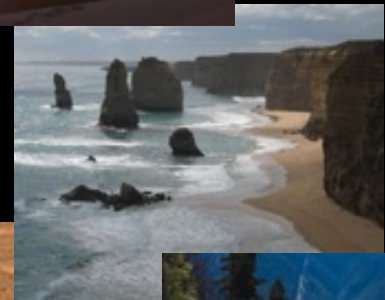
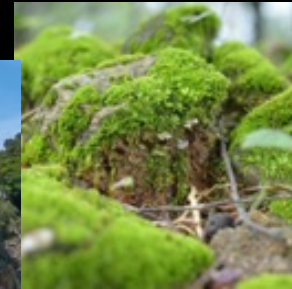


Erosion, Weathering, and Deposition

- Physical Weathering
- Chemical Weathering
- Biological Weathering
- Erosion
- Sediment Transport
- Deposition



Preview File

Please enjoy this preview of your Student Version of the presentation. Please note within this sample file:

- Some slides appear blank because they have been removed
- Student versions have portions of the text removed which is given in the teacher version and appear as _____ which the students are to fill in
- Other slides may have on them, this represents writing that has been removed on this sample

The paid full version of your resource includes both Google Slides and PowerPoint and is Google Classroom Ready



Part 1 - Weathering

How Sediments Are Made



Weathering Erosion Deposition

W. E. D.

Weathering *Breaks It*

Breaking
Down of the Material

Wind Water Ice

Erosion *Takes It*

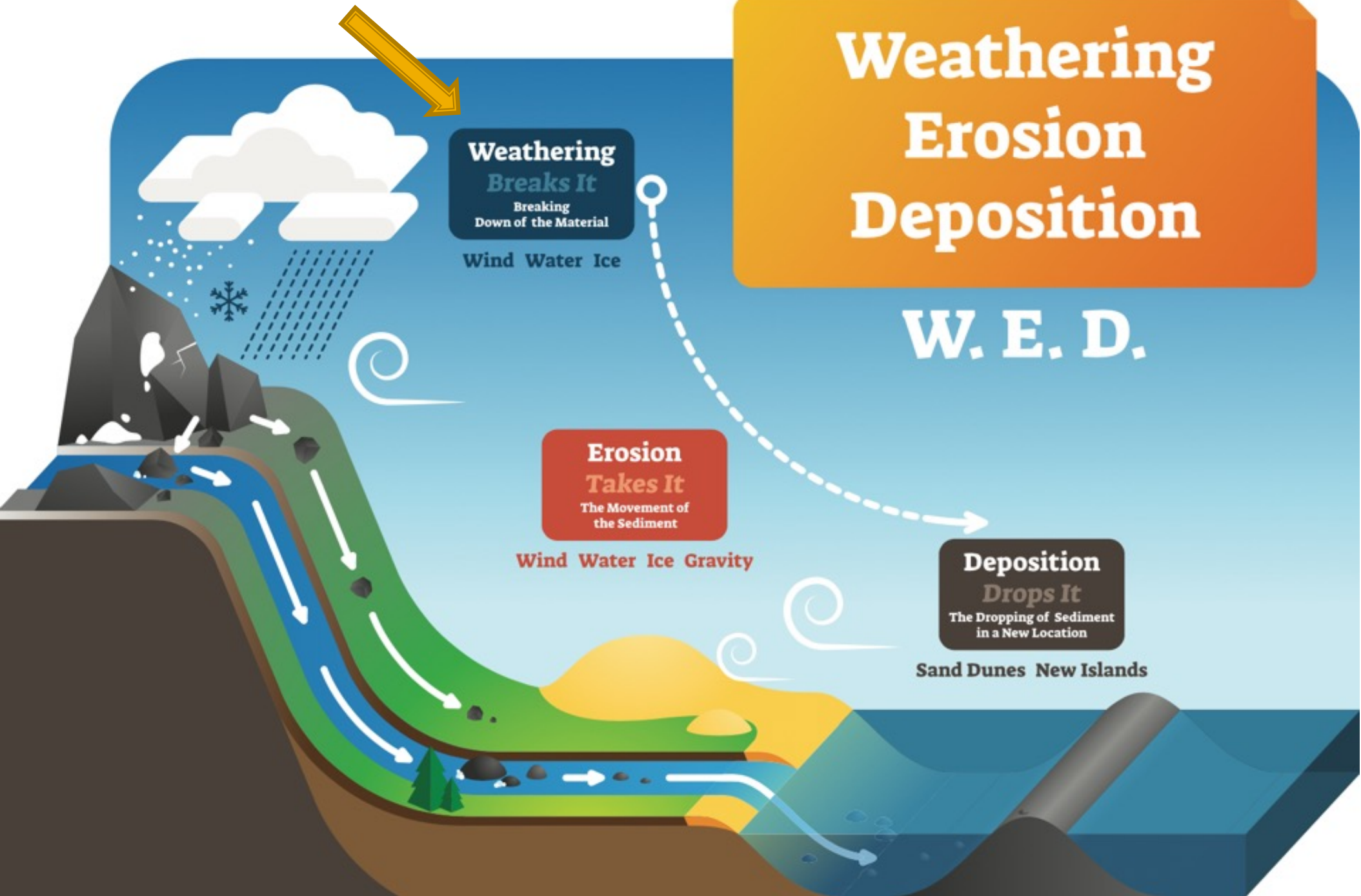
The Movement of
the Sediment

Wind Water Ice Gravity

Deposition *Drops It*

The Dropping of Sediment
in a New Location

Sand Dunes New Islands



Two Main Processes For Breaking Down Rocks, Soil, and Minerals

- Weathering

- _____

- Erosion

- _____

