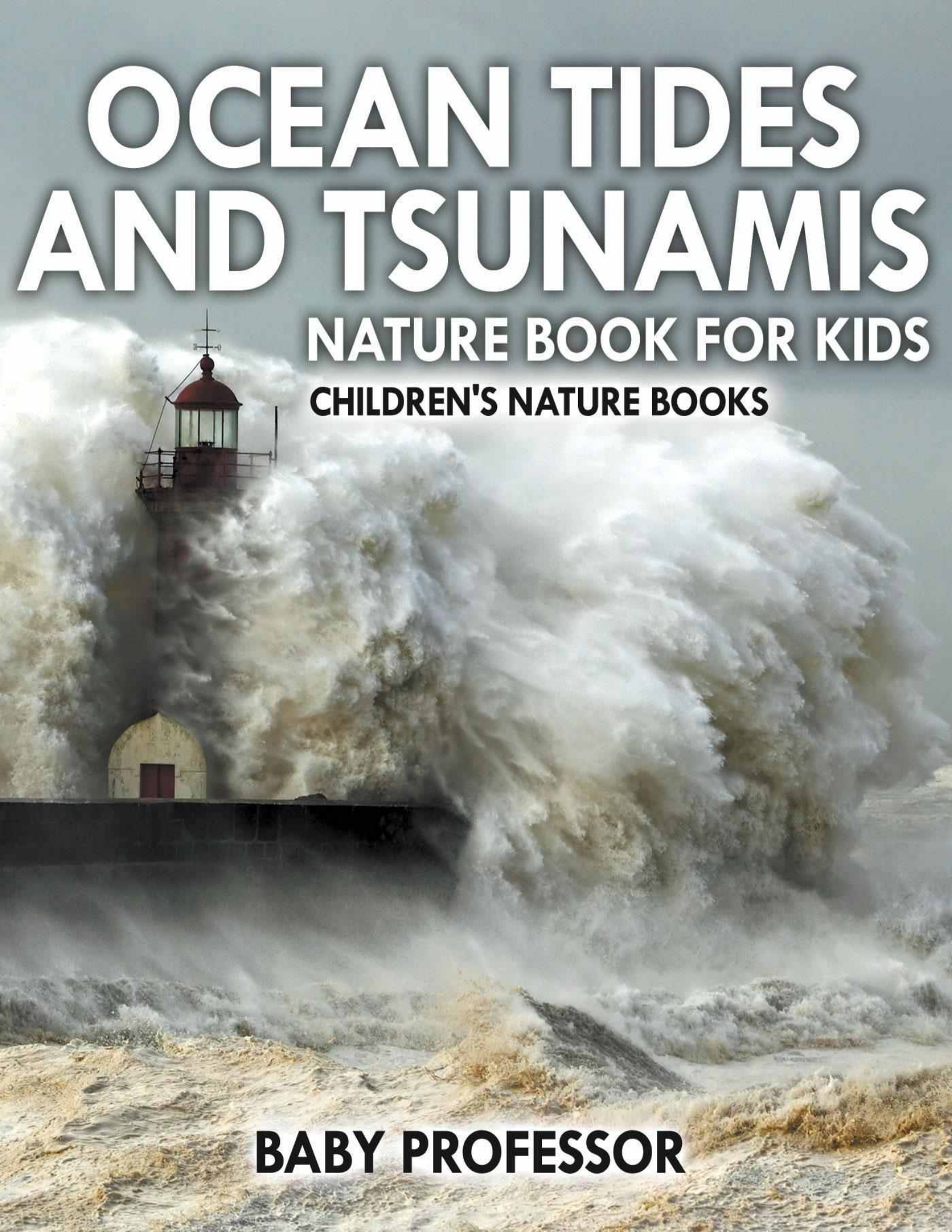
# OCEAN TIDES AND TSUNAMIS

## NATURE BOOK FOR KIDS

### CHILDREN'S NATURE BOOKS



BABY PROFESSOR

# OCEAN
# AND TSU

## NATURE BOO

Children's No

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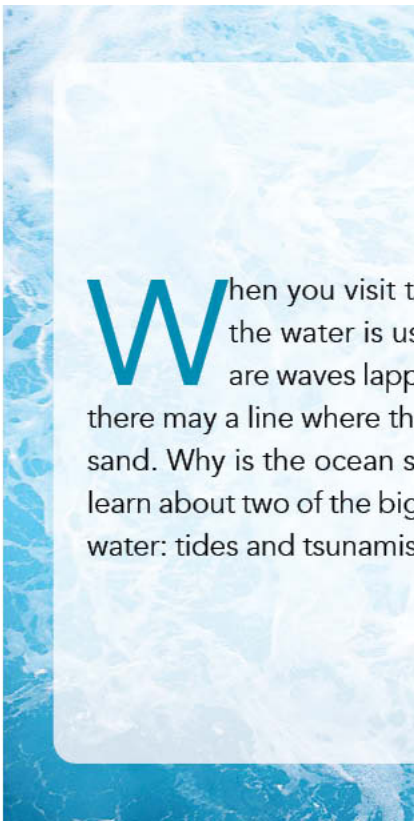



Waves

# THE TIDE IS FROM SPACE!

Most of the movemer
sea is waves. Waves
the wind and by the actio
the by far the biggest wa
the tide.

Twice a day the ocean's water moves toward its highest point on the shore, and twice a day it retreats toward its lowest point. What causes this movement is the gravitational force of our moon and the sun.

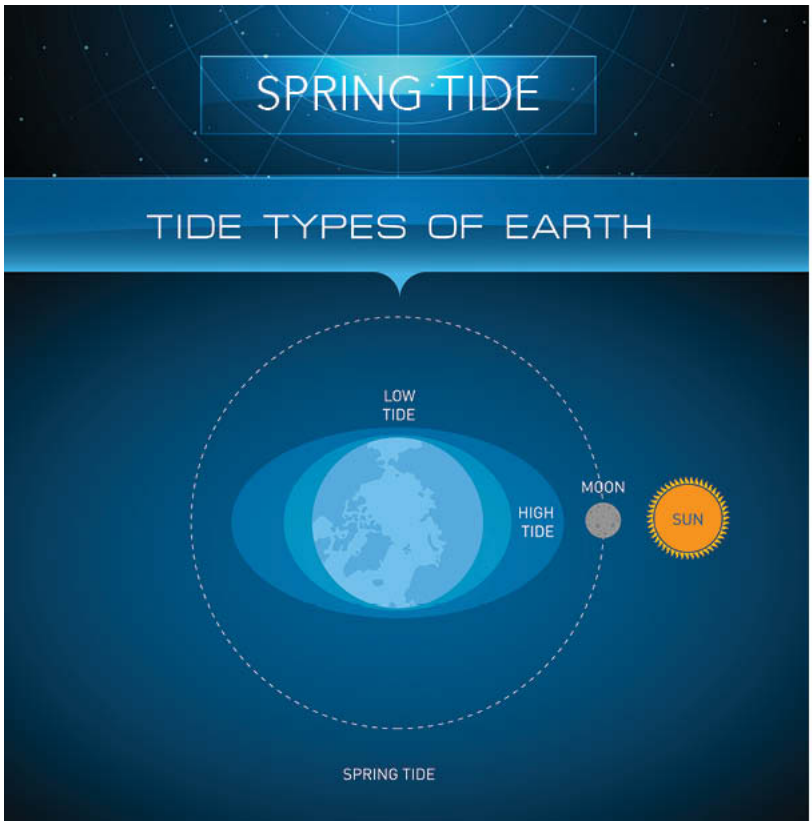
*Waves crashing down.*

