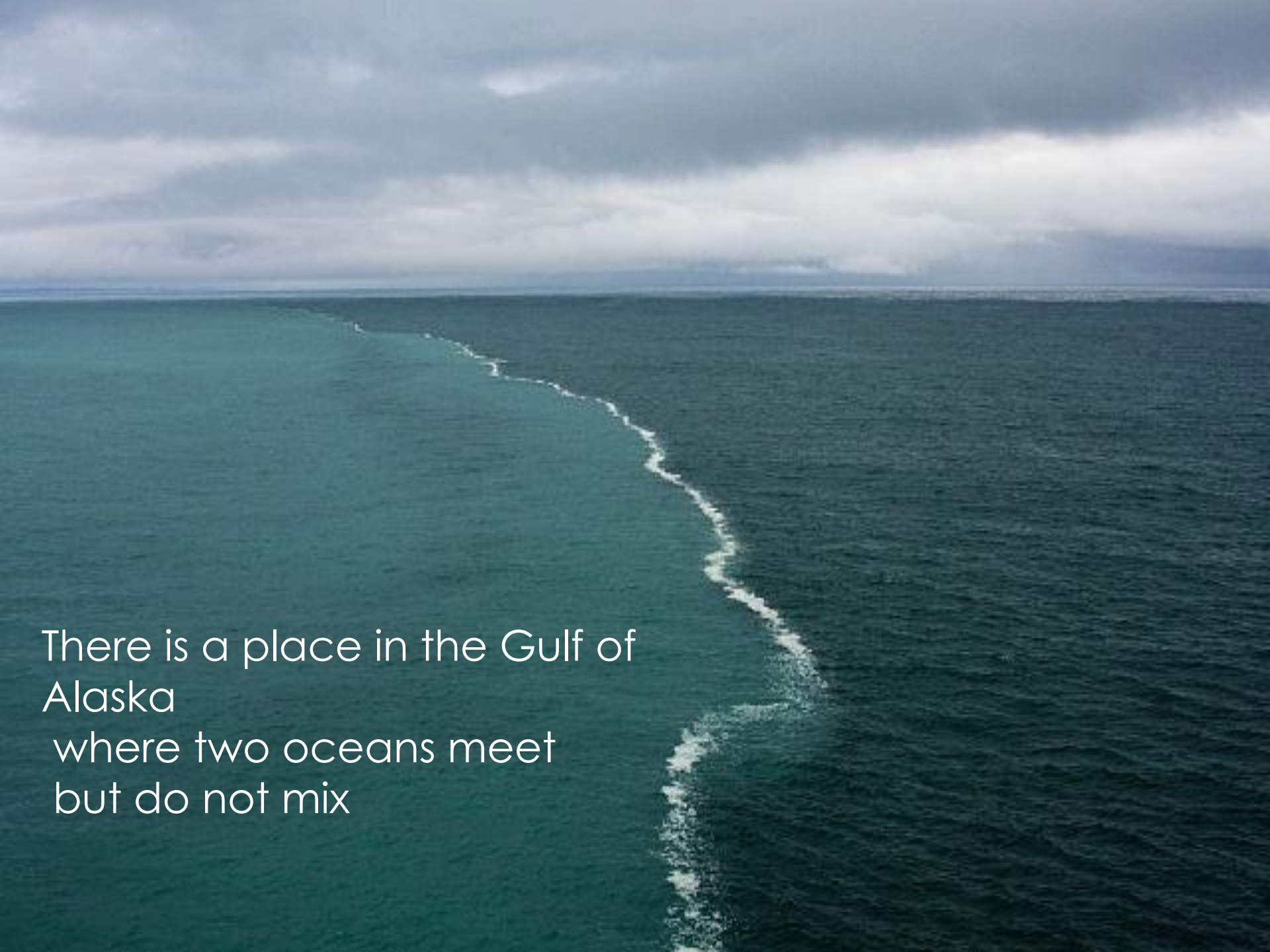




DESIGNED BY:  
BARANNIKOVA LEYRA

# OCEAN FACTS

An aerial photograph showing two distinct ocean currents meeting at a sharp, winding boundary. The water on the left is a light, milky turquoise color, while the water on the right is a much darker, deep blue. The boundary between them is marked by a thin, white line of foam or surf. The horizon is visible in the distance under a heavy, overcast sky with dark, grey clouds.