- Weathering is the breaking down of rocks (or, the creation of the sediments) and erosion is the transporting of them

Weathering vs. Erosion

A farmer's field is full of nutrient rich soil.. Heat, water/ice, farming machines, etc... break it down (worms and bacteria help too) into smaller parts. This is weathering.

Another farmer's field is all dried up and kind of dusty. Wind comes along and blows it away, stripping the land of its minerals. This is erosion.

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Major Types of Physical Weathering

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____



Phang Nga Bay, Phuket Province,
James Bond Island

Thermal Stress

- _____
- The repeated heating (expansion) and cooling (compression) exerts stress on the outer layers of rocks, which _____
 - The peeling of outer layers is sometimes called exfoliation

The exfoliation Dome, called the moon rock, in the Augrabies National Park, Northern Cape South Africa



Pressure Release

- Rocks underground are under a lot of pressure from everything on top of them



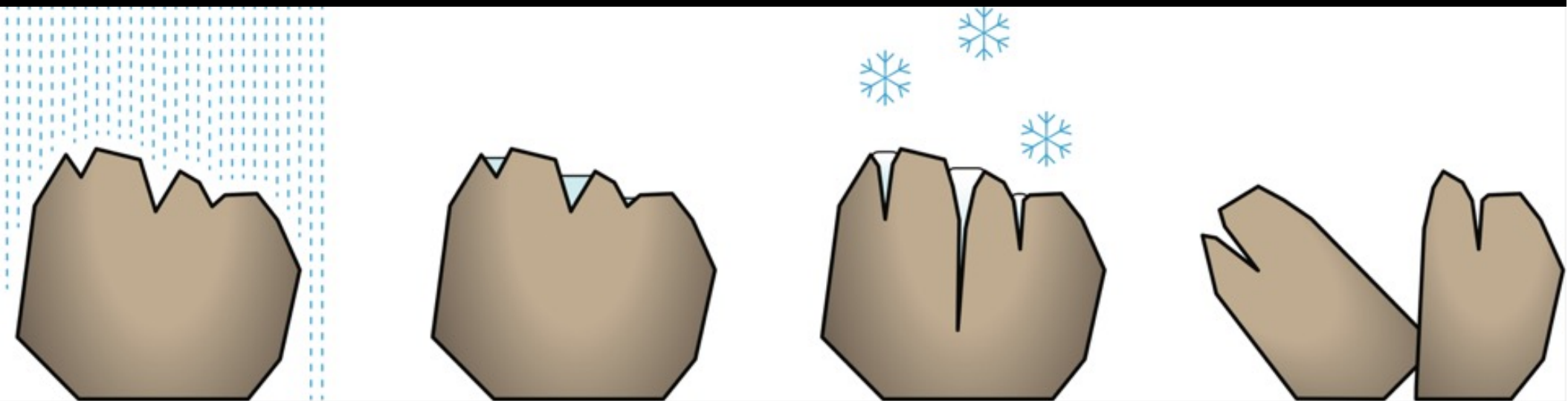
- Fractures appear parallel to the surface
- Over time, sheets of rock can break away



Pressure release in granite.
Nannestad, Norway.

