# Intro to Permaculture - Permaculture Shelter Design Video Transcript

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Buildings have many design considerations when planning a Permaculture system, and their designs are specific to each climate and to the available materials and skillsets.

One major design theme is to plan for passive comfort. This means that the design of the building creates a comfortable environment that doesn't require excessive energy for heating, cooling, and lighting. This is accomplished by the buildings' orientation, layout, and materials. The layout and orientation are also key to maximizing natural light, which saves electricity for artificial lighting.

Another major design theme is to build using local and natural materials as much as is possible. Every location has materials that are available and don't need to be shipped in from afar. To get a clue about what materials can be used, look at what indigenous people built structures out of, whether it's adobe in the Southwestern US, thatch in Indonesia, or wood on the West Coast of North America.

There are too many different climate zones and building types on the planet to go over in detail in this short presentation, but I am going to give you a very basic outline of the major building themes for deserts, equatorial tropics, and cool temperate regions. The design strategies for other climate zones tend to be hybrids of these major strategies, like in the subtropics, the cold deserts, the warm temperate climates and at high elevations in the tropics. My goal is to pique your interest so you look further into this for your unique climate conditions.

We're going to start in the desert. As we've learned, deserts are not usually located on the equator, they tend to be further North or South, so they tend to have warmer and colder seasons based on the movement of the sun. Even warm deserts tend to require some heating in winter, and this increases the further you get from the equator. This is why desert buildings are oriented towards the sun, for solar gain in wintertime, and this is where most of the windows should go.

Windows should be limited on the North and East sides, with little or no windows in the West where the hot late afternoon summer sun beats down. The rest of the sides of the house should be shaded with wide overhangs.

Trellising and plantings can be connected to the house for more shading and cooling.

Trees should be planted in an arc around the house to further keep the sun off of the walls, and rainwater harvesting tanks collecting water from the roof can be placed to accentuate shelter for the home.

High mass materials like earth or stone are best used for the walls and the floor, where they can absorb the sun's heat in winter while staying cool in the summertime. Insulation on the outsides of the mass walls will help keep them cool in summer and warm in the wintertime. A correctly sized overhang will

block the sun from shining in the windows during the summer. Ideally in summer you cook in an outdoor or detached kitchen to avoid heating up the house more.

So this is a really simplified version of an idealized desert house. Of course, there are many, many different configurations and styles and building materials, and many different indigenous methods and examples that we can look at. Great diversity.

So now we are going to look at the temperate zone house. In the temperate zones, orientation towards the sun is a must, as light becomes more limited during the winter the further you get from the equator, where the temperate zones are primarily located.

Making sure that the building is elongated to the East and West with lots of glazing on the sun-facing side will bring light and warmth in, when the sun is lower on the horizon during fall, winter, and spring.

An attached greenhouse is a great idea for capturing heat in the temperate zone. The structure will lose more heat than it gains on the non-sun facing sides of the house, so limiting glazing on the shady side and the West is best. The East side catches the morning light, and the Southeast (or Northeast if you are in the Southern hemisphere) is a good place for glazing as well. In most locations, the coldest winds will come from the direction of the poles, so evergreen trees on the poleward side help to block cold winds.

In really cold climates, like Iceland, houses may be dug into the ground for temperature moderation.

High insulation is essential, because you can't rely on the sun to heat the buildings' interior mass during the winter, when it can be cloudy for long periods in a temperate climate. Heating is needed during the winter, and insulation helps to keep that heat in so you need to use less fuel to stay warm.

There are incredibly efficient wood stoves that have been developed, like the Rocket Mass heater and Russian Oven, which we have provided links to. We want to use as little fuel to warm the structure and hold the heat in as long as possible with high insulative design.

So that's basically the temperate climate house, and now we're going to move on to the tropics, where heating is certainly not an issue.

Cooling is the primary need for building design in the tropics. There is no need to orient towards the sun, but structures should be oriented towards cooling breezes, with shade maximized around the rest of the dwelling for cooling.

In the tropics, there is no dormant season, so insects, reptiles, and mammals are all very active year round. To help keep critters outside of the house, many traditional buildings are elevated on piers.

Chickens, guinea fowl, and other domestic birds forage underneath, keeping the insect populations down. In this picture from San Pedro, Belize, you can see the kitchen is on ground level with the bedroom elevated above. It is common to have the kitchen detached from the main dwelling so as not to heat the space during cooking.

Structures are often made of light permeable material, so air can move through, with wide overhangs in every direction to protect against heavy rains and add shade around the building, as well as trees. There are many other details depending on the site, especially in hurricane prone locations.

So that was a really quick breeze through a very vast subject. My goal is to just wet your appetite so you go out and find more. We've provided a number of links to get you started learning about climate appropriate structures, so I encourage you to browse them and teach yourself.