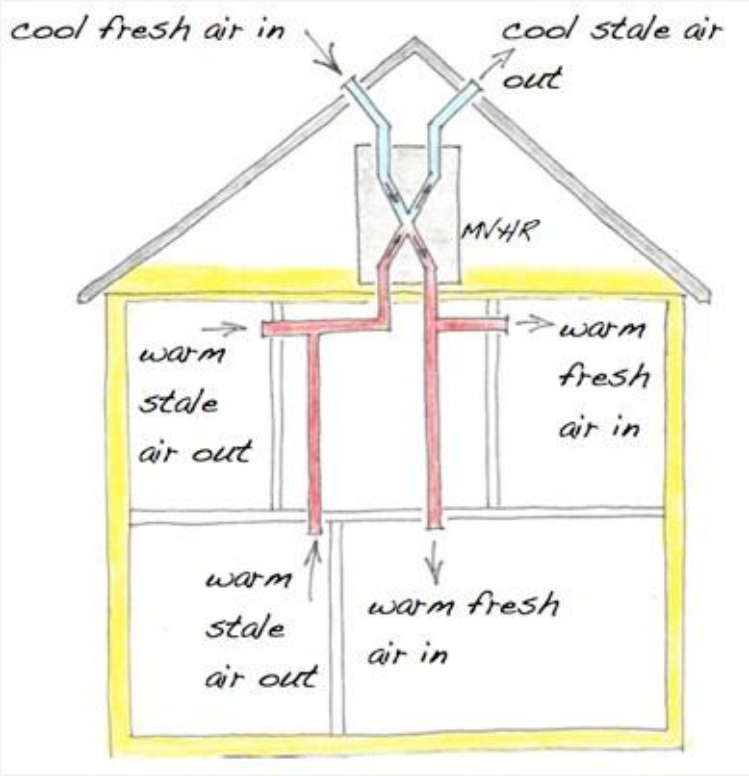
Mechanical Heat Recovery with Ventilation System

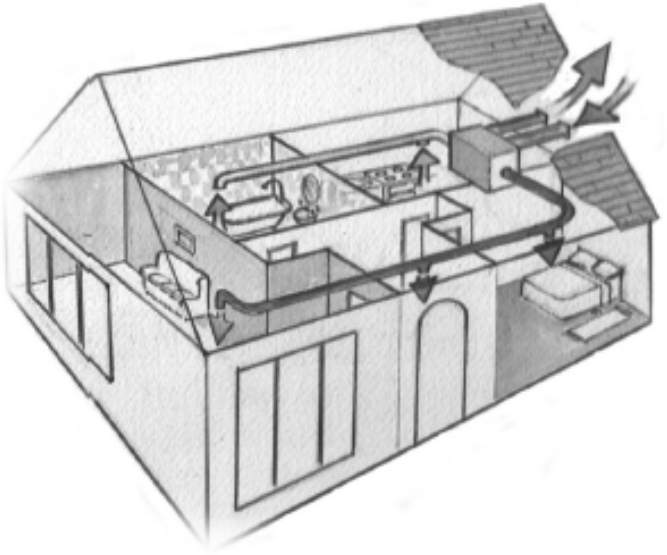


2010 Higher Level

10. **(a)** Using notes and ***freehand sketches***, discuss in detail the importance of any **two** of the following in the design of a Passive House:

- shape and form of the house
- continuity of insulation
- reduced thermal/cold bridging.

(b) The layout of a Mechanical Heat Recovery with Ventilation system (MHRV) for a Passive House is shown in the accompanying sketch. Explain, using notes and ***freehand sketches***, the operating principles of such a system and discuss **two** advantages of this system for a Passive House.



(c) Show, using notes and ***freehand sketches,*** **two** design details that would help prevent the possible overheating of a Passive House in summer.

“Passive House”

What is a Passive House?