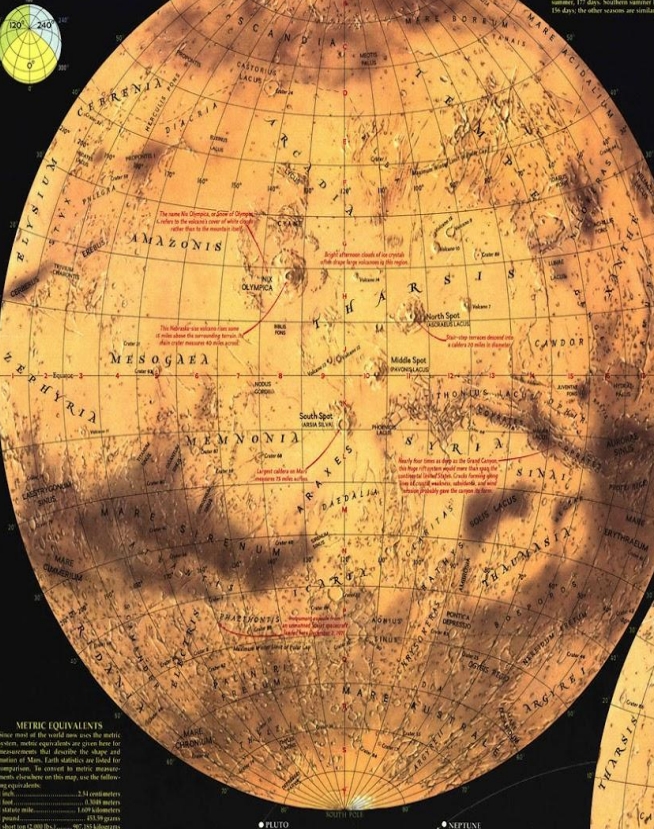
There is a place in the Gulf of  
Alaska  
where two oceans meet  
but do not mix





**THREE EQUATORIAL VIEWS**  
 Centered at 0°, 120° and 240° longitude, each view displays a perspective map of Mars. The equator is shown as a straight line. The map shows the shape and location of Mars. The equator is shown as a straight line. The map shows the shape and location of Mars.

**CENTRAL MERIDIAN 120°**



**SEASONS ON MARS**

Because the axis of Mars is tilted with relation to the orbit—slightly more than Earth's—the planet experiences four seasons of its own. The equator of each globe Mars is a circle which opens toward the seasons in their different lengths. In perihelion, its closest point to the sun, the planet moves fastest along its orbit. Mars is in perihelion in the northern hemisphere's summer. The equator is tilted toward the sun and aphelion, its farthest point from the sun, is in the southern hemisphere's summer. The equator is tilted toward the sun and aphelion, its farthest point from the sun, is in the southern hemisphere's summer. The equator is tilted toward the sun and aphelion, its farthest point from the sun, is in the southern hemisphere's summer.



**RETROGRADE MOTION**

A planet observed on successive nights usually appears to shift from west to east in relation to the stars behind it. This about motion results from both the earth's and the planet's orbital revolutions. About every two years the faster rotating earth overtakes Mars, and the red planet then appears to change direction and to travel from east to west against the stars. This retrograde motion lasts several months around the time of opposition.



**CONJUNCTION**  
 When Mars and the earth are aligned on opposite sides of the sun, the arrangement is called conjunction. At these times, Mars stays in the sky early in the morning and appears as a bright red star. During a cycle of approximately 780 days there is one conjunction and one opposition. The Mars then is one conjunction and one opposition. The Mars then is one conjunction and one opposition.



**OPPOSITION**  
 When Mars and the earth are aligned on the same side of the sun, the arrangement is called opposition. At these times, Mars stays in the sky early in the night and appears as a bright red star. During a cycle of approximately 780 days there is one conjunction and one opposition. The Mars then is one conjunction and one opposition. The Mars then is one conjunction and one opposition.



**CENTRAL MERIDIAN 240°**



**METRIC EQUIVALENTS**

Since most of the world area uses the metric system, metric equivalents are given here for measurements that describe the shape and location of Mars. The metric equivalents are listed for comparison. To convert by metric measurements, wherever they are used, use the following equivalents:

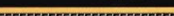
- 1 inch = 2.54 centimeters
- 1 foot = 0.3048 meters
- 1 mile = 1.6093 kilometers
- 1 nautical mile = 1.852 kilometers
- 1 liter = 0.26417 gallons
- 1 ton (2,000 lbs.) = 907.185 kilograms
- To convert Fahrenheit degrees to centigrade, subtract 32 and multiply by 5/9.