Frost Weathering

- Sometimes called frost wedging
- Water can/does creep inside any kind of hole, crack or crevasse in a rock
- _____
- It can dislodge mineral grains or fracture boulders



Frost Weathering

CLICK THE VIDEO
IMAGE IN
SLIDESHOW
MODE TO ACCESS
THE VIDEO.



1

- Ice growth is known to be able to generate pressures of up to 207 MPa, more than enough to fracture any rock
- This process can take minutes or years depending on the amount of water and the strength of the rocks
- Note: This process can and does cause many homes to develop cracks in their basement walls which, when thawed can leak in the spring



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Salt Crystal Growth

- Salt crystal growth, otherwise known as haloclasty, causes disintegration of rocks when saline solutions seep into cracks and joints in the rocks and evaporate, leaving salt crystals behind



Hydraulic Action

- This category represents a group of _____
- Ex/ Water that repeatedly bashes up against the surface of a rock to dislodge particles
- Caves are often produced this way



London Bridge - Australia



The Twelve Apostles - Australia

Corrasion and Attrition

- ---
- Attrition is a similar effect caused by the eroded particles after falling to the sea bed where they are subjected to further wave action and smashed up against each other and ground up into smaller and smaller pieces
 - Note: These processes are an important component in the creation of sand near coastal areas

3 Basic Ways of Physical Weathering



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1. _____

- Ex. Thermal Stress and Pressure Release

2. The rocks have foreign substances seep into the cracks which create pressure and break pieces off

- Ex. Frost Weathering and Salt Crystal Growth

3. _____

- Hydraulic Action, Corrasion and Attrition

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Dissolution

- _____
- This occurs when acids dissolve rocks and minerals
- One of the most well-known processes is carbonation



Carbonation

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3

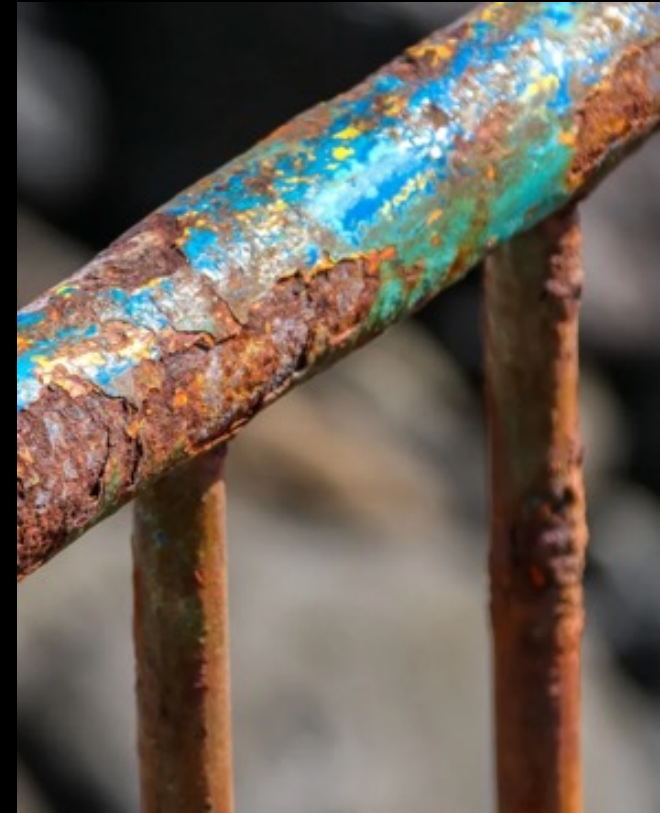
- Carbonation is when _____
- Rocks that contain a high amount of calcium (like limestone) will react with the carbonic acid to make a solution of calcium bicarbonate and simply melt the rock away



Many limestone statues have been dissolved by acid rain.

