

Scenario: Earthquakes

Your building will be located in a city that sometimes experiences strong earthquakes. Temperatures, rainfall and light levels are all average but space is limited.

Your task: Design a building that would be suitable for this environment. 8 people must be able to live in this building. The building must be attractive, use as little energy as possible and use the environment to its advantage.

Points to consider:

- What technologies or features would be useful?
- Which building designs or materials are strong and which are weak?
- What shapes are most likely to fall down?
- Can you prevent the building from moving?
- The effects of earthquakes can be minimised by installing a free swinging block high up in the building called a 'tuned mass damper'

Scenario: Heat

Your building will be in a country in the northern hemisphere with very high temperatures, averaging between 30 and 40°C during the day. There is almost constant sunshine and little rainfall; as a result, water shortages are common and water can't be wasted.

Your task: Design a building that would be suitable for this environment. 8 people must be able to live in this building. The building must be attractive, use as little energy as possible and use the environment to its advantage.

Points to consider:

- What technologies or features would be useful?
- Warm air rises
- What colours or materials reflect light and what absorbs it?
- Air conditioning requires all windows and doors to be sealed to work properly
- Shading is useful to block the sun's rays
- Glass allows in light- but also heat
- Which compass direction is the sunniest?

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Scenario: Cold

Your building will be in a country with very low temperatures, which rarely rise above freezing. There is little sunshine and high snowfall.

Your task: Design a building that would be suitable for this environment. 8 people must be able to live in this building. The building must be attractive, use as little energy as possible and use the environment to its advantage.

Points to consider:

- What technologies or features would be useful?
- Warm air rises
- What colours or materials reflect light and what absorbs it?
- Melted snow could be useful for non-drinking water
- Snow is heavy and can cause roofs to collapse if it builds up
- How will you stop water from freezing in the pipes?
- How will you stop heat from being lost from the building?

Scenario: Flooding

Your building will be located in an area that often floods up to a height of 3.5 metres. Temperatures are warm and never drop below freezing, but rainfall levels are very high.

Your task: Design a building that would be suitable for this environment. 8 people must be able to live in this building. The building must be attractive, use as little energy as possible and use the environment to its advantage.

Points to consider:

- What technologies or features would be useful?
- Will you prevent the property flooding or will you live with it?
- Which rooms will you put on the ground floor?
- Electricity doesn't mix with water!
- How will you ensure a clean water supply when the building has flooded?
- Insects such as mosquitos are very common in warm, wet conditions
- A storey is usually about 3 metres high

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Scenario: Hurricanes

Your building will be in a country that often experiences hurricanes; these involve very high winds and very high rainfall. Temperatures are average.

Your task: Design a building that would be suitable for this environment. 8 people must be able to live in this building. The building must be attractive, use as little energy as possible and use the environment to its advantage.

Points to consider:

- What technologies or features would be useful?
- Which building materials are strong and which are weak?
- What shape should the building be?
- What areas experience the highest winds?
- How will you prevent the building from flooding in the rain?

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