



# Mount Everest: Climbing the World's Tallest Physical Feature

## 29.1 Introduction

On the afternoon of May 10, 1996, more than a dozen climbers were near the summit, or top, of Mount Everest. Suddenly a storm blew in. It lashed the climbers with gale-force winds and driving snow. Later one of them recalled, "At times you couldn't even see your own feet." Some climbers managed to survive the blizzard and make it down the mountain. Others didn't. In the end, nine people died. Another three lost their lives on the mountain later that month. It was the deadliest climbing season ever on Mount Everest.

Mount Everest is an amazing place. At over 29,000 feet, it is the tallest mountain in the world. It lies within Nepal's Sagarmatha National Park. In 1979, this park was named a **World Heritage site**. These sites are places of great natural or cultural value to the world. **UNESCO**, a branch of the United Nations, identifies such places on its World Heritage List. UNESCO also assists countries in preserving and protecting these sites.

Climbing Mount Everest is a very difficult feat. Even so, more and more people come to Nepal each year to attempt the ascent. In this chapter, you will read about the challenges they experience on their way to the top. You will see how **tourism** to Mount Everest is affecting Nepal and its people. And you will discover what is being done to protect this very special place from overuse.

### Essential Question

**How can people both experience and protect the world's special places?**

This diagram shows one of the main climbing routes up Mount Everest. Notice that there are several camps along the route. Each lies at a different elevation. Moving from camp to camp, climbers face tough physical challenges. Keep this diagram in mind as you try to answer the Essential Question.

### Graphic Organizer





### First to the Top

In 1953, Edmund Hillary and Tenzing Norgay became the first climbers to reach the top of Mount Everest. Their success has inspired many others to make the ascent. These climbers all want to stand at the top of the world's highest mountain.

## 29.2 The Geographic Setting

Mount Everest is located in the Himalaya Mountains of southern Asia. It lies on the border between Nepal and the Chinese region of Tibet. In 1999, scientists measured the summit's height as 29,035 feet. In the future, this number may change as measuring methods become more accurate. Whatever its exact height, Everest is more than five miles high. The mountain was named Everest for a British official in India. In Nepal, it is known as Sagarmatha, which means "forehead in the sky." In Tibet, it is called Chomolungma, or "mother of the world."

**Many Ways to the Top** The first successful ascent of Mount Everest was on May 29, 1953. On that day, Edmund Hillary of New Zealand and Tenzing Norgay of Nepal reached the summit. "My first sensation was one of relief—relief that the long grind was over," Hillary later wrote. "I turned and looked at Tenzing. Even beneath his oxygen mask and the icicles hanging from his hair, I could see his infectious grin of sheer delight." Since then, a few thousand people have tried to climb the mountain. Even fewer have made it to the top.

There are many routes to the top. The two main ones are the southeast ridge from Nepal and the northwest ridge from Tibet. Most climbers take the first route. They climb in stages over a period of weeks. At each stage, they stop at camps on the side of the mountain. This allows them to **acclimatize**, or adjust to the high elevation, as they go. If climbers didn't acclimatize, they would risk getting ill from the lack of oxygen at high elevations.

**Exposure** is another problem for climbers. Extreme weather conditions, such as freezing temperatures and high winds, can cause injuries and even death. Most summit attempts take place in April and May, when the weather is at its best. Even then, it never gets above freezing at the top. And conditions can still be deadly, as they were during the climbing season of 1996.

**Protecting the Future of Mount Everest** As the popularity of climbing Everest has grown, so have the problems caused by too much use. One is trash. In the past, many climbers left their trash on the mountain. Piles of cans, bottles, and garbage could be seen at camps along the route. Most of this trash has now been picked up, but keeping the mountain clean remains a concern.

Another problem is overcrowding. During the climbing season, camps become small villages, with dozens of people. More than 30 climbers might reach the summit in a day. Sometimes lines form as climbers slowly make their way to the top.