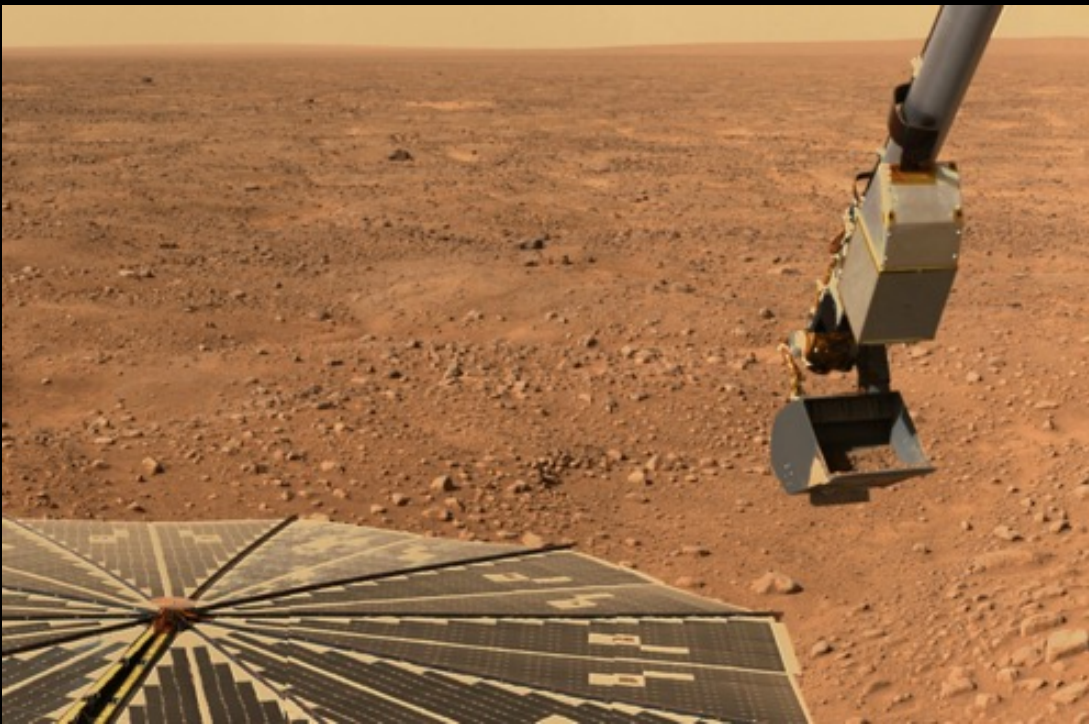
Oxidation

- 'Rusting' is often used as a term for oxidation
- Occurs when minerals in rocks (or metal structures) combine with oxygen to form an oxide
- _____



Oxidation

Iron easily oxidizes and forms red rust while copper creates a green oxide.



Red iron oxide surface of Mars.



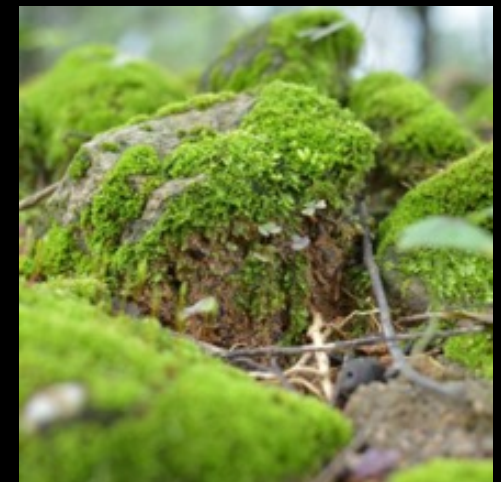
When the Statue was unveiled in 1886, it was a shiny brown color, like a penny. Oxidation of the copper turned it green.

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Biological Weathering



- Examples:
 - Moss growing on rocks release an acid waste product than can dissolve the rock
 - Or the decaying remains of dead plants can raise acid levels in soil causing damage



Then what?

