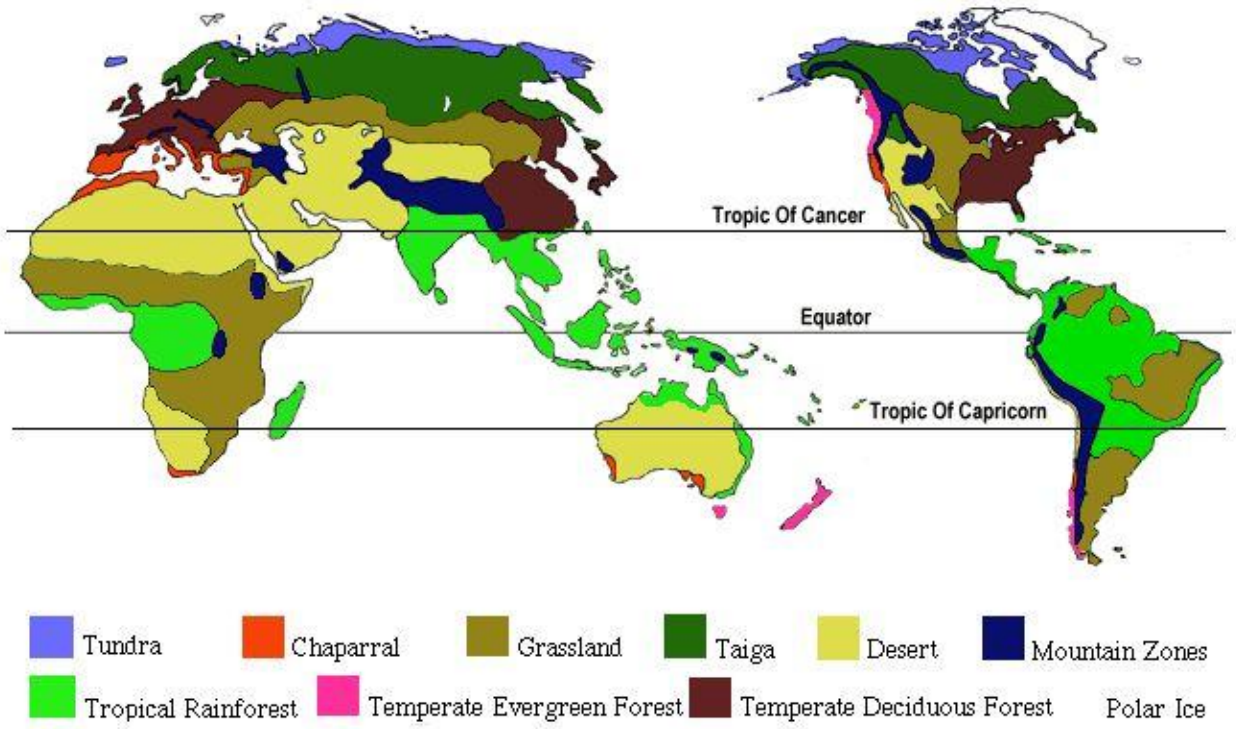
BLACK ROCK DESERT
HIGH ROCK CANYON
EMIGRANT TRAILS

NATIONAL CONSERVATION AREA

Desert Formation

THE PLAYA



Biomes

- A biome is a large geographic area that has a specific climate (average temperature and rainfall). Within this biome exist organisms (plants, animals, etc.) with characteristic adaptations suited to best survive there. The above map illustrates the different biomes of the world and where each is located.
- The world's oceans and freshwater lakes are also considered separate biomes.

The Desert Biome

- Since the average temperature and rainfall dictates the construction of a biome, we must first look at the rainfall cycle to understand the process of desert formation.
- The rainfall cycle is the process by which evaporation extracts water from the oceans. Winds carry this moisture across the land. The warm surface of the earth causes the air to rise and cool. Thus, water vapors condense and fall as rain.
- The removal of cloud cover is essentially what causes a desert to form. So, how is cloud cover removed from some parts of the earth and not the rest?

