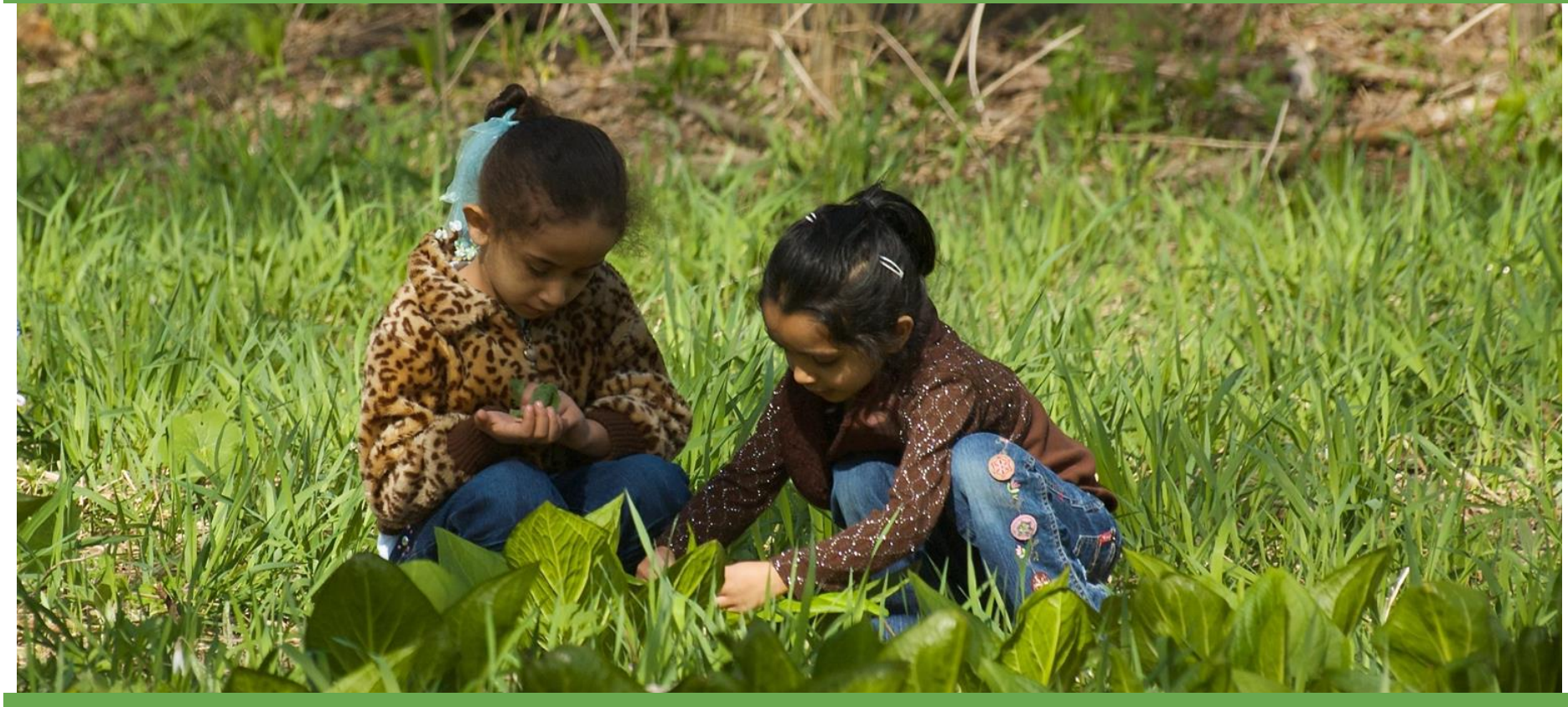
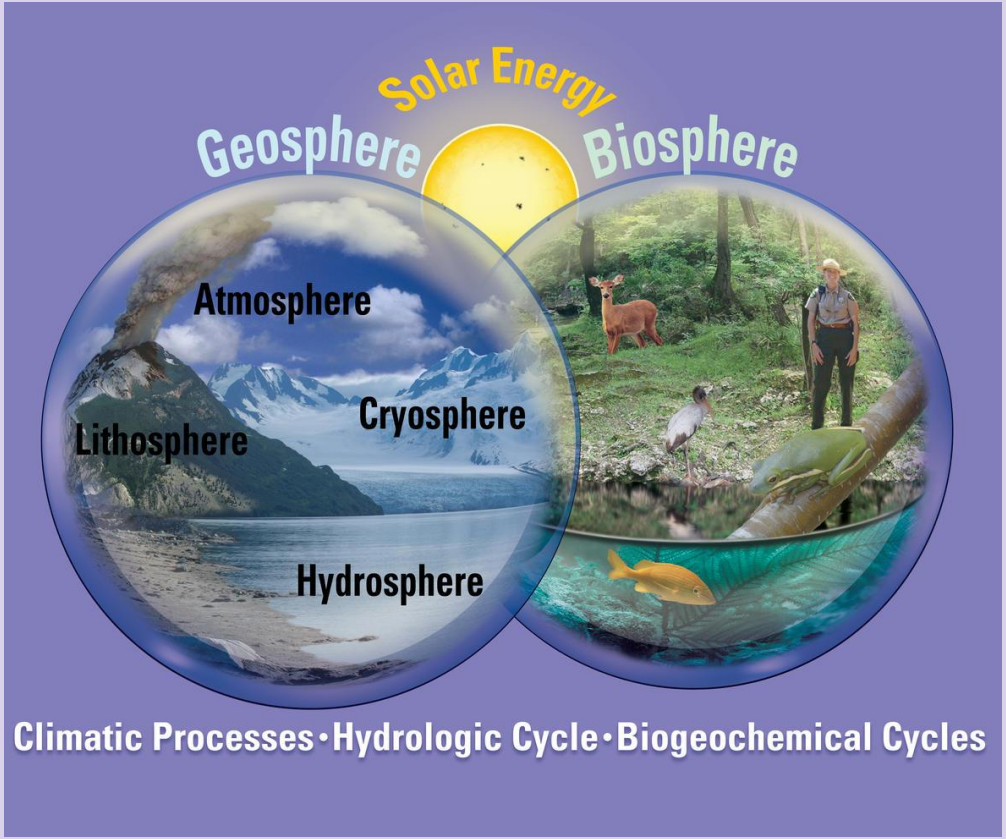
The Biodynamic Engine That Drives Our Ecosystem