Once the material has been broken down, it is free to be transported and deposited somewhere else... that's where erosion and deposition come in.

Part 2 – Erosion and Deposition: How Sediments Are Relocated



Weathering Erosion Deposition

W. E. D.

Weathering

Breaks It

Breaking
Down of the Material

Wind Water Ice

Erosion

Takes It

The Movement of
the Sediment

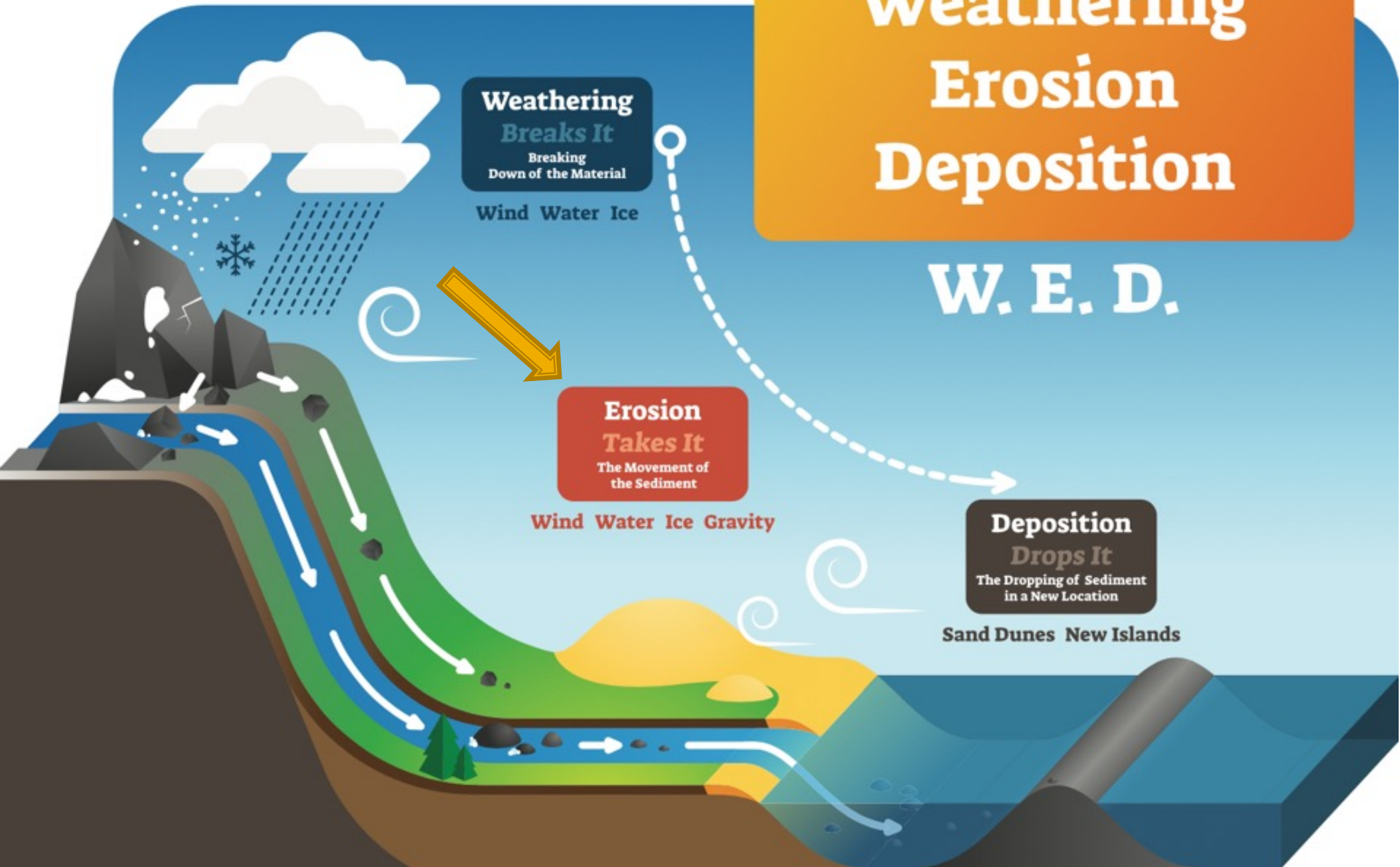
Wind Water Ice Gravity

Deposition

Drops It

The Dropping of Sediment
in a New Location

Sand Dunes New Islands



Sediment Movement

- Weathering is the act of breaking down rock, land, soil, human-made structures, etc.
- _____
- These smaller pieces are easily carried away by wind or water
- _____

