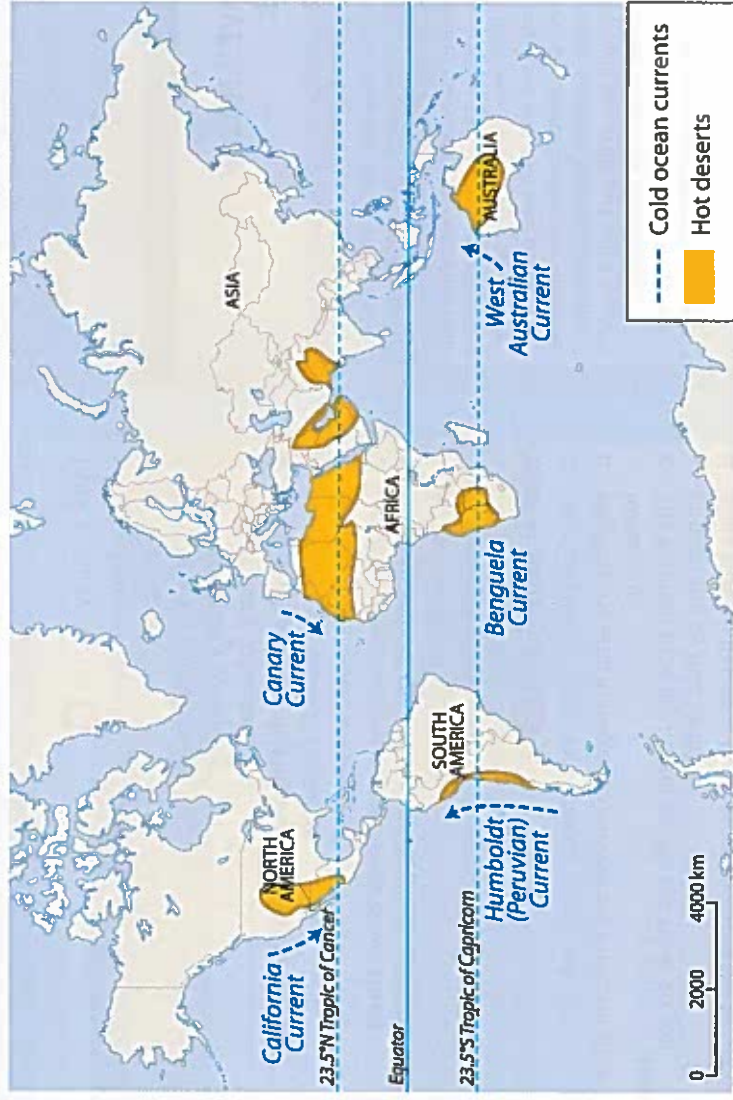


# 41 Hot desert climates

## Challenging places?

A desert is an area that receives less than 250 mm precipitation in a year. Arid (dry) deserts can be hot, for example the Sahara Desert in Africa; or cold, as found in the northern **tundra** regions of North America and Eurasia. These pages are about hot deserts that are found in sub-tropical and tropical latitudes. They have very high daytime temperatures, often over 50°C, and low nighttime temperatures, well below 0°C with clear skies and sometimes a ground frost. They are mostly found on the western edge of continents because the **prevailing winds** in tropical regions are off-shore, blowing from the east across land, so they cannot pick up moisture from the sea. Hot deserts are extreme environments which present challenges for people who live there or visit there.

### B The world's hot deserts



- Hot deserts of the world**
- Mojave Desert
  - Atacama Desert
  - Sahara Desert
  - Namib Desert
  - Kalahari Desert
  - Arabian Desert
  - Thar Desert
  - Great Australian Desert
  - Sonoran Desert
  - Secchura Desert

### TASK 1: Study Source A

- a Describe the scene. Give at least **three** reasons that suggest this is an area of low rainfall.
- b Explain how mesas have been formed here.

### TASK 2: Study Source B

- a On an outline map of the world, add the borders of the ten hot deserts and the cold ocean currents shown.
- b On your map, name all ten hot deserts from the box provided. Use an atlas to help.
- c Describe the distribution of hot deserts.