Every body exerts gravitational force on every other body. You experience this every day, as the Earth's gravitation pulls you down toward the center of the planet and keeps you from just continuing to float away from the ground when you jump.

It also explains why you fa
slip: gravity is pulling on
soon as you are not balar
your hands, if you are dc
Earth hauls you down wi
about gravity in the Baby
*Dance on the Moon?*

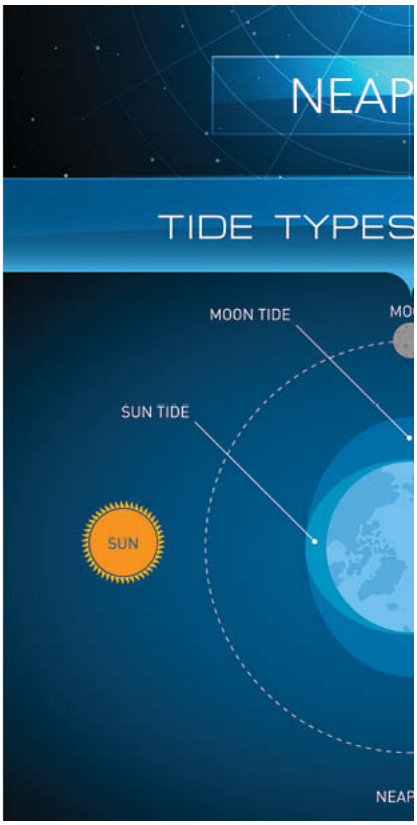
Earth's gravity has a strong effect on you, the air, and the water of our planet. But both the moon and the sun have gravitation pull on everything on the Earth's surface. This effect is most obvious with our oceans.