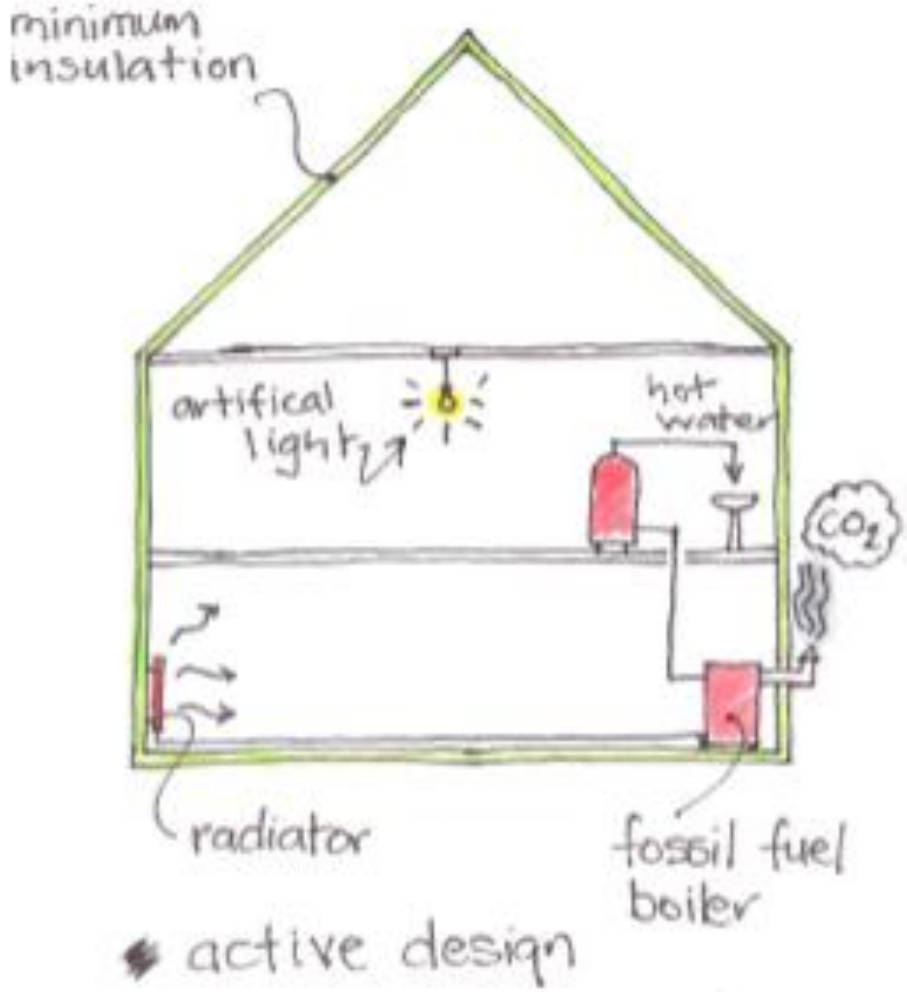
Passive Design

There are 2 approaches to creating a comfortable internal environment in a home

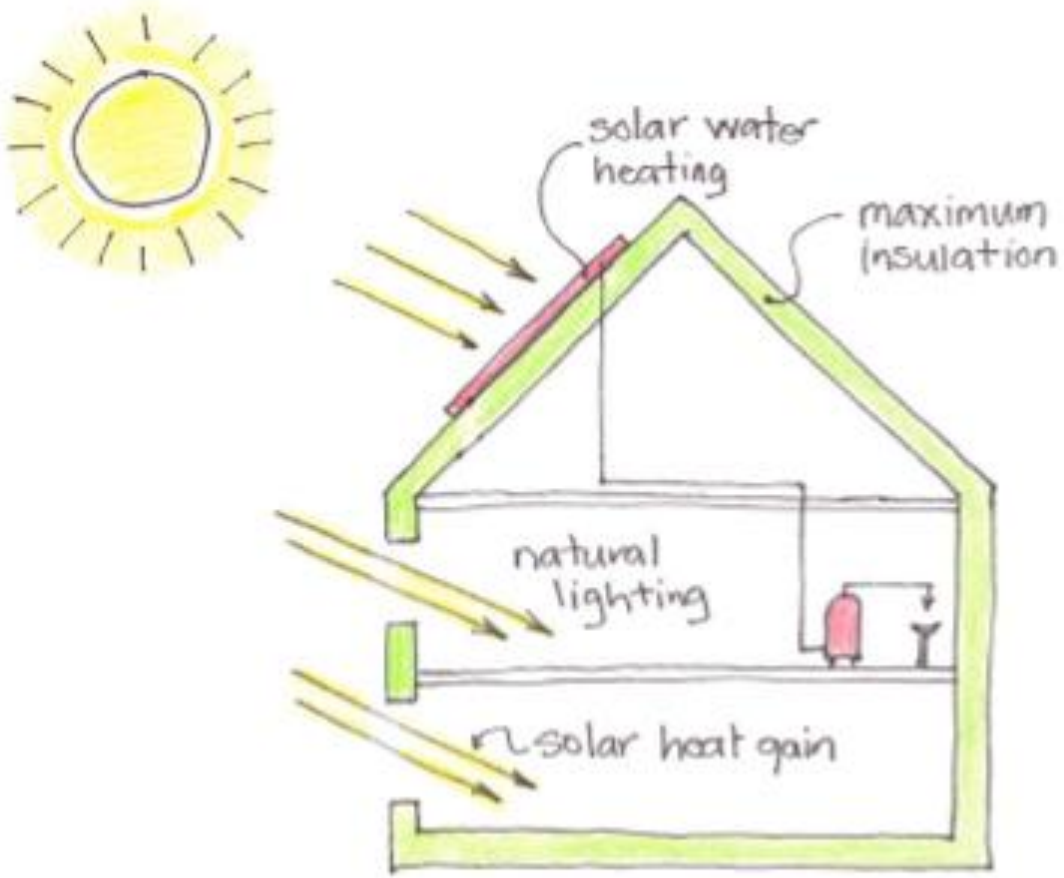
1. Active design – Relies on burning fossil fuels to produce energy to provide space heating, water heating and lighting