Deb (Perryman) McMullen, Elgin Sustainability Commission & PreK- 12 Science Coordinator

Crooked Lake, Petoskey, Michigan

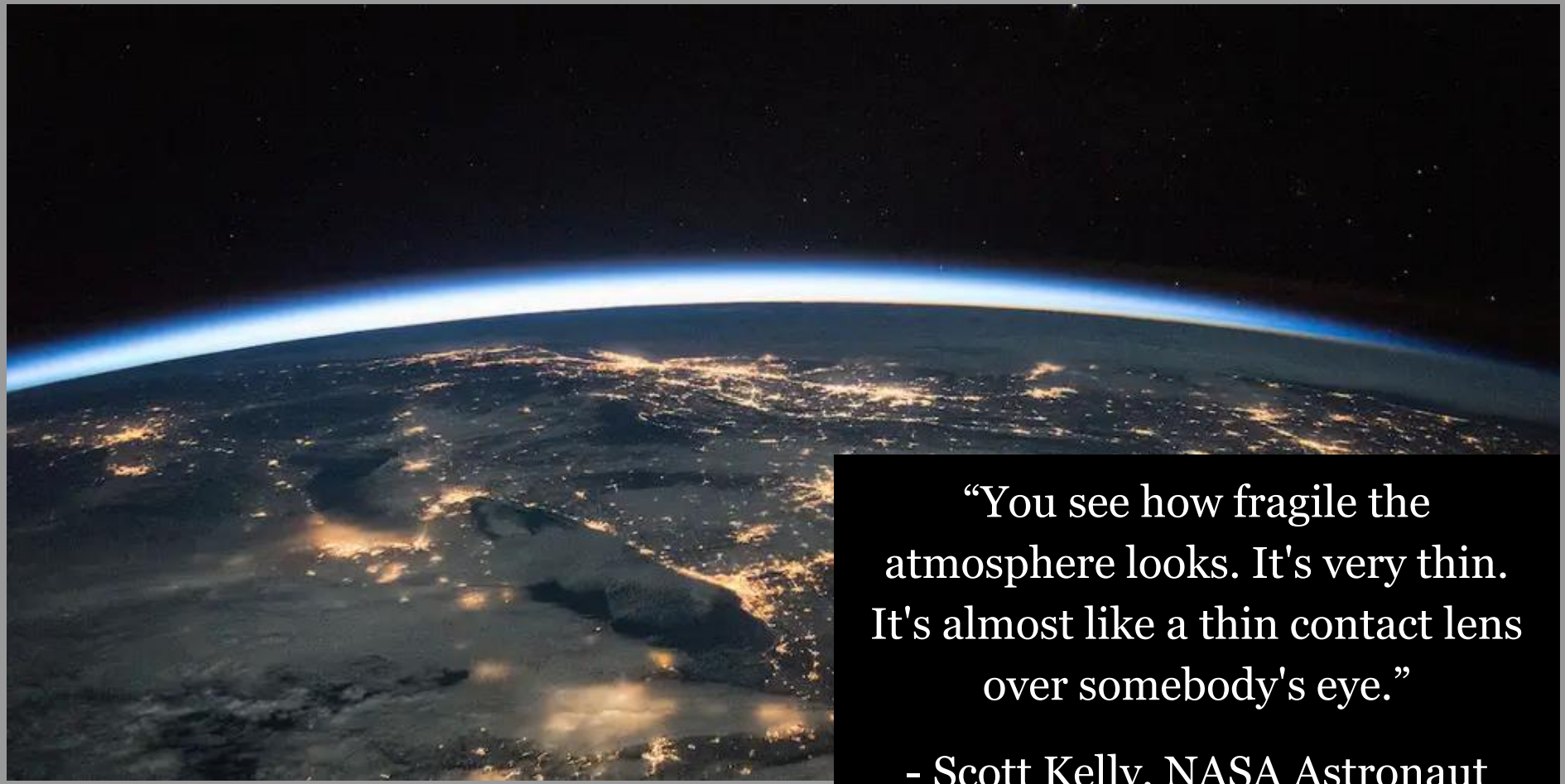
Biodynamic Engine



Biogeochemical Cycles

Atmosphere
Lithosphere
Cryosphere
Hydrosphere
Biosphere

https://www.usgs.gov/media/images/biogeochemical-cycling-diagram-showing-climatic-processes-hydrologic