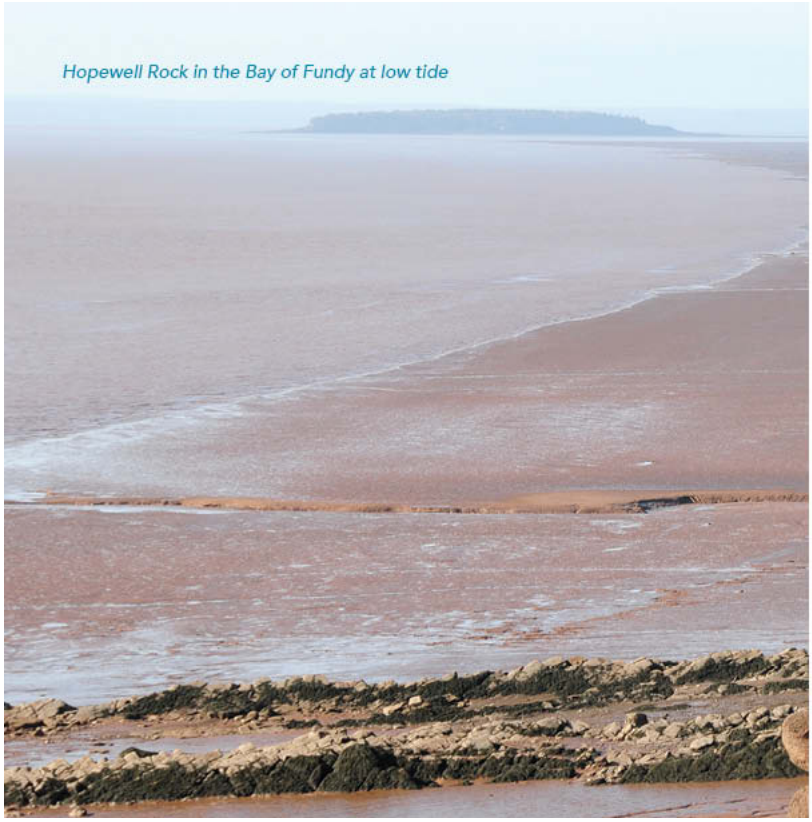
*North winds on waves.*




Since the moon is clos
effect is greater than t
the Earth facing the moon,
bulges up slightly in respc
pull and the water come
make *"High Tide"*. On th
facing the moon, the wate
shore to make *"Low Tide*
twice a day.

The sun has a similar, smaller effect. When the moon and the sun are on opposite sides of the Earth, the gravitation forces partly cancel each other out, and both high and low tides are less extreme This is called a **Neap Tide.** And when the moon is on the same side of the Earth as the sun, the tides can get to their greatest highs and lows.





*Hopewell Rock in the Bay of Fundy at low tide*

## HIGH TIDES IN THE BAY OF FUNDY

The shape of the shoreline and how shallow part of the ocean is also affect the size of the tides. The highest tidal range in the world is in the Bay of Fundy, between New Brunswick and Nova Scotia in eastern Canada. The Bay is much more shallow than the open ocean, and is shaped like a narrow, long bottle. This exaggerates the tidal effect, so at its most extreme the difference between high and low tide can reach over fifty feet!