The growing number of climbers raises questions about the mountain's **carrying capacity**. This term refers to the number of people or animals an area can support. When a population grows too large, the area is likely to be damaged. That's one reason Everest was declared a World Heritage site. By drawing attention to the region, UNESCO hopes to protect it for future generations.

## ► Geoterm

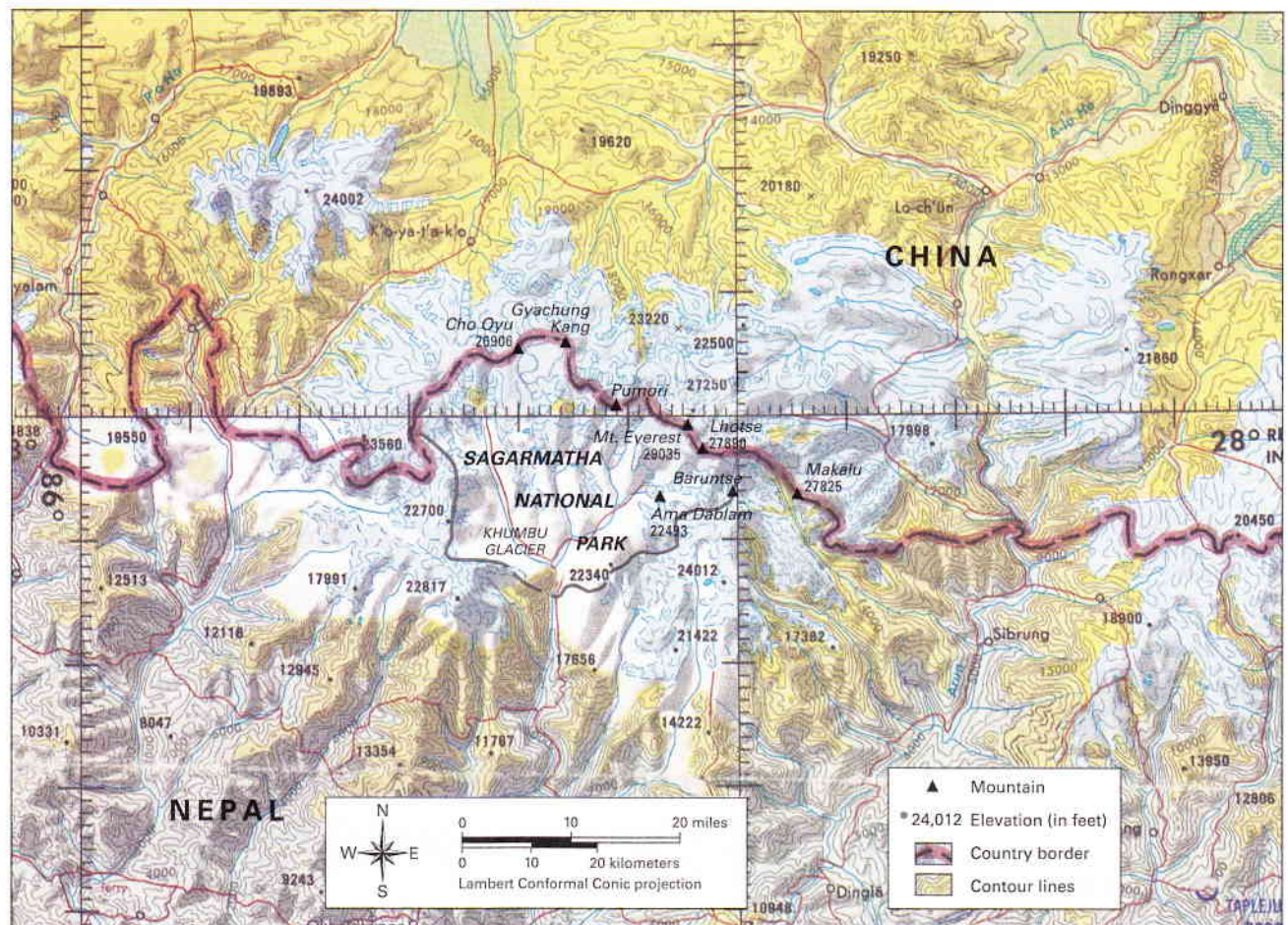
**acclimatize** the process of adjusting to lower oxygen levels at high elevation. Climbers adjust through exercise and rest as they gradually move higher.

