

PASSIVE SOLAR DESIGN

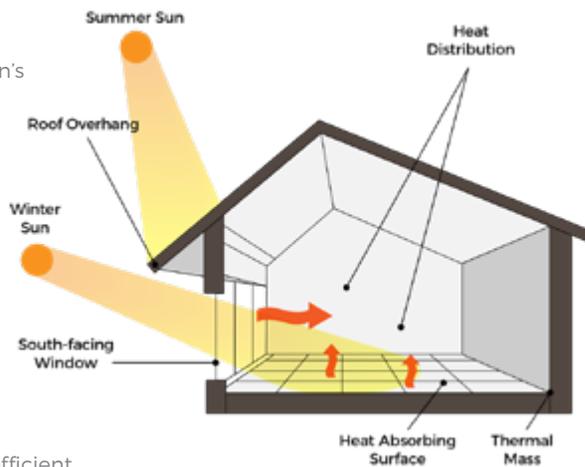
What is Passive Solar?

Passive solar is harnessing the sun's energy to reduce the need for mechanical heating and cooling. It increases energy efficiency and comfort in the home by adding insulation and improved ventilation.

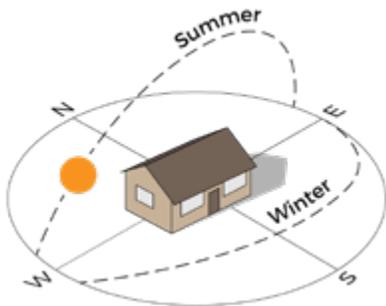
In a passive solar house, the sun's heat is absorbed in the winter and repelled in the summer. This method of heating and cooling is highly efficient

because it utilizes the sun's energy to distribute heat throughout the house.

In order for passive solar to work, a house must have large south-facing windows, roof overhangs, and insulation that is continuous from the foundation to the roof. The large windows are designed to take advantage of the lower winter sun while roof overhangs are positioned to block the higher summer sun from reaching into the house. Once a house becomes nearly air tight through improved insulation, air ventilation also becomes necessary. It's a great upgrade that fills the home with sunshine, warmth, and helps bring the outside in. Many houses qualify for a passive solar design upgrade like this!



Angles of the Sun



For passive solar to work, the house must be orientated in a south-facing position.

Here we can see the relationship between a passive solar house and the sun. On a typical summer afternoon, the sun's steep angle will not be able to heat the house because of the long roof overhangs. In the winter however, the sun travels across the horizon at a much lower angle and reaches into the house through its large windows to warm the surfaces inside.

Due to these shifting sun patterns, days are much shorter during the winter and much longer during the summer.

Passive Solar is Nothing New

Techniques of passive solar building design were practiced for thousands of years, before the advent of mechanical heating and cooling. Fully developed solar architecture and urban planning methods were first used by the Greeks and the Chinese. Roman bathhouses had large south facing windows, allowing sunlight to naturally warm the spaces. In many early civilizations, architects developed techniques for retaining heat from sunlight during the winter and maximizing shade during the summer.

This cliff

dwelling

built by

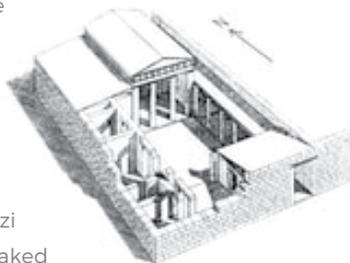
the Anasazi

people soaked

up the sun in cold

months and was almost fully covered

by shade when summer arrived.



Conclusion

- Free heat in the winter and less heat in the summer
- Reduced need for expensive mechanical systems
- Improved insulation with reduced drafts and cold rooms
- Decreased wear and tear on the HVAC system
- Additional natural lighting to the home
- Lower monthly energy bill

Our ancestors understood the importance of the orientation of all buildings and windows. Utilizing natural energy sources, such as the sun, has benefited people in the past and will play an important role in the future. Modern science provides us with better insulation, ventilation, and testing equipment than our ancestors had. There are things we can learn from people who lived long ago. Not everything from the past is good but maybe our fast-developing advanced society will benefit from revisiting how things were done long ago. Today, energy is cheap and we do not concern ourselves much about turning our thermostats up or down. That may not always be the case as non-renewable resources will slowly dry up. Our ancestors did not have advanced science. They relied on faith and time-tested traditions. We should not totally abandon our ancestors but bring back some of their faith and traditions and see how we can revive them by using modern science.