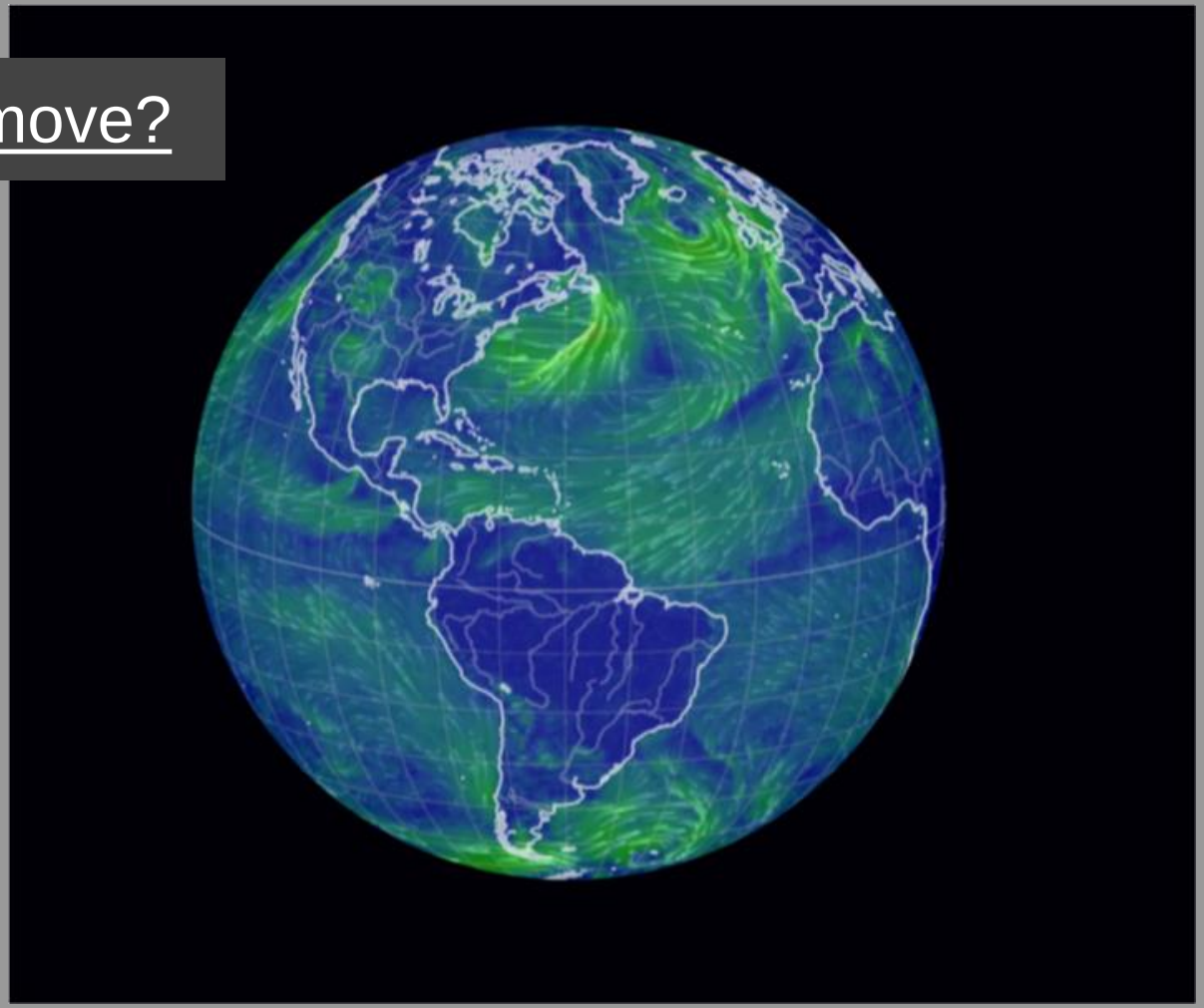


“You see how fragile the atmosphere looks. It's very thin. It's almost like a thin contact lens over somebody's eye.”