**carrying capacity** the number of people or animals the environment of an area can support. A place's carrying capacity depends on the environment.

**exposure** the harmful effects of cold, wind, or other extreme weather conditions

**World Heritage site** a place of great natural or cultural value that has been placed on UNESCO's World Heritage List. UNESCO helps countries preserve these sites for future generations.

## The Mount Everest Region



### A Rugged Landscape

A topographic map uses elevation lines and symbols to show physical and human features in an area. Mount Everest lies in a very rugged region of the Himalaya mountain range. Climbers hike for days just to get to Base Camp. Then they face a nearly 12,000-foot climb to reach the summit.



### The Effects of Tourism

This sign advertises one of the many tourist hotels in Nepal. Tourism has brought lots of money to Nepal. Climbing groups have also funded schools and medical clinics. Some Nepalese have benefited from tourism, but most are still very poor.

### The High Cost of Climbing

Climbing Mount Everest has become a big business. Private guide services charge as much as \$60,000 per person. A typical climber may spend another \$8,000 to \$20,000 on personal gear and airfare.

## 29.3 From Lukla to Base Camp

Expeditions to Mount Everest begin with a trek to Base Camp. On the way, climbers can see Everest in the distance. “I stared at the peak for perhaps 30 minutes,” recalled one climber. “The summit looked so cold, so high, so impossibly far away. I felt as though I might as well be on an expedition to the moon.”

**A Slow Start Helps Climbers Acclimatize** For most people, the adventure begins in Kathmandu, the capital of Nepal. From there they fly to the town of Lukla at 9,350 feet above sea level. At Lukla, they begin their hike to Base Camp. This hike, which takes from six to eight days, helps hikers acclimatize to the thinning air. By the time they reach Base Camp, they are at 17,600 feet.

Base Camp is set up every climbing season at the edge of the Khumbu Glacier. It is made up of dozens or even hundreds of tents. This “tent city” includes kitchens, dining halls, and even solar-powered lights. Most climbers spend several weeks at Base Camp to get used to the thin air.

Climbers who do not acclimatize well may begin showing symptoms of altitude sickness at this point. This illness is also called Acute Mountain Sickness, or AMS. Common symptoms include nausea and headaches. In severe cases, AMS can cause fluid in the lungs, swelling of the brain, and even death.

**The Impact of Tourism** Nepal is a poor **developing country**. Climbing expeditions, and tourism in general, have had major effects on its people and environment. On the positive side, tourism brings in money. Tourists pay for food, lodging, and supplies. Villagers also make money as porters. They carry heavy loads of equipment and supplies for climbers. The porters often use yaks, a kind of longhaired ox, to help them move goods.

At the same time, tourism has had harmful effects. Porters, for example, are sometimes overworked and mistreated. Also, some villages have cut down trees to build hotels for the tourist trade. More trees may have been cut to provide fuel for cooking and heating for tourists. This has led to **deforestation** and soil erosion in the Everest region.

### What Does It Cost to Climb Everest?

| Item  | Cost for a Team of Seven Climbers |
|---|-----------------------------------|
| Crew (includes guides, cooks, and doctor)   | \$98,000                          |
| Transportation and lodging en route to Base Camp  | \$41,000                          |
| Permits and fees  | \$79,000                          |
| Supplies (includes fuel, oxygen, batteries, tents, medical supplies, and climbing gear) | \$49,000                          |

## 29.4 From Base Camp to Camp I

Just above Base Camp lies the Khumbu Icefall. It consists of giant chunks of ice called *seracs*. “Imagine trying to hopscotch uphill through a field of ice boulders the size of houses and weighing some 30 tons, each of which could shift at any moment without warning,” wrote a climber about the icefall. “It’s like a jigsaw puzzle of giant blue ice puzzle pieces.”