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Sediment Transport

- _____
- There are 6 main mechanisms that involve sediment transportation/erosion:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____



Aeolian (ee-ow-lee-uhn)

- _____
- Air is a very low-density fluid and has a lot of trouble moving large objects (unless of course you get hurricanes or tornadoes...)
- In order for wind to move rocks, the grain size of the rock must typically be higher than zero on the Phi scale... i.e. less than 1 mm
- _____



A sandstorm approaching Al Asad April 27, 2005.

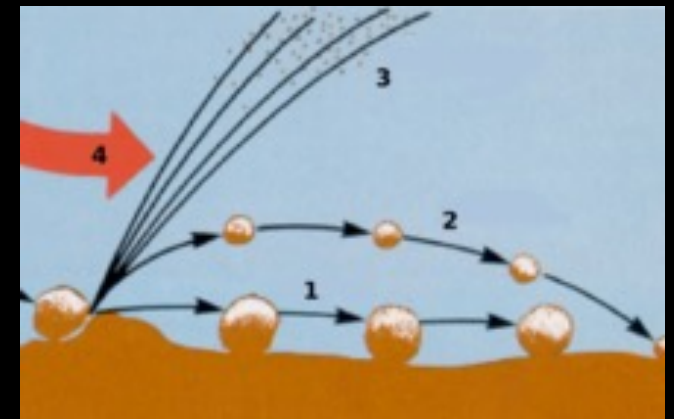
Aeolian

Aeolian transport of sediment particles can happen in one of 3 ways:

1. _____

2. _____

3. _____



1. Creep
2. Saltation
3. Suspension
4. Wind current



- Anywhere the ground is uneven, ripples of sand can form as the wind deposits it on the ground
- These ripples are called bedforms (the same pattern can happen in sand on a beach under water)
- Sand can also gather around objects like plants or rocks
- If enough sand is deposited, the ripples can grow to dunes the size of small mountains

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Fluvial



Fluvial

- Erosion by moving water can happen in two ways
 1. _____
 2. If the river carries significant quantities of sediment, this material can weather the bed. At the same time the fragments themselves are ground down, becoming smaller and more rounded

Fluvial

- A river is continually picking up and dropping solid particles of rock and soil from its bed throughout its length
- _____
- _____
- Areas where more particles are dropped are called alluvial or flood plains, and the dropped particles are called alluvium
 - Note: because water is thicker than air, it will be able to suspend and push larger pieces of rock. The size of the rock depends on how fast the water is moving.

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Glaciers

- Glaciers slowly deform and flow due to stresses induced by their weight
- Glaciers can move/flow in one of two ways:
 1. _____
 2. _____
- And, because glaciers are so thick, they can carry the largest of all sediments... Boulders!



Fox Glacier – New Zealand

Glaciers

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PREVIEW



6

- The three main processes of sediment transport for glaciers

1. _____

2. _____

3. Plucking: As the glacier flows over the bedrock's fractured surface, it softens and lifts blocks of rock and brings it into the ice



Coastal, Hillslope, and Debris Flow

- Coastal is basically just fluvial that happens near the coast
 - _____
- Hillslope is a category that contains the following: Soil creep (gravity pulling dirt down the hillside), Tree throw (a hole created when trees are pulled over and out of the ground), and movement of soil by burrowing animals

Debris Flow

- Debris Flow is a moving mass of loose mud, sand, soil, rock, water, and air that travels down a slope under the influence of gravity



7



A rockslide in Guerrero, Mexico



Goodell Creek Debris Avalanche,
Washington, USA

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Deposition

Deposition occurs when the force(s) responsible for sediment transport are no longer able to overcome the forces of gravity and friction.

Since the force(s) to create motion is/are no longer strong enough, motion stops, and the sediment is added to a new location.