	MARS		EARTH	
	Miles	Kilometers	Miles	Kilometers
Mean diameter	4,219	6,794	7,927	12,742
Equatorial diameter	4,217	6,793	7,926	12,743
Polar diameter	4,185	6,754	7,884	12,714
Mean circumference	12,225	19,724	24,874	39,919
Surface area (square miles and kilometers)	84,477,000	141,212,000	196,946,000	321,967,000
Volume (cubic miles and kilometers)	39,600,000,000	162,250,000,000	1,083,220,000,000	4,542,670,000,000
Mean distance from sun	141,600,000	227,940,000	92,970,000	149,600,000
Maximum distance from sun (aphelion)	154,840,000	249,120,000	101,900,000	163,000,000
Minimum distance from sun (perihelion)	128,140,000	206,650,000	91,840,000	147,100,000
Mean orbital velocity (distance per second)	74.0	24.8	68.5	29.7

**The Red Planet MARS**

Produced by the Cartographic Division  
 National Geographic Society  
 MELVYN M. PRINZ, PRESIDENT  
 NATIONAL GEOGRAPHIC MAGAZINE  
 WILLIAM M. GARDNER, EDITOR  
 GILBERT M. PHILLIPS, CHIEF CARTOGRAPHER

RELEASED FEBRUARY 1973  
 Project Director: David H. Cook  
 Map printing by J. Neely



**MARS PLACE IN THE SOLAR SYSTEM**

The fourth planet out from the sun, Mars is half again as far from the sun as Earth. It is the planet nearest to Saturn. The orbits of the planets are shown in the diagram. The orbits of the planets are shown in the diagram. The orbits of the planets are shown in the diagram.



**SIZE COMPARISON**

Mars varies about twice the diameter of the moon and half that of Earth. In volume, Mars is four times larger than the moon but only a quarter the size of the earth or about the same as Earth's land area.

**SUBSURFACE COLOR**

Most scientists believe hydrated iron oxide is responsible for the pink-brown color of the highland portions of Mars. These areas are about three-quarters of the planet, mostly in the northern hemisphere, and are brightly lit and each region appears to be a different color. A white cap of ice covers each polar region in winter.

**POLAR CAPS**

Each winter there is a white cap of ice and small amounts of frozen water cover the ground from the pole to about 60 degrees. In the southern hemisphere, dark areas, largely in the southern hemisphere, made up of volcanic light and dark regions appear to be a different color. A white cap of ice covers each polar region in winter.

**ATMOSPHERE**

Mars has a thin atmosphere. It is about 100 times as dense as Earth's atmosphere. It is about 100 times as dense as Earth's atmosphere. It is about 100 times as dense as Earth's atmosphere.

**TEMPERATURE**

The largest reason why Mars cannot sustain life is its low temperature. Such a low temperature is due to its distance from the sun and its thin atmosphere. Such a low temperature is due to its distance from the sun and its thin atmosphere.

**CLOUDS**

This white cloud, which is composed of water vapor, is the only cloud in the sky. It is composed of water vapor and is the only cloud in the sky. It is composed of water vapor and is the only cloud in the sky.

**WINDS**

Winds on Mars are very strong. They are caused by the uneven heating of the surface. They are caused by the uneven heating of the surface. They are caused by the uneven heating of the surface.

**WEIGHT**

Gravity on the surface of Mars is only 38 percent that of Earth. This means that the weight of an object on Mars is only 38 percent that of its weight on Earth. This means that the weight of an object on Mars is only 38 percent that of its weight on Earth.

**MAGNETIC FIELD**

Mars does not have a magnetic field. This is because the planet's core is not molten. This is because the planet's core is not molten. This is because the planet's core is not molten.

**NOMENCLATURE**  
 Names in capital letters refer to dark and light surface features. They represent a system of latitude and longitude based on geographic and geologic information. The names of the features are listed in the table. The names of the features are listed in the table. The names of the features are listed in the table.