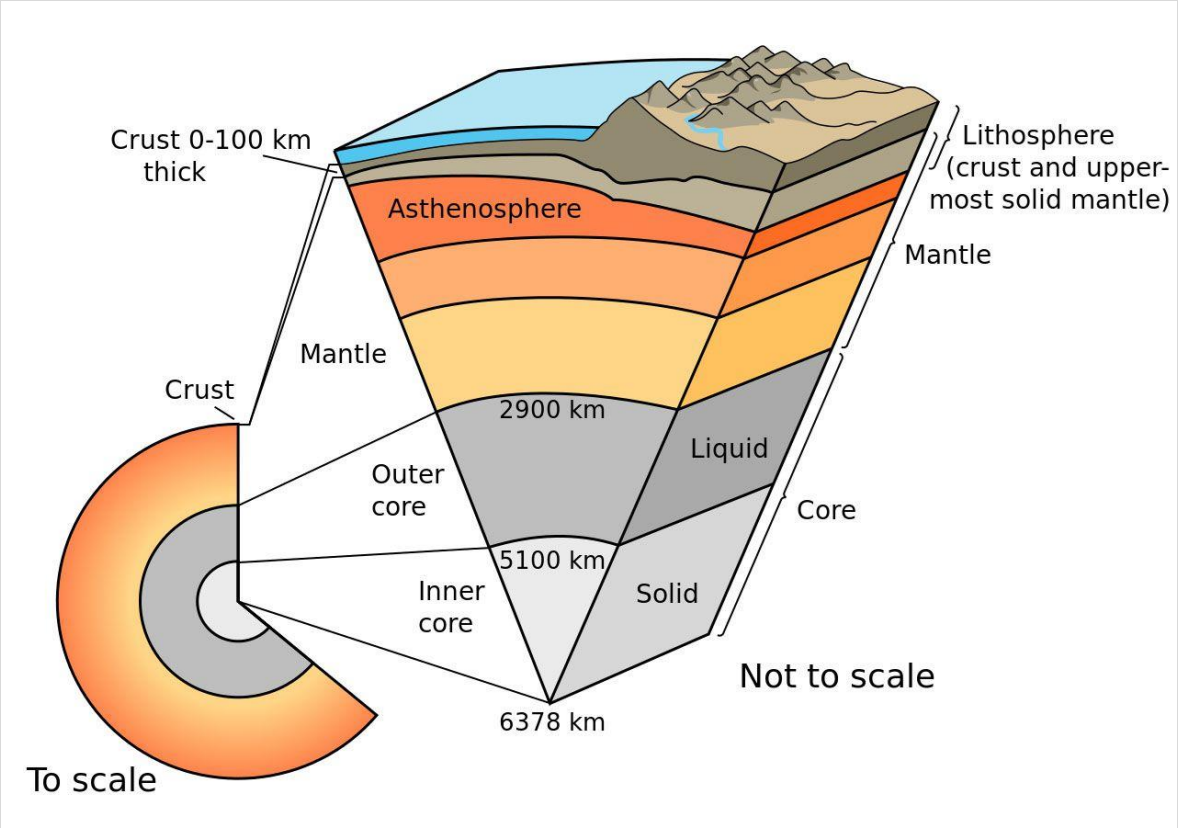
- Scott Kelly, NASA Astronaut

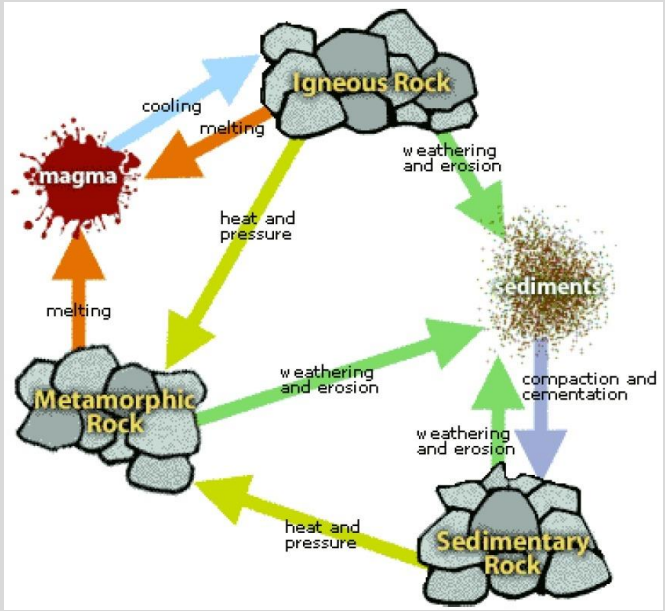
NASA Johnson/Flickr

What do winds move?