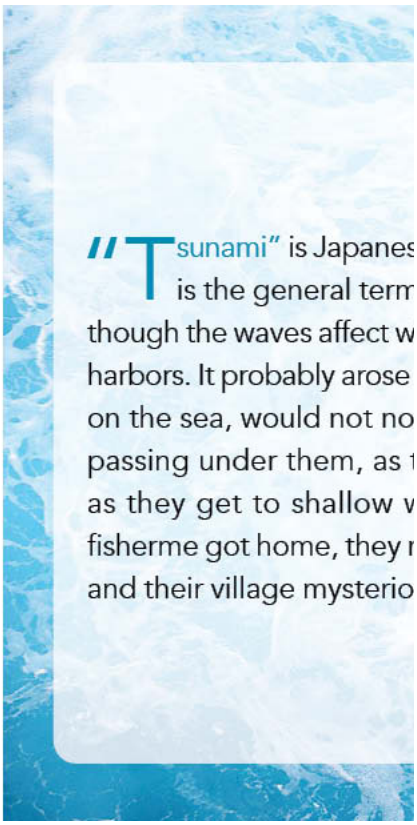
*St. Martins Sea Caves High Tide.*

The extreme tide chan
speeds erosion, creatin
releases lots of nutrients i
fish, whales, and other ma
are under way to try to harn
of Fundy tides to create e
hurting the Bay's ecosyste

The high tides often prov
sailors. You may anchor y
water, row to shore for supp
you return, that your boat
mud flat!

*High tide in the Bay of Fundy.*


A TSUNAMI
FOLLOWS A
HUGE EVENT


"Tsunami" is Japanes
is the general term
though the waves affect w
harbors. It probably arose
on the sea, would not no
passing under them, as
as they get to shallow w
fisherme got home, they
and their village mysterio

While tides are regular, predictable events, tsunamis are not. A tsunami is a series of large waves caused by some disturbance in the ocean. The disturbance could be an earthquake, a volcanic eruption, a meteor hitting the ocean, a landslide, an underwater explosion, or some other major event.

*Stormy wave.*

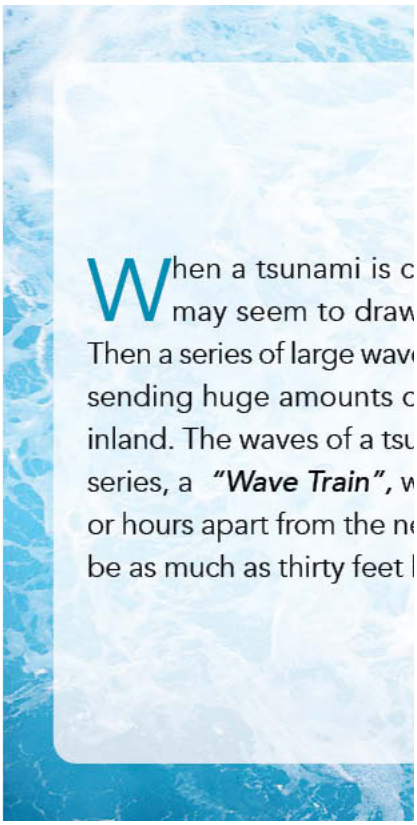
Greek scientists first su
were caused by und
two thousand years ago, bu
For example, scientists do
earthquakes create tsunar

*Giant blue waves crested with foam.*

Water does not compress. This means that when a force acts on it, water gets pushed in the direction ("along the vector") of the force. When an event creates force that creates waves, the waves can travel hundreds of miles across the open ocean and arrive with little warning at a shore far away from the originating event.

*Tsunami wave coming to city*

# TSUNAMI WAVES



When a tsunami is c
may seem to draw
Then a series of large wav
sending huge amounts c
inland. The waves of a tsu
series, a ***"Wave Train"***, w
or hours apart from the n
be as much as thirty feet

Tsunami waves don't l
they look more like th
much, much higher and f
is why they are sometim
even though tsunami wa
with the tide.

