

# What is Climate-Responsive Design?

## Worksheet

Climate-responsive design means adapting a building's orientation, massing, materials and openings to the specific sun, wind, temperature and humidity conditions of its location, so the building itself does much of the work of staying comfortable.

## Questions

1. Which strategy suits a hot-arid climate best?
  - A) Thin, lightweight walls
  - B) Thick, high-mass walls with small shaded openings
  - C) Large unshaded glass walls
  - D) Dark, heat-absorbing roofs
2. In a cold climate, glazing should be concentrated on which facade (northern hemisphere)?
  - A) North
  - B) East only
  - C) South
  - D) West only
3. Why is cross-ventilation prioritized in hot-humid climates?
  - A) It blocks all sunlight
  - B) Thermal mass can't dissipate heat when nights stay warm
  - C) It increases humidity
  - D) It reduces daylight
4. A compact building form with less exposed surface area mainly helps in which climate?
  - A) Hot-humid
  - B) Cold
  - C) Hot-arid
  - D) Temperate only
5. A house is being designed in a hot-arid desert climate. Recommend two climate-responsive strategies.
6. A house is being designed in a cold northern climate with harsh winters. Recommend two strategies.
7. A building in a hot-humid tropical climate needs passive cooling. What strategy fits best?
8. Define: What is climate-responsive design?
9. Define: Best wall strategy for hot-arid climates?
10. Define: Best glazing strategy for cold climates?

## Answer Key

1. B) Thick, high-mass walls with small shaded openings — High thermal mass delays desert heat swings; small shaded openings limit solar gain.
2. C) South — South-facing glazing captures the most winter sun for passive heat gain.
3. B) Thermal mass can't dissipate heat when nights stay warm — Continuous airflow removes heat and moisture when nighttime cooling by mass isn't effective.
4. B) Cold — Less surface area means less heat loss to cold outside air, saving heating energy.
5. Strategy 1: use thick, high-thermal-mass walls (adobe/rammed earth) to delay peak heat by hours Strategy 2: keep window openings small and shaded, oriented away from low western sun
6. Strategy 1: design a compact, low-surface-area form to reduce heat loss Strategy 2: place most glazing on the south facade to capture winter solar gain, minimize north glazing
7. Humid heat cannot be delayed by mass (nights stay warm) → prioritize cross-ventilation Use raised floors, large shaded openings, and light, low-mass materials to let heat escape continuously
8. Shaping a building's form, materials and orientation to work with the local climate rather than against it.
9. Thick, high-mass walls that delay and dampen daytime heat before it reaches the interior.
10. Maximize south-facing glazing for solar heat gain; minimize north-facing glazing to cut heat loss.

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