Lithosphere





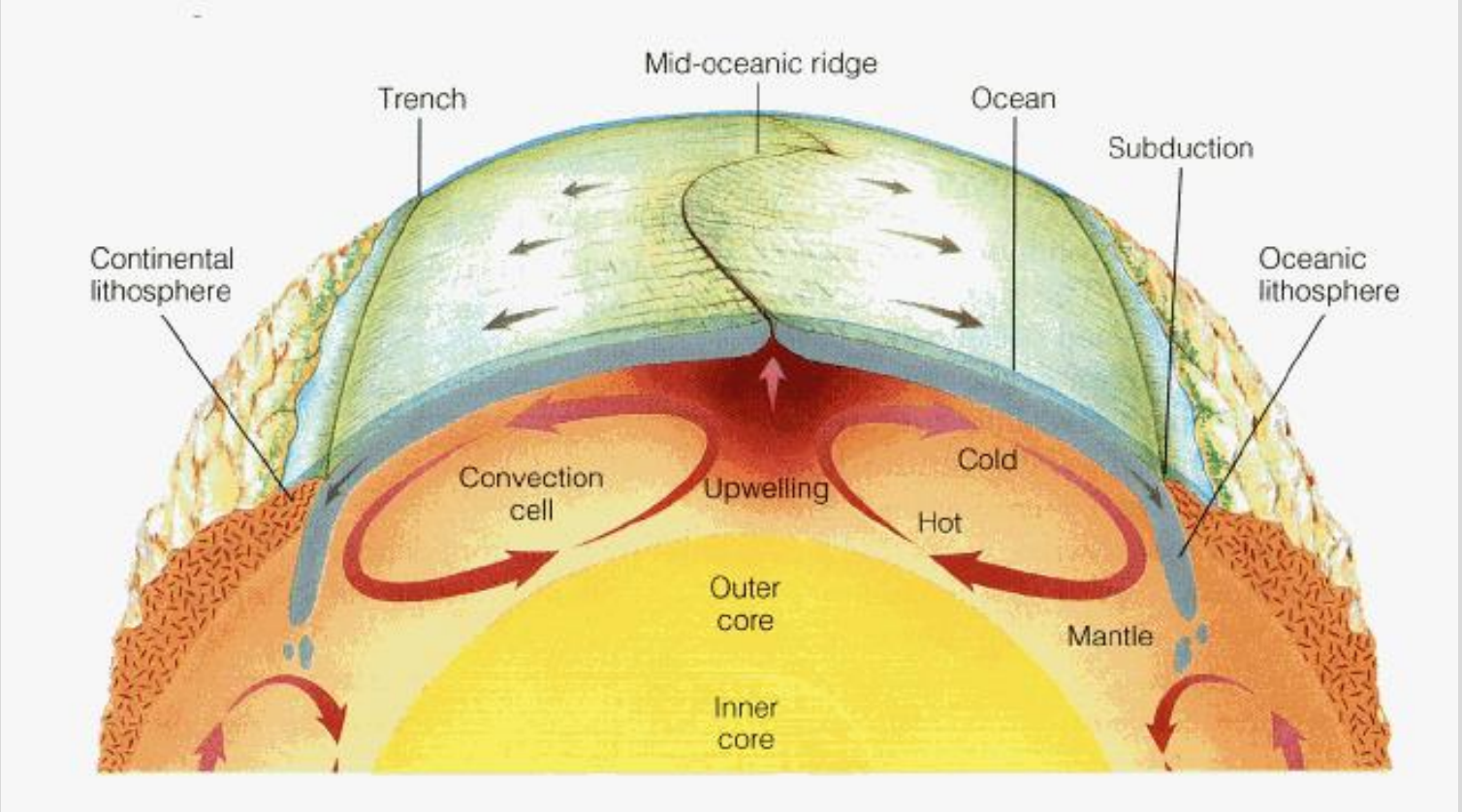
Tectonic Plates
Mountains
Volcanoes
Oceanic Crust
Continental Crust