**Surviving the Khumbu Icefall** Climbers reach the Khumbu Icefall on the second stage of their journey. This stage takes them from Base Camp at 17,600 feet to Camp I at 19,500 feet. It usually takes one to three weeks to set up Camp I. Climbers move up and down the icefall each day, carrying supplies to the higher camp. This also helps them acclimatize.

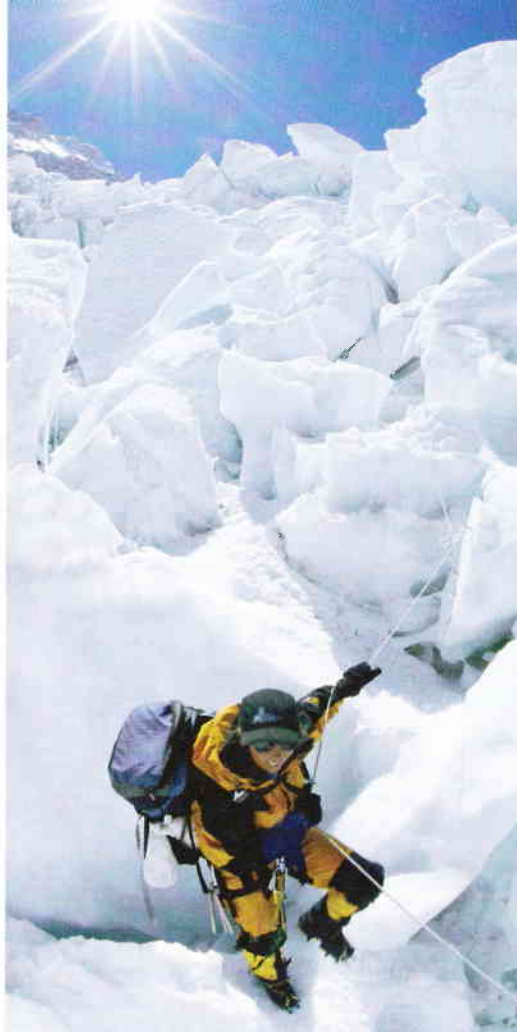
The icefall is the most dangerous part of the climb. More climbers have died here than on any other part of the mountain. Some were crushed by shifting seracs. Others died after falling into a crevasse, or a deep crack in the ice. Still others were swept down the mountain by an **avalanche**.

Climbers try to limit the risks by starting out their hikes before dawn. Their goal is to get through the icefall before the sun melts the ice. That’s when the ice starts to shift, becoming more dangerous.

**Everest’s Expert Climbers: The Sherpas** Much of the work on Everest is done by a Himalayan people known as Sherpas. Tenzing Norgay was a Sherpa. Many of the great climbers on Everest, including a few women, have been Sherpas.

Sherpas play a critical role on Everest expeditions. They act as guides, cooks, and porters. They set up the camps and carry most of the supplies. They go through the icefall before other climbers to set up ladders and ropes for safe passage. Many Sherpas have died doing this hazardous work.

Every expedition has a head Sherpa, called a *sirdar*. The sirdar has authority over the other Sherpas. In some cases, an expedition will have two sirdars. One stays in Base Camp, while the other makes the climb to the top.



### Climbing the Khumbu Icefall

The Khumbu Icefall is the riskiest section of the Everest ascent. Climbers must cross deep crevasses on shaky ladders. They have to beware of falling blocks of ice. One mountain climbing guide warns that “everything you stand or climb on can fall any minute without warning.”



### Sherpas Play a Key Role

Few Everest climbs would succeed without Sherpas. These natives of the Everest region work as guides and porters on most expeditions. One of the most famous Sherpa climbers was Babu Chiri Sherpa. He reached the summit 10 times and once spent 21 hours at the top. He died in an accident on Everest in 2001.