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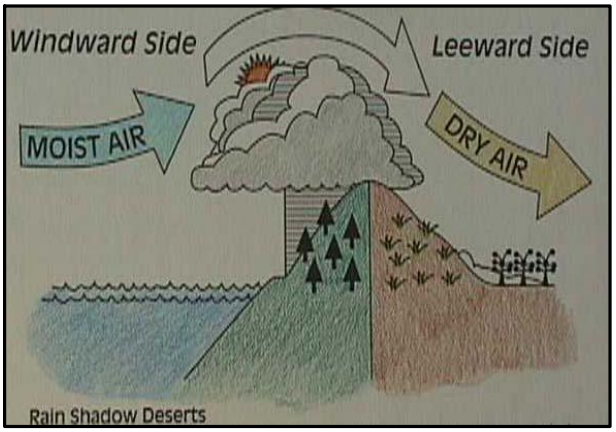
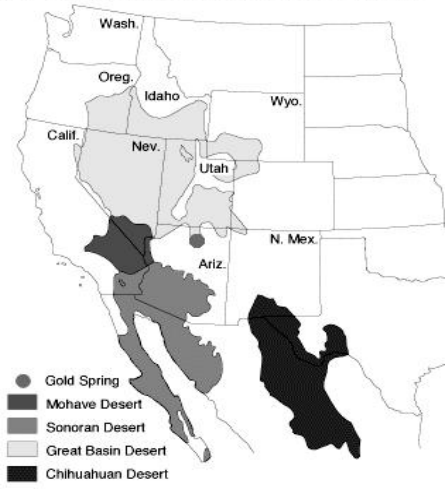


- **Rain Shadow Deserts**
- Moisture for storms comes from large bodies of water, primarily oceans, and is pushed over the continents by massive global air currents.
- When this moist air comes over a continent and hits a mountain it is forced up the range where it cools, condenses and often falls as rain or snow.
- Mountains often receive much more precipitation than the areas around them. As this air pushes over the top of the mountain and down the other side it can again expand, although it has now lost much of its moisture.
- This "Rain Shadow" effect can be so strong that the area behind a mountain is a desert. In fact, all the deserts of North America are influenced by this "Rain Shadow"

Figure 1. Desert regions of North America (from Sheridan, 1981)



- **Great Basin Desert**
- Centered over the state of Nevada, but continuing into portions of California, Oregon, Idaho, Utah, Wyoming, Arizona, and New Mexico this desert is located between the Sierra /Cascade Mountains on the west and the Rocky Mountains on the east.
- The Great Basin is actually not a single basin, but a series of basins and substantial mountain ranges many over 10,000 feet.
- This is our most northern desert and highest, with most basins over 4,000 feet. It is considered a cold desert.
- Precipitation, much of it snow, averages between four and eleven inches. The majority falls during late winter and early spring, produced by the same massive Cascade and Sierra Nevada Ranges, where most of the rainfall is forced out of the clouds.
- The Great Basin lies beyond in the "Rain Shadow." The Great Basin is sagebrush country. Small to medium size scrubs dominate in basins, pinyon and juniper woodlands take over as you ascend to medium elevations. Cacti are limited due to cold temperatures.
- The Great Basin has little outward drainage. It is partially drained by the intermittent Quinn River, which has no outlet but evaporates as it crosses the desert.
- The Black Rock Desert is a dry lake bed in the Great Basin and is one of the flattest places on earth.
- The Black Rock Desert is part of the extended playa of the lakebed of prehistoric Lake Lahontan, which existed during the last ice age between 9,000 and 20,000 years ago.

Information obtained from Wikipedia,
http://en.wikipedia.org/wiki/black_rock_desert
Chihuahuan Desert Research Institute,
http://www.cdri.org/na%20deserts/.