### A A desert scene

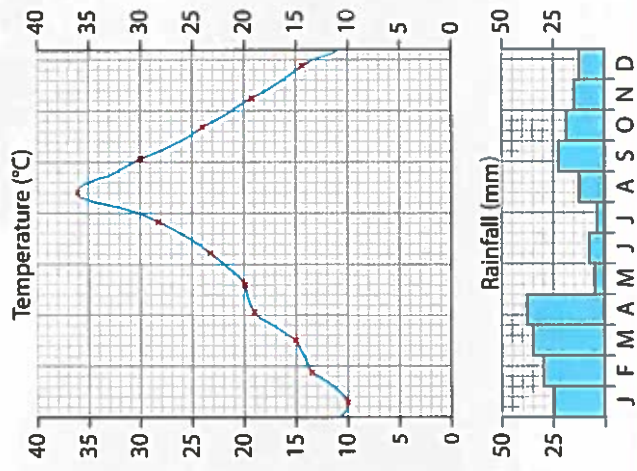


### Monument Valley, the Mojave Desert, USA

The Mojave Desert is a dry, barren desert. The Monument Valley area was originally a basin of sandstone and limestone layers. It has slowly been uplifted to become a flat plateau up to 3 km above sea level. Heat, wind and water have eroded the land for over 50 million years, cutting it up and peeling away the rock layers. Hard horizontal rocks have been left as isolated caps above softer sandstone. These are called 'mesas'. Due to low rainfall, the features are not rounded.

### C A hot desert climate

MONUMENT VALLEY, THE MOJAVE DESERT USA (37°N 110°W)

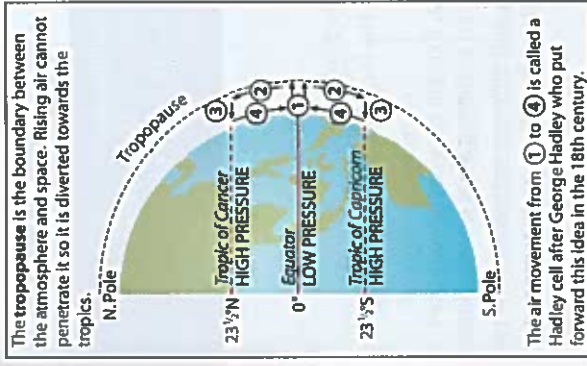


Monument Valley (37°N 110°W), the Mojave Desert, USA

	J	F	M	A	M	J	J	A	S	O	N	D
Temperature (°C)	10	13	15	19	20	23	28	36	30	24	19	14
Rainfall (mm)	25	30	34	37	4	6	3	12	22	18	15	13

Average annual rainfall = 219 mm  
Temperatures are average (mean) for each month

### D Creating hot deserts



### Key to diagram (left)

- ① Due to the heat of the sun, which is overhead at the equator, the land surfaces are warmed up and air rises. This gives low pressure at the surface along the equator. This rising air cools and condenses to give thunder clouds and heavy rainfall in equatorial regions.
- ② Once this rising air reaches the tropopause it then travels to the north and south towards each tropic.
- ③ As it moves away from the equator at high altitude it cools. Between 20° and 35° north and south of the equator the air begins to sink or subsides towards the surface.
- ④ This gives permanent sub-tropical high-pressure systems (anticyclones) in these areas. Rainfall cannot occur where air sinks. These areas of aridity are the hot deserts of the world.

### TASK 3: Study Source C

- a What is the mean temperature of the hottest month?
- b What is the mean temperature of the coldest month?
- c Work out the annual mean temperature range.
- d How much below 250 mm is the average annual rainfall? Describe its distribution.
- e Monument Valley is a famous desert that has been featured in many films. Suggest the best time of year for tourists to visit or film-makers to make films. Justify your choice.

### TASK 4: Study Source D

- a Explain how sub-tropical high pressure zones are created.
- b Why is it difficult for rain to form in these areas?
- c Name **two** hot deserts in each of:
  - areas of sub-tropical high pressure
  - the western side of continents close to cold ocean currents.
- d Use Source B to help you name **three** cold currents that flow to the west of **three** named hot deserts.
- e Suggest why these ocean currents are cold.
- f How can cold ocean currents help create fog but also cause a lack of rainfall in some hot deserts?