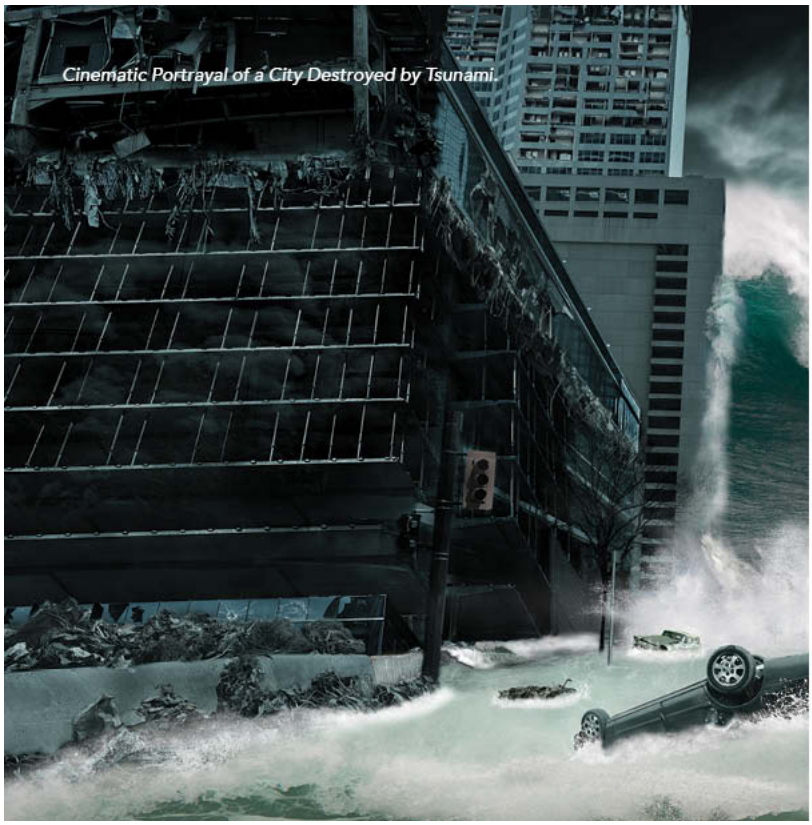
*Colorful Ocean Peak.*

## LANDSLIDES

Underwater landslides can create huge tsunamis as they displace large volumes of water very quickly. In 1958, a landslide in Alaska generated the highest wave ever recorded: 1700 feet high! Fortunately, the landslide and wave were in a bay, which contained its destructive force.

A similar event in the waters of the Vajont Dam in Italy caused a wave surge over 800 feet high that killed over two thousand people.

*Longarone (BL) after Vajont disaster dam, 1963.*



*Cinematic Portrayal of a City Destroyed by Tsunami.*

# TSUNAMI DISASTERS

Tsunamis can cause
destruction. Since
people have died becau

Tsunamis have two
damage. The first is wh
travelling at high spe
buildings, and forests.
the water drains back i
wreckage with it. Smas
of buildings can cause
down to the sea to stru
survived the waves as t

*Here are some tsunami d*
*past and from long ago.*

## INDONES

A giant earthquake ne
huge tsunami that kill
in countries around the In

*A village near the coast of Sumatra lays*
*the Tsunami that struck South East Asia*

## FUKUSHIMA, 2011

Japan's nuclear reactors at Fukushima were protected by high sea walls along 15 miles of shoreline. When the tsunami waves rolled in, they were 50% higher than the walls, and just spilled over them and knocked many of the walls down. This was a disaster all along the coast, but particularly in that it caused a massive spill of radiocatve material at the reactor.

*Damage scenery of the East Japan great earthquake disaster.*

## ALEXANDRIA, 365

A tsunami heavily damaged Alexandria in Egypt in 365. Historian Ammianus Marcellinus is the first to have recorded the pattern of an earthquake, the sea drawing back from the shore, and then the huge waves rolling in and damaging the shore and the city.

## MESSINA

This earthquake and re
more than 100,000 c
the worst natural disaster
history.

## THE STOREGGA SLIDE, 6,000 BCE

In the North Sea between England and Denmark there was once a large, low territory that historians call Doggerland. It was inhabited, and the southern part of it linked Britain to what is now France. About eight thousand years ago there were three huge landslides in Norway involving almost 200 miles of cliffs.

The landslides triggere
that changed the British
Doggerland altogether, c
part of the North Sea, and
an unknown number of p


SUNAMI HAZAR
IN CASE OF EARTHQ
O HIGH GROUND O

# TSUNAMI WARNINGS

We can't predict tsu
happens, we can
Sensors attached to bu
Indian oceans record pr
water and send out a sig
tsunami is happening. The
stations on vulnerable s
some people escape.


t may be too late to ge
you see a tsunami comi
at more than 400 miles p

In 2004 Tilly Smith, aged
Thailand with her parents
drawing back very quick
what she had learned i
parents. Her family and c
managed to escape th
immediately.

*Tsunami evacuation route sign.*

# LEARN MORE ABOUT THE EARTH

Our Earth provides a
of the time. But thir
and deadly. Read other
like *What Happens Befo*
*Erupt?* and *A Kid's Book*
learn more about danger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