2. Passive Design – Uses energy from the sun to produce this energy

Active Design



Passive Design



- passive design

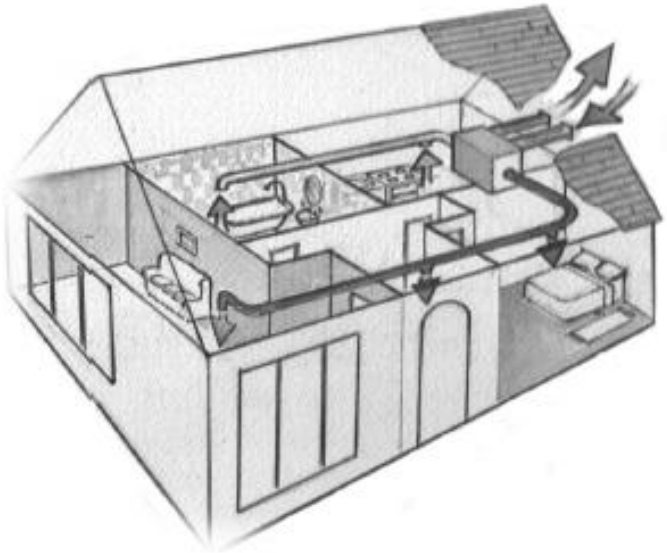
Passive Design Principals

- using the sun's energy (solar gain) to heat the home (space heating & water heating),
- using the heat produced by people and appliances to heat the home,
- using very high levels of insulation to retain the heat (i.e. floors, walls, roof, windows, doors),
- using the sun to provide light in the home,
- controlling air flow to reduce heat loss,
- using the land and planting to provide shelter.