### **The Long Climb**

Scaling Everest requires great skill and endurance. The risks of climbing are much greater at such high elevations. The lack of oxygen makes it hard to function. As people's thinking gets fuzzy, it is easy to make mistakes. And even a small mistake can prove fatal.

### **29.5 From Camp I to Camp IV**

The third stage of the climb takes climbers from Camp I at 19,500 feet to three more camps. The highest is Camp IV at 26,000 feet. One of the most difficult parts of the climb is the Lhotse Face, a steep rock wall covered in ice. "The wind kicked up huge swirling waves of powder snow," a climber recalled of his climb up Lhotse. "Ice formed over my goggles, making it difficult to see. I began to lose feeling in my feet. My fingers turned to wood. It seemed increasingly unsafe to keep going."

**Through the Valley of Silence** When climbers leave Camp I, they enter a long valley called the Western Cwm (pronounced *koom*). It is also called the "Valley of Silence." Ridges on either side of the valley block the wind. The most common sounds that climbers hear are their own labored breathing and the crunch of boots on ice and snow.

The hike through the Western Cwm is a long, gentle climb. On a sunny day, the valley gets quite hot. This comes as a surprise to climbers who expect freezing conditions. "You literally pray for a puff of wind or a cloud to cover the sun," one climber said.

**Crampons and Rocks: Ascending to Camp IV** Camp II lies at the base of the Lhotse Face. The ice-covered wall rises up 3,700 feet. Climbers use crampons and ropes attached to the ice to make this ascent. Crampons are spikes that attach to a climber's boots. Climbers kick the crampons into the ice to get a foothold and then pull themselves up on the rope.

Camp III is perched on a narrow ledge halfway up the face. On a clear day, the view is astounding. “I sat with my feet hanging over the abyss, staring across at the clouds, looking down at the tops of 22,000-foot peaks,” wrote one climber. “At long last, it seemed as though I was really nearing the roof of the world.”

From Camp III, climbers ascend another 1,500 feet to the South Col. This saddle between the face and the summit is the location of Camp IV. A saddle is a low point on a ridge that connects two peaks.

At 26,000 feet, Camp IV is in the “Death Zone.” At this elevation, it is difficult for humans to breathe. The lack of oxygen puts tremendous stress on the body. Climbers are at great risk of altitude sickness. With so little air getting to their brains, they are also more likely to make fatal mistakes. Most climbers breathe bottled oxygen to survive. Even then, it is hard to remain at this altitude for more than two or three days. If the weather turns bad, most climbers have to turn back.

**Cleaning Up the World’s Highest Junkyard** Camp IV is the last camp before the summit. In the past, it was also a major dumping ground. The camp was littered with empty oxygen bottles, used climbing equipment, and human waste. Even dead bodies were left on the mountain. This led to the South Col being called “the world’s highest junkyard.”

Between 1953 and the mid-1990s, climbers left an estimated 50 tons of glass, plastic, and metal on Mount Everest. In recent years, groups of climbers have scaled the mountain to bring down the trash. One Japanese team came back with 2.6 tons of garbage, including old tents, fuel bottles, and plastic. As a result, the mountain is now much cleaner than it once was. One climber commented, “If you want to find garbage on Everest now, you have to go looking for it.”

To keep Everest clean, the government of Nepal charges climbers a fee to use the mountain. Part of this money goes to waste cleanup. Climbing groups also have to leave a \$4,000 “garbage deposit” with the government. If they don’t carry their trash off the mountain, they lose their deposit.

Nepal’s government is also working to reduce deforestation. Mountain climbers must now bring their own fuel with them to Everest. Cutting down trees for fires is prohibited. Tree-planting programs have been organized in many parts of Nepal. New forests have been planted and are being protected from overuse.

