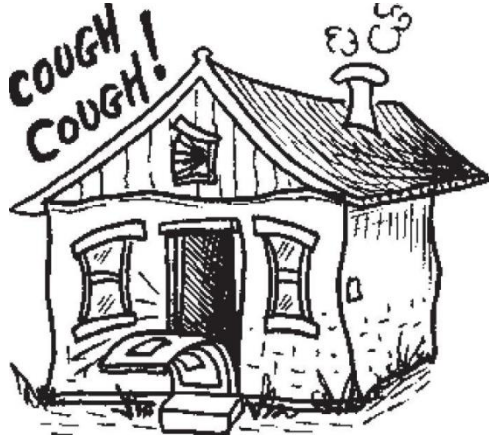


# What is building biology?

- Building Biology deals with the inter-relationship between our built environment and our health, as well as the impact our buildings have on the greater environment

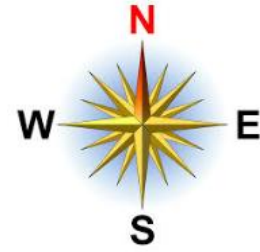


# "Sick Building Syndrome"



- Sick Building Syndrome is where a building becomes a toxic environment for humans and animals due to poor design, poor management, water damage, or a combination of them all

# Orientation



- House to face north to take advantage of thermal mass, light etc
- As a general rule, build on east-west axis with living quarters on (warmer, brighter) northern side and bedrooms on (cooler) southern side

# Layout of the Site

- PRINCIPLE – Ensure that either the slope of the land, or drains, keep water away from building
- IDEAL - If site is sloped away from house, or house is on stumps if on the side of a hill

# If building on a hill

- To reduce likelihood of water damage, build on top of the slope rather than digging into the slope
- If you want to build into the slope, ensure adequate drainage and complete separation of building from soil
- Direct the water away from your building otherwise it will find its way in!
- Moist ground makes it easier for termites

# Getting the Foundations Right

## Concrete slab

Ensure:

- the slab must be allowed to cure fully (otherwise ensure on-going ventilation in the walls)
- timber framing must be fully dry when cladding affixed

# Getting the Foundations Right (cont'd)

Stumps (brick/wood/metal etc) including brick perimeter footings

Ensure:

- adequate crawl space (450mm from bearers)
- appropriately sized air vents to allow subfloor ventilation
- topsoil to be removed to reduce mould growth



# Building Materials

- Use materials that have the least amount of toxins in them, so as to reduce the amount of off-gassing that will occur after installation
- Wrap the home with a vapour permeable membrane to allow moisture to move through the building envelope
- To the greatest extent, ensure building materials are dry and waterproofing membranes fully cured



# Exterior

- Roof and guttering
  - No flat roofing
  - No hidden/box guttering
  - Guttering and drains to be able to handle very heavy downfalls (a worthy investment as it only takes one event to create damage that can be very expensive to remediate)

# Gardens

- NO gardens or soil to be in contact with building
- Adequate drainage



# Interior

- Entry foyer (take off shoes)
- Heating
  - No unflued gas heaters
- Wet areas (bathrooms, kitchen and laundry)
  - Use appropriately sized exhaust fan (vented to exterior)
  - ensure waterproofing membranes (eg in bathroom) are allowed to cure thoroughly during construction



# Interior (cont'd)

- Flyscreens
- If flooding occurs completely dry out within 24 hrs
- If you discover a leak remove/replace any damaged building materials, furniture etc
- Moist building materials encourage ants, cockroaches, and termites