**SCALE—1:25,000,000 OR 45 MILES TO THE INCH**

This map is a projection of the spherical planet Mars. The map is a projection of the spherical planet Mars. The map is a projection of the spherical planet Mars.

These three equatorial hemispheres and two polar maps, based on the Lambert Azimuthal Equal-Area Projection, are shown to the same scale. The zero longitude meridian falls between the two hemispheres of the same projection established by William Beer and Johann von Mädler for their 1840 map of Mars. The zero longitude meridian falls between the two hemispheres of the same projection established by William Beer and Johann von Mädler for their 1840 map of Mars.

**MAP PROJECTION**  
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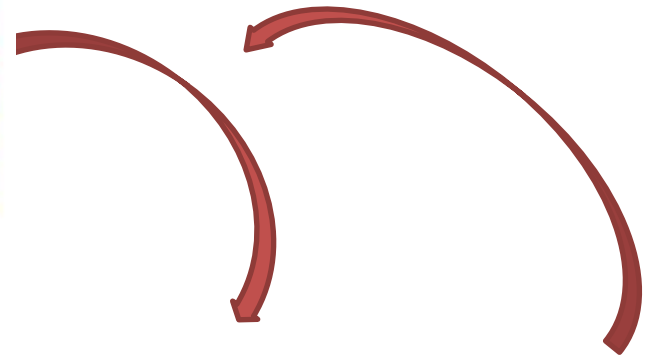
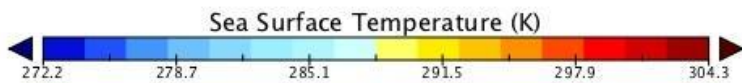
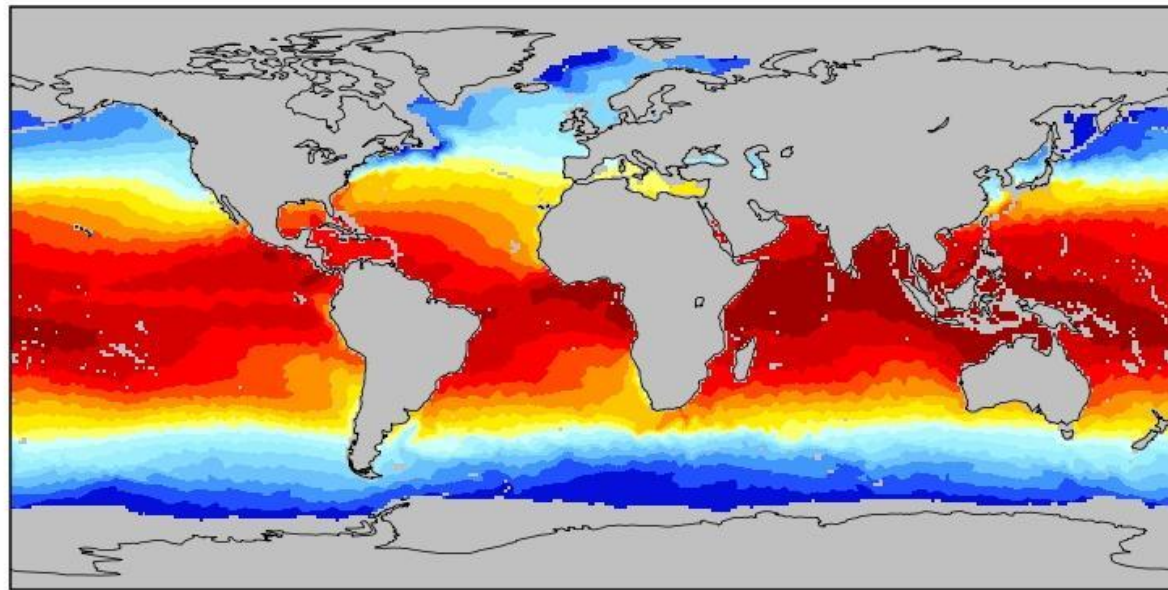
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Although tap water freezes at 0 degrees Celsius (32 degrees Fahrenheit), seawater does not freeze until about minus 2 degrees Celsius because 3% of it is salt.

Sea Surface Temperature



The same  
technology





Some fish in cold  
Antarctic waters have  
natural antifreeze in their  
blood so they don't  
freeze.











**Australia**

**The Great  
Barrier Reef**

THANKS FOR UR  
ATTENTION