### Empty Oxygen Cylinders

Piles of trash were once a common sight on Everest. In recent years, climbing groups have cleaned up the mountain. Here Appa Sherpa, who climbed Mt. Everest 11 times, inspects oxygen bottles collected from the mountain. Climbers use bottled oxygen to help them breathe at very high altitudes.







### Summit Gear

Climbers who reach the top of Everest today wear special gear designed for high altitudes. Earlier climbers made the ascent with far less equipment. They wore wool sweaters, scarves, and jackets. They had heavy oxygen tanks but no radios. Note the flags left on the summit by earlier climbers.

## 29.6 From Camp IV to the Summit

After resting a few hours at Camp IV, climbers set out for the summit. They are now in the Death Zone, the most grueling stage of the climb.

Climbing in the Death Zone is a real physical test. “At those altitudes you’re going quite slowly. You take a step and you breathe six to eight times and then you take another step and then you breathe six or eight times,” a climber recalled. “You can’t look at the whole ascent. You have to break it down into small sections and into tiny little steps. That’s how you eventually chew your way to the summit.”

**Climbing in the Death Zone** It’s only 3,000 vertical feet from Camp IV at 26,000 feet to the summit at 29,035 feet. But each step takes great effort. Deep snow, steep drop-offs, and exposure to harsh weather make this part of the climb even more difficult.

It takes about 12 hours to reach the summit from Camp IV. Then it takes another 4 hours to get back down. Most climbers begin the final ascent in darkness at around 11 P.M. This usually gives them enough time to reach the top and get back to camp before the end of the next day.

Climbers first set their sights on the South Summit.

This is a small dome of snow and ice just below the summit. To get here, they must ascend a long, steep ridge covered in unstable snow. “It took an age to climb that ridge, hour after hour,” a climber later wrote. “Each step was a monumental effort of will, requiring a kick, and another kick, to secure a footing and ensure you didn’t slide with the soft snow down again to where you had started.”

From the South Summit, climbers have only 300 feet to go. But they have to climb along a terrifying knife-edge ridge. One slip can mean a fall of thousands of feet and certain death.

Climbers must also get over the Hillary Step. This is a rock cliff 40 feet high that lies just below the summit. It is one of the toughest obstacles that climbers face on Everest.

**On Top of the World** When they reach the top, climbers are greeted by an extraordinary view. They see Tibet to the north and Nepal to the south. Surrounding them on all sides are other giant peaks of the Himalayas. They are truly on top of the world.

The summit itself is about the size of a picnic table. It is covered with flags, photos, and other offerings from previous visitors. Climbers usually don’t stay at the top for long. They have to head back down before it gets dark or the weather changes.

By the time they reach the summit, climbers are exhausted. This makes the return to Camp IV extremely dangerous. Even a small mistake can cause climbers to lose their footing and plummet down the mountain. If the weather turns bad, the mistakes can multiply.

**Seeking Even Greater Challenges** Over the years, climbers have sought new challenges on Everest. Some make the ascent without oxygen. Others do it very rapidly. In 2004, a Sherpa set a speed record by climbing from Base Camp to the top in just over 8 hours. In 2001, an American became the first blind person to scale Everest. And in 2003, a 70-year-old Japanese climber became the oldest person to reach the top.

Some people come down the mountain in challenging ways. A few have skied down or descended on snowboards. One man came down on a paraglider. This is a device like a large kite.

For still others, climbing Everest is part of a greater challenge called the Seven Summits. To meet that challenge, a climber must scale the tallest mountains on all seven continents. Whatever a climber's goals may be, reaching the summit of Mount Everest is an amazing feat.

## 29.7 Beginning to Think Globally

In this chapter, you read about the challenges that climbers experience on the world's highest mountain. You learned that climbers must acclimatize as they ascend Mount Everest. You read about exposure to extreme weather. And you discovered some of the effects of tourism on the Everest region. You saw that tourism raises questions about the carrying capacity of the mountain environment.

