Lesson – Earthquakes

THE FOLLOWING **VIDEO** HAS BEEN APPROVED FOR
ALL AUDIENCES
BY THE EARTH SCIENCE TEACHERS ASSOCIATION OF AMERICA , INC

THE VIDEO HAS BEEN RATED

I	INTELIGENT
	UNDER 15 REQUIRES TEACHER ASSISTANCE
	STRONG EARTH SCIENCE LANGUAGE, DETAILED DIAGRAMS, AND SUPER AWESOMENESS

- I can identify the different types of crustal features
- I can describe what an earthquake is & where earthquakes start
- I can explain how to measure an earthquake
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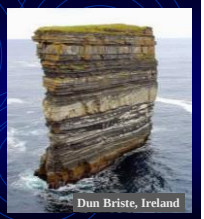
- I can name the scales used to measure earthquake damage
- I understand earthquake safety
- I can describe a tsunami

What Happens to Rock?

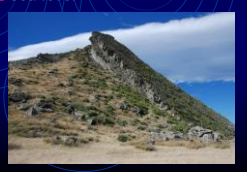
-MOST sedimentary rocks show **ORIGINAL HORIZONTALITY**



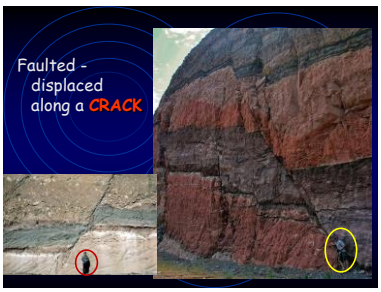
Dun Briste, Ireland

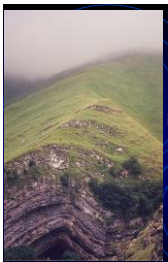
DEFORMED LAYERS

-Uplifted- **RAISED UP**
Ex: Fossil 100 meters **ABOVE** sea level



Faulted - displaced along a **CRACK**





Folded- **BENT or CURVED**

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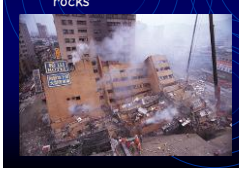
SCIENCE **25'**

Where do most earthquakes occur?

- Lakes
- Central Zones
- Mid-Atlantic Ridge
- Fault Lines

What is an Earthquake?

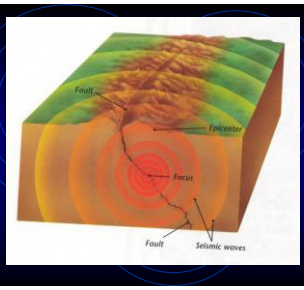
- Natural rapid shaking of **LITHOSPHERE (CRUST)**
- Releases **ENERGY** stored in rocks



Where do Earthquakes START?

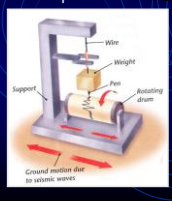
-Start at one Point **BENEATH** earth's surface where rock breaks under stress called **FOCUS**

-Point **ON** surface directly above focus is called **EPICENTER**



Measuring Earthquakes

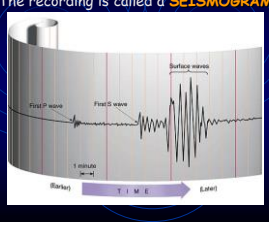
- Instruments used to measure earthquake called **SEISMOGRAPH**



The needle records motion of the earth, it leaves a wavy line.

Seismogram

·The recording is called a **SEISMOGRAM**



Measuring Earthquakes

-Energy of quake is carried through **SEISMIC WAVES**

3 TYPES:

1) P waves
2) S waves
3) SURFACE WAVES

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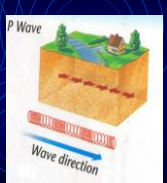
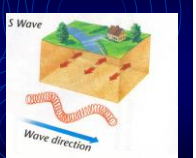
P waves

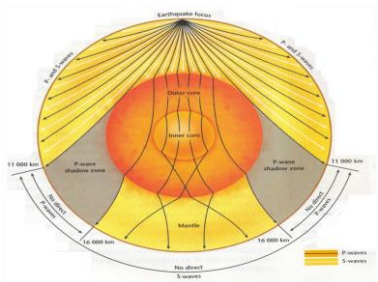
- **PRIMARY WAVES**
- Vibrate in the **SAME** direction the waves are moving
- Move through **SOLIDS** & **LIQUIDS**
- **FIRST** to arrive at epicenter
- Moves **FAST**



S waves

-**SECONDARY WAVES**
-Vibrate at **RIGHT ANGLES** to the direction the waves are moving
-Move ONLY through **SOLIDS**
-**SECOND** to arrive at epicenter
-Moves **SLOW**





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Detecting & Measuring Seismic Waves

-3 rating scales to measure earthquakes:

1) Mercalli scale
2) Richter scale
3) Moment magnitude scale

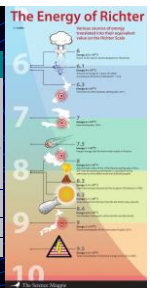
Mercalli Scale

The Mercalli Scale

Earthquake Intensity	Earthquake Effects
I–II	Almost unnoticeable
III–IV	People notice vibrations like those from a passing truck. Unstable objects disturbed.
V–VI	Dishes and windows rattle. Books knocked off shelves. Slight damage.
VII–VIII	People run outdoors. Moderate to heavy damage.
IX–X	Buildings jolted off foundations or destroyed. Cracks appear in ground and landslides occur.
XI–XII	Severe damage. Wide cracks appear in ground. Waves seen on ground surface.

Richter Scale

Richter scale no.	No. of earthquakes per year	Typical effects of this magnitude
< 3.4	800 000	Detected only by seismometers
3.5 - 4.2	30 000	Just about noticeable indoors
4.3 - 4.8	4 800	Most people notice them, windows rattle.
4.9 - 5.4	1400	Everyone notices them, dishes may break, open doors swing.
5.5 - 6.1	500	Slight damage to buildings, plaster cracks, bricks fall.
6.2 6.9	100	Much damage to buildings: chimneys fall, houses move on foundations.
7.0 - 7.3	15	Serious damage: bridges twist, walls fracture, buildings may collapse.
7.4 - 7.9	4	Great damage, most buildings collapse.
> 8.0	One every 5 to 10 years	Total damage, surface waves seen, objects thrown in the air.



Moment magnitude scale

- Most OFTEN used to measure strength of earthquake
- **Use** HEIGHT of wiggles on seismograms to infer total amount of energy

Earthquake Magnitudes

Earthquake	Moment Magnitude
San Francisco, California, 1906	7.7
Southern Chile, 1960	9.5
Anchorage, Alaska, 1964	9.2
Loma Prieta, California, 1989	7.2
Northridge/ Los Angeles, California, 1994	6.7

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Earthquake SAFETY?

Prepare for a future Earthquake

1) Earthquake DRILLS
2) Proper PLANNING & CONSTRUCTION of building

During an Earthquake:

1) Stand in a doorway.
2) DROP, COVER, HOLD

RUN FOR COVER BEFORE FACEBOOKING ABOUT IT !

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Tsunami

77.4 ft High Waves 3/11/11 in Japan

- A LARGE OCEAN wave
- Caused by an UNDERWATER EARTHQUAKE

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