Mechanical Heat Recovery with Ventilation System

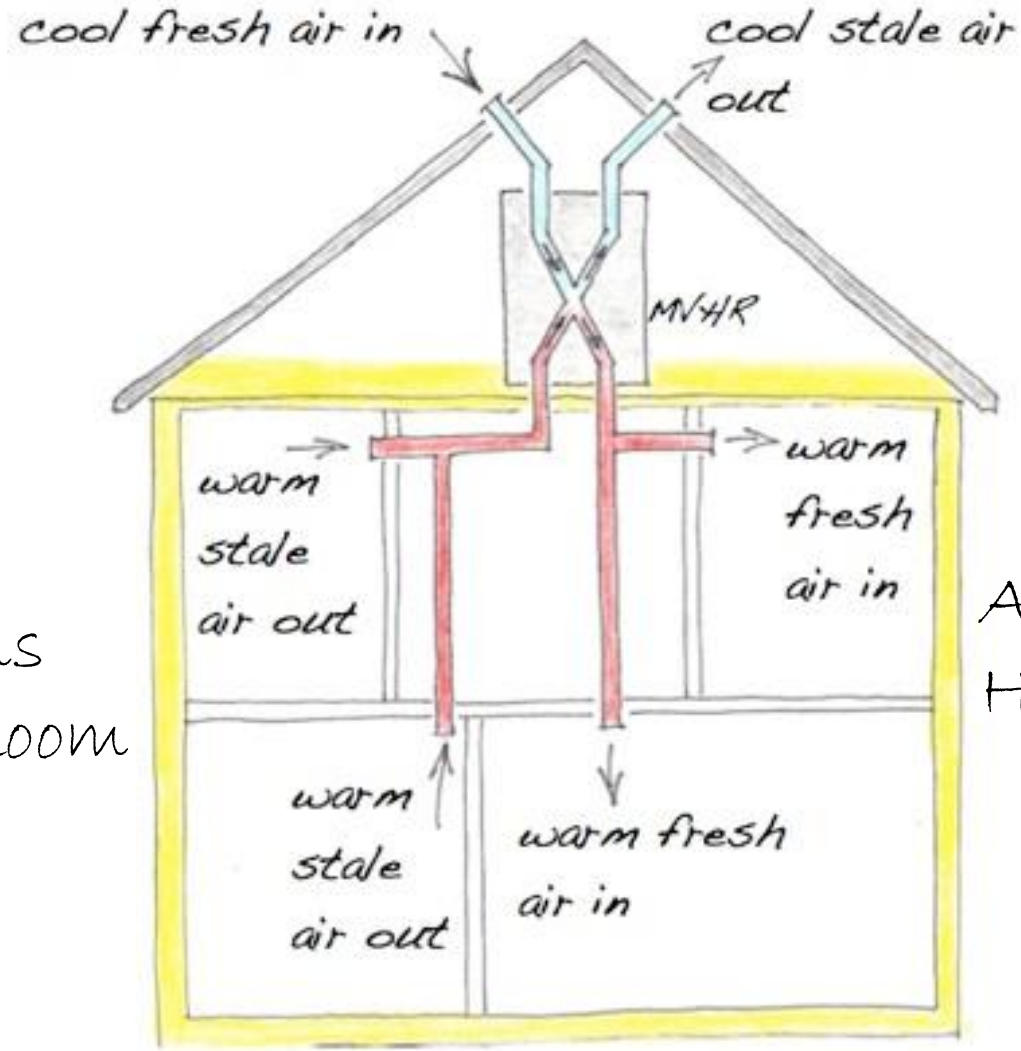
Question We Will Answer

(b) The layout of a Mechanical Heat Recovery with Ventilation system (MHRV) for a Passive House is shown in the accompanying sketch. Explain, using notes and ***freehand sketches***, the operating principles of such a system and discuss **two** advantages of this system for a Passive House.



Layout of System

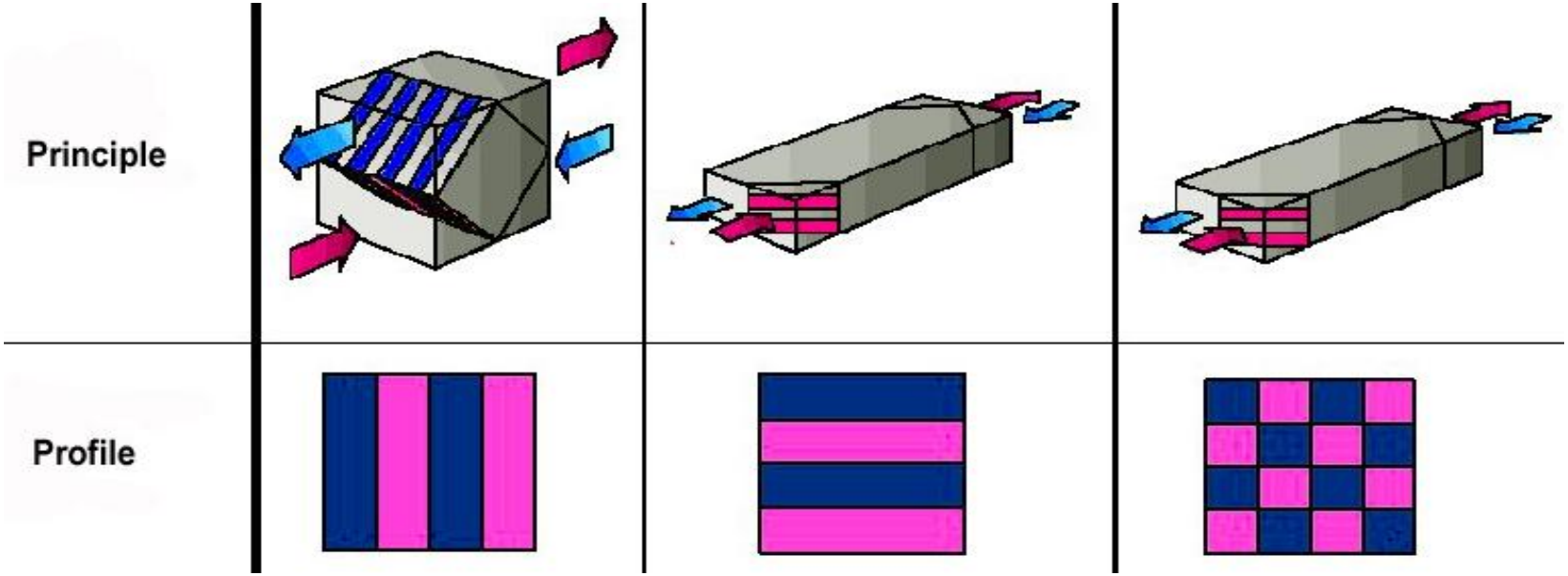
Kitchen
Bathrooms
Utility Room



All over the House

How it works

1. Removes pre-heated air from the kitchen, bathroom and utility rooms
2. Conducts this pre-heated air to air exchange unit where heat is extracted
3. The extracted heat is used to heat fresh colder air
4. Warm fresh air is distributed throughout the house using a separate independent ducting system



Advantages of the System

1. Up to 93% of heat is recovered from exhaust air and therefore reduces heating costs
2. Filters prevent pollen and allergens from entering
3. Reduced dependency on fossil fuels – no conventional heating system required
4. Reduces or eliminates risk of mould growth
5. Constant flow of fresh air, especially to bedrooms
6. Controlled temperatures within