People come to Mount Everest because it is a very special place. But Everest is only one of the world's many wonders. Keep this in mind as you look at more World Heritage sites in the next section.

## Seven Summits Challenge

| Mountain (Continent)       | Elevation  |
|----------------------------|------------|
| Denali (N. America)        | 20,320 ft. |
| Aconcaqua (S. America)     | 22,840 ft. |
| Elbrus (Europe)            | 18,481 ft. |
| Kilimanjaro (Africa)       | 19,339 ft. |
| Everest (Asia)             | 29,035 ft. |
| Kosciuszko* (Australia)    | 7,310 ft.  |
| Vinson Massif (Antarctica) | 16,067 ft. |

\* Some sources list Carstensz Pyramid (16,023 ft.) instead.

### The Lure of Summits

The Himalayas contain 9 of the world's 10 tallest mountains. Some are visible in the photograph below, as are some climbers along the ridge. But every continent has its highest peaks. Taken together, they make up the Seven Summits Challenge. The challenge is to climb the highest mountain on each of the world's seven continents.



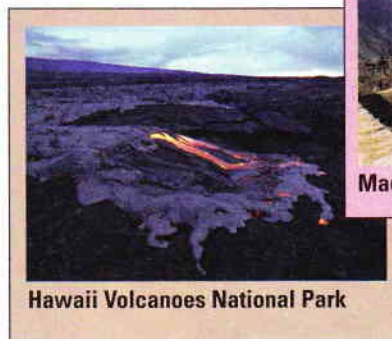
## 29.8 Global Connections

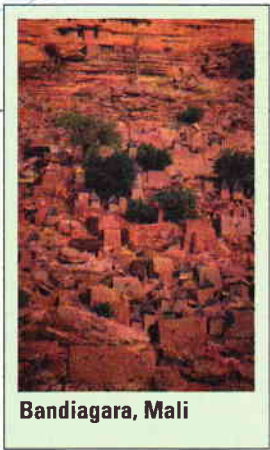
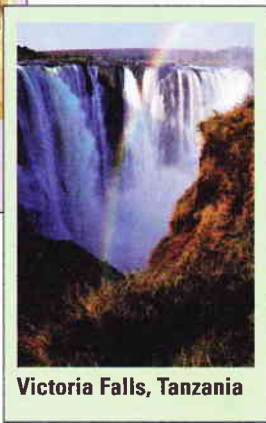
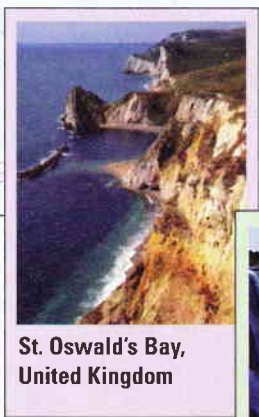
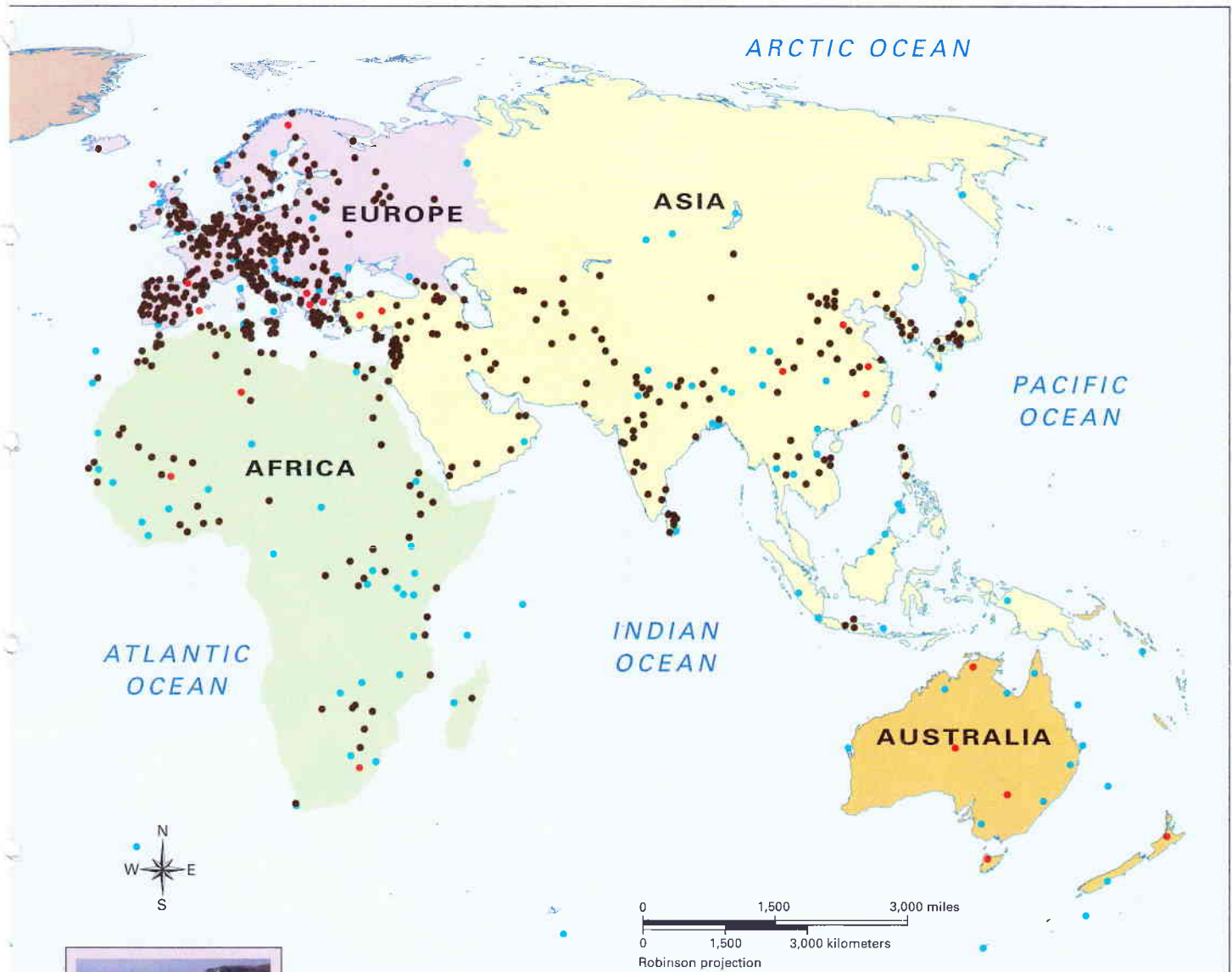
The map shows the location of many World Heritage sites. There are hundreds of these sites spread across the globe.

**How does a place become a World Heritage site?** Countries can nominate special places for the World Heritage List. A committee at UNESCO then votes on them. There are three types of sites: natural, cultural, and mixed. Natural sites are areas with unique physical features. The Grand Canyon in Arizona is one natural site. Cultural sites have great historic, artistic, or scientific value. They may be monuments, groups of buildings, or an old city. India's Taj Mahal is a cultural World Heritage site. Mixed sites combine natural and cultural features. The Mayan ruin of Tikal in the rainforest of Guatemala is a mixed site.

**What risks do World Heritage sites face today?** Many of these sites are at risk of being damaged or lost. Some are threatened by ethnic conflict or war. Others are endangered by pollution or development. Often the greatest risk is overuse. This happens when more people visit a site than its carrying capacity allows. Such a site may be in danger of being "loved to death."

**Why should World Heritage sites be protected?** These sites are among the greatest treasures in the world. They represent the wonders of nature or the finest expressions of human culture. People visit them to enjoy their beauty or to learn more about the history and achievements of humankind. By protecting these special places, we are preserving them not just for ourselves, but also for future generations to enjoy.





**ANTARCTICA**