https://www.nationalgeographic.org/encyclopedia/lithosphere/

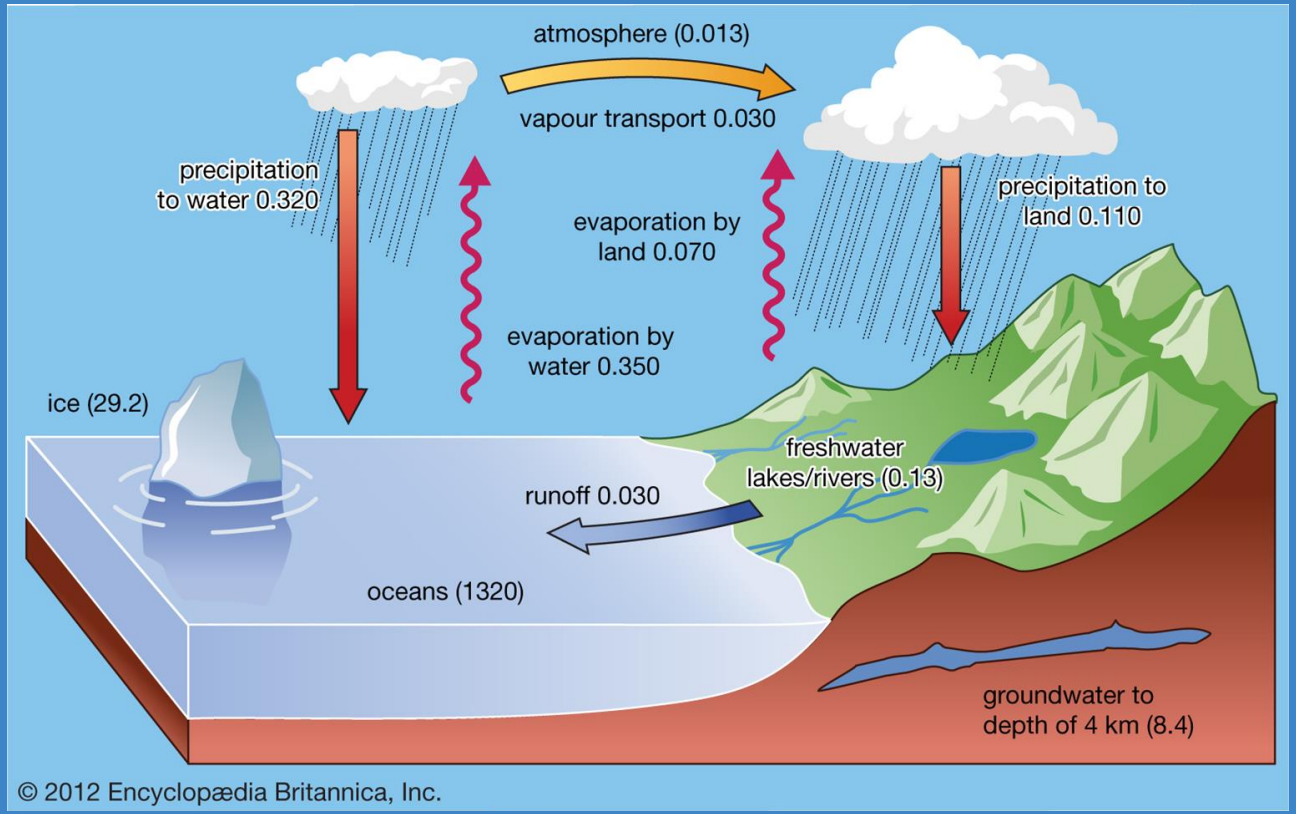
The Solid Earth

[Animation 1]

[Animation 2]

