your family will take part in an extreme design challenge. You will roll some dice and randomly select an extreme environment to design a home for your family. Like Wright, design your home within the harshness of the environment and keep in mind the goal to keep your family safe in such an extreme environment.

## MATERIALS NEEDED

- dice
- copy / graph paper
- ruler
- pencil
- colored pencils / crayons

ENVIRONMENT	HAZARDS	GOAL
Rainforest	Constant rainfall year-round. Flooding can get up to 40 feet during heavy rain seasons. Marshy, wet ground.	Design a shelter that keeps people safe and dry that can last in the damp ground of the rainforest.
High Mountains	Low pressure with little oxygen. Extreme cold temperatures all year.	Design a shelter that can provide oxygen and warmth all year to those who stay there.
Deep Ocean	High pressure, no oxygen. Surrounded by water you are unable to drink.	Design a shelter that keeps you dry, provides oxygen, water, and human needs that can last underwater.
Mars	High radiation from the sun. Extreme temperatures (-200 degrees) with no breathable oxygen. Extreme winds.	Design an extraterrestrial shelter that can withstand strong radiation, extreme temperatures, and winds, while providing oxygen, food, and water.
Hot Desert	High temperature. Dry with very little source for water. Sparse vegetation and biological life.	Design a shelter that can be built on the desert sand and provide safety from the sun.
Outer Space	A vacuum with no air for humans to breathe. Extremely cold (-445 degrees), no biological life.	Design a shelter that humans can live in for a long period of time which provides air, warmth, and food.

## Instructions:



1. The table contains six extreme environments, some of the hazards to overcome, and the goal your family will try to reach if that environment is chosen. Review this information before you begin.
2. Have a group discussion in your family about the information you just read. Besides just keeping people safe, what other things do humans have to consider when living in an extreme environment? Think about **food, water,** and **fun activities.** How can you include those into your house design? Think about the design for your family. How big does it need to be to fit everyone? Will you have to share rooms to conserve space? Think of the design for each room. A kitchen would look much different in space than it would in the ocean. Decide if each person in the family will design part of the shelter or if you will design it all together.
3. Roll the dice to find out in which extreme environment you'll be working. This is the environment you will have to design your home around.
  - 1: Rainforest
  - 2: High Mountains
  - 3: Deep Ocean
  - 4: Mars
  - 5: Hot Desert
  - 6: Outer Space
4. Start designing your new home in that extreme environment. Grab multiple pieces of paper. Draw your environment first, remembering to leave room for your shelter. If need be, you can restart multiple times until you think your environment is well-detailed. Then, in detail, draw your shelter. Make sure to label each part and how your family's shelter provides:
  - The ability to withstand the elements
  - A source of water
  - A source of food
  - Breathable air
  - A stable temperature
  - Ways to stay entertained
5. Once you have completed your drawing, send a picture of it to us on our Facebook page or email it to us at [Education@FrankLloydWright.org](mailto:Education@FrankLloydWright.org).