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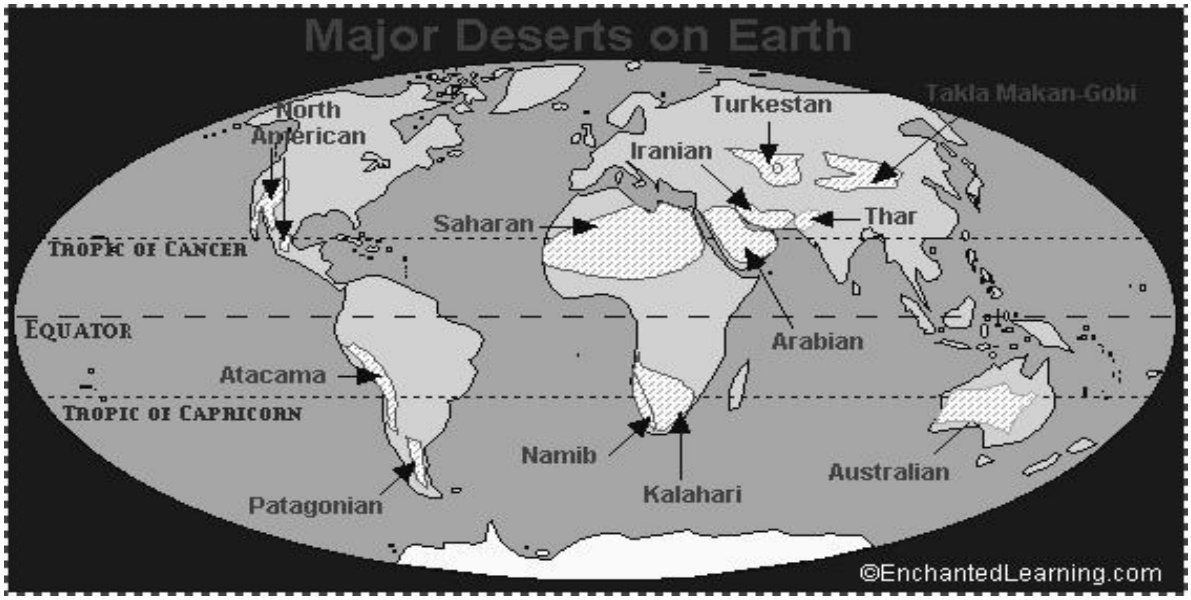
Global Weather Patterns

- Deserts tend to occur in two belts that circle the globe. Both the Northern and Southern Hemisphere have this belt located between 15 and 35 degrees latitude, roughly centered over the Tropic of Cancer and the Tropic of Capricorn.
- This is no accident. The sun is more directly overhead the equatorial region so it receives the most intense sunlight, and this solar energy heats the air.
- Hot air has two important qualities: it can hold enormous quantities of moisture, and it rises up into the atmosphere. So hot tropical air tends to be moist and rise into the atmosphere. As this air rises it cools, condensing the moisture and converting it to water where it falls as rain.
- This is why rain forests tend to occur near the equator. What goes up must come down, and gravity pulls this mass of rising air back to the ground.
- Tropical air typically falls at about 30 degrees latitude on either side of the equator and along the desert belt, but robbed of its moisture it is now hot and dry.
- The result is often persistent high pressure systems that tend to block incoming storms, or push them into other regions. These patterns make deserts possible, but typically other factor must also intrude to make deserts a reality.



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Desert Lands Cover Incredible Distances

- Many who have driven through deserts in the United States may think they are enormous, but they are only the fifth largest in the world covering about 500,000 square miles.
- By contrast the great Sahara Desert covers almost 3.5 million square miles, the Australian deserts 1.3 million square miles, the Arabian deserts 1 million square miles, while the deserts of Turkistan have 750,000 square miles.
- Numerous smaller deserts are also scattered across the globe. All are unique, and have adapted to their own particular environments.
- Dry areas created by global circulation patterns contain most of the deserts on the Earth.
- The deserts of our world are not restricted by latitude, longitude, or elevation.
- They occur from areas close to the poles down to areas near the Equator.
- The People's Republic of China has both the highest desert, the Qaidam Depression that is 2,600 meters above sea level, and one of the lowest deserts, the Turpan Depression that is 150 meters below sea level.
- Deserts are not confined to Earth. The atmospheric circulation patterns of other terrestrial planets with gaseous envelopes also depend on the rotation of those planets, the tilts of their axes, their distances from the Sun, and the composition and density of their atmospheres. Except for the poles, the entire surface of Mars is a desert. Venus also may support deserts.

The horizon of Mars, part of the first color image from the rover Spirit. (1)

1. Information obtained from CBC News Online, http://www.cbc.ca/news/background/space/mars_index.html.