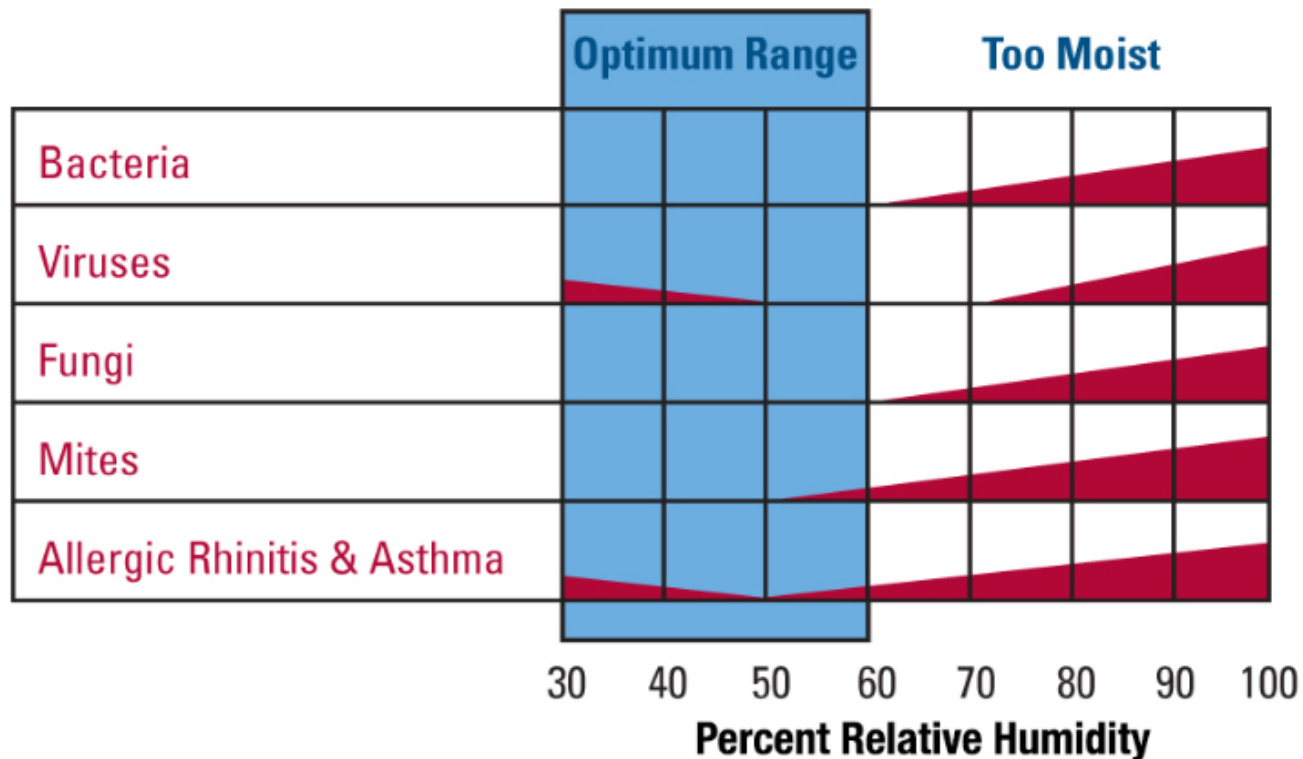
# Indoor climate

- Regulate indoor air humidity by using humidity-buffering materials and dehumidifier(s)
- Minimize exposures to mould, bacteria, dust, and allergens
- Promote good indoor air quality through natural ventilation



# Ideal Humidity Levels

- Indoor relative humidity at around 50%. Once it gets to 60%, then dust mites start to thrive. If it gets to 70% then mould starts to grow



# Dehumidifiers & Wardrobe Heaters

- I always recommend getting some cheap hygrometers to become familiar with the levels of humidity throughout the day
- The second recommendation is to invest in a dehumidifier (particularly for the bedroom)
- If you're not a fan of doorless wardrobes, the way to reduce the likelihood of mould in a wardrobe is to use wardrobe heaters (such as Dampchaser)



# Glazing

- Have eaves over windows
- When selecting windows consider:
  - sun/heat gain/heat loss
    - Small windows on southern and western sides
    - Large windows on northern side and medium on eastern side (unless wanting lots of morning sun)



# Thermal mass

- Note: If a part of the thermal mass does not see the sun, it will act as a heat sink

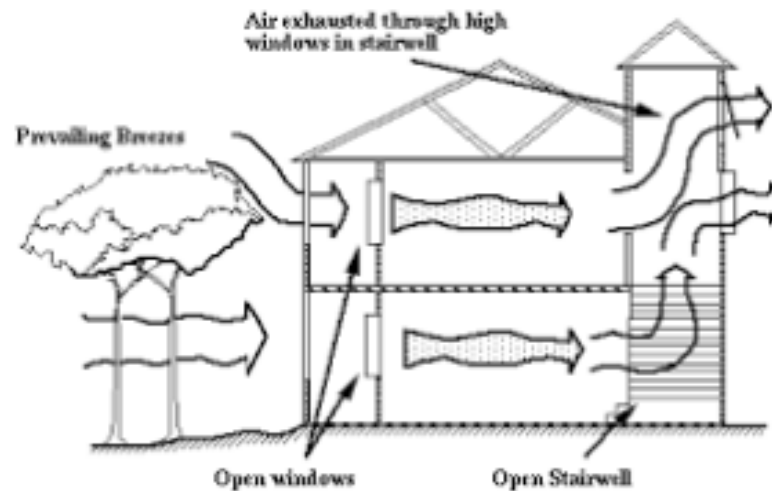


# Insulation

- Ensure all exterior walls and the ceiling cavity are completely insulated
- Anywhere the ceiling or wall insulation is pierced (eg windows, fans, skylights, stairs, lights) means a reduction in insulating capacity
- Thus put in as much (good) insulation as you can afford

# Ventilation

- Lack of ventilation increases carbon dioxide, VOCs (from off-gassing of new carpets, flooring, cupboards and furniture), moisture, dust and mould
- Passive ventilation
- Ceiling fans



- Ventilation of roof space (eg Whirly birds)

# Inadequate ventilation + moisture =

- Ensure size of fan/window can cope with amount of moisture generated in the bathroom