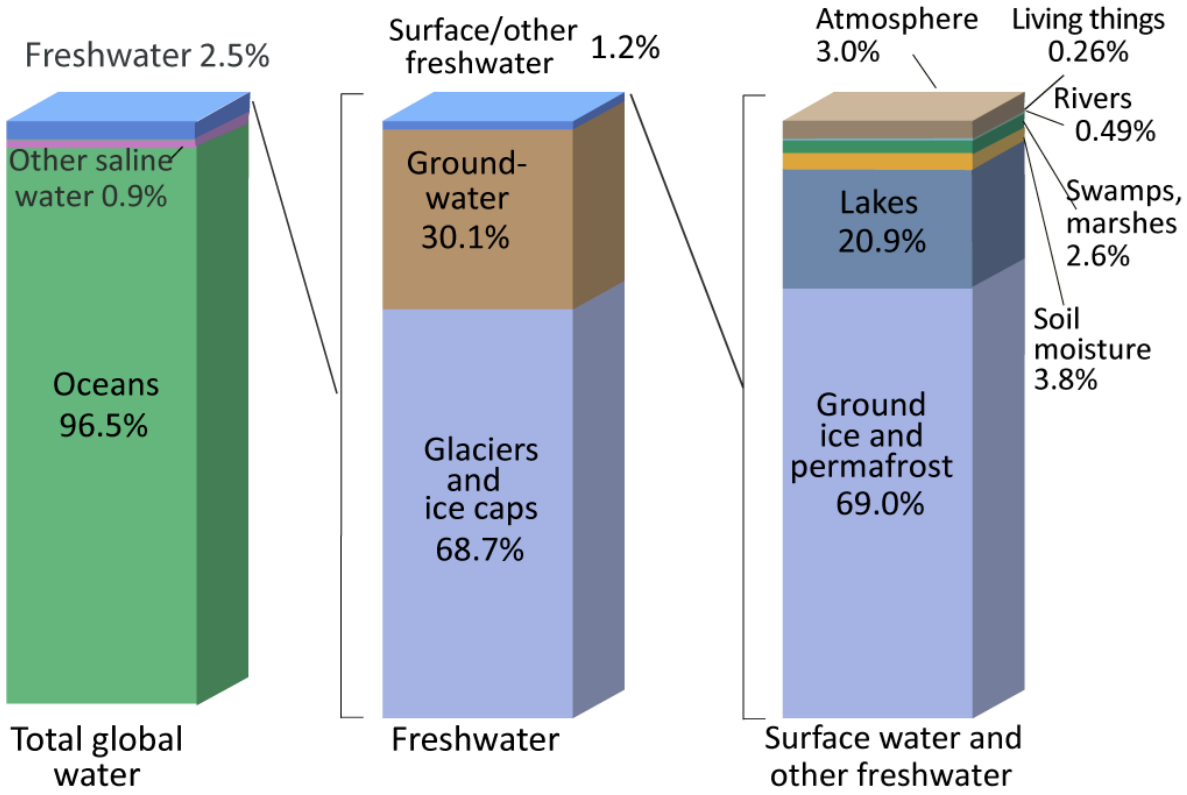


Hydrosphere



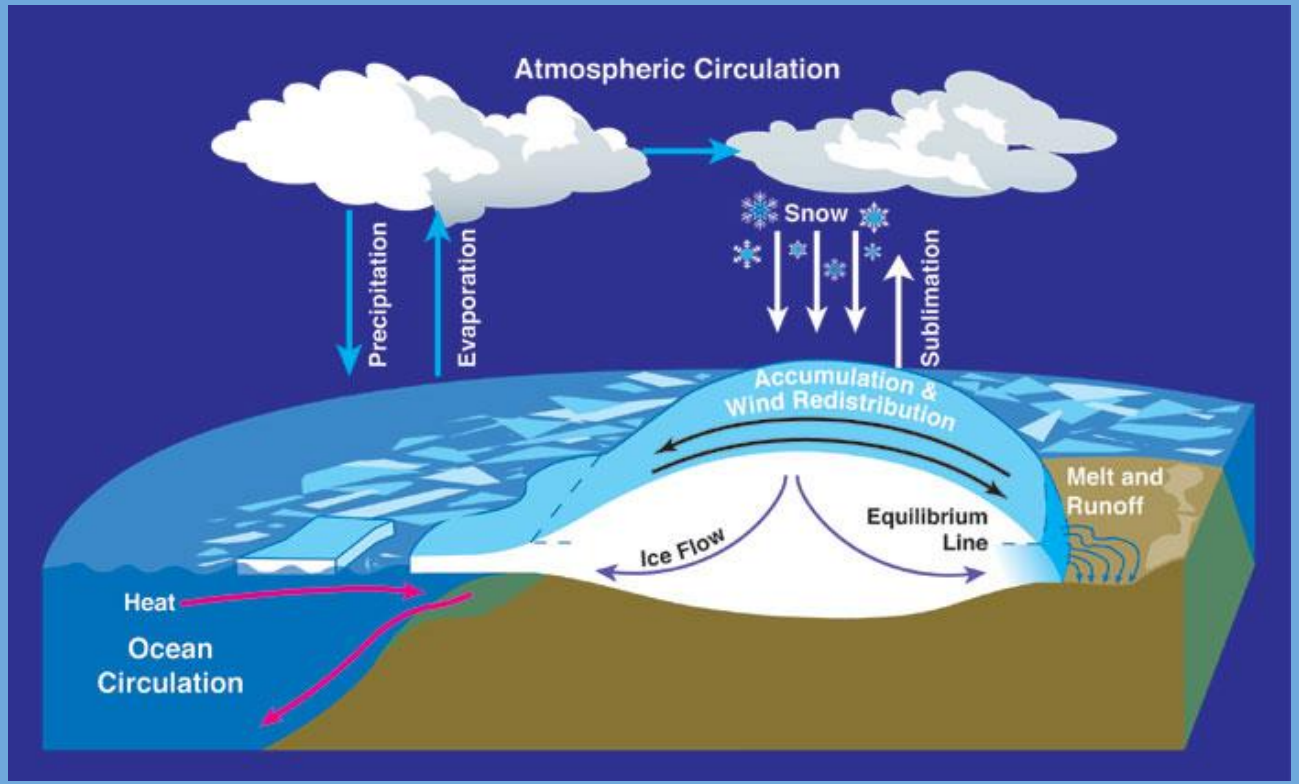
https://images.app.goo.gl/zRnN9VZ6K4AN19TY9

Where is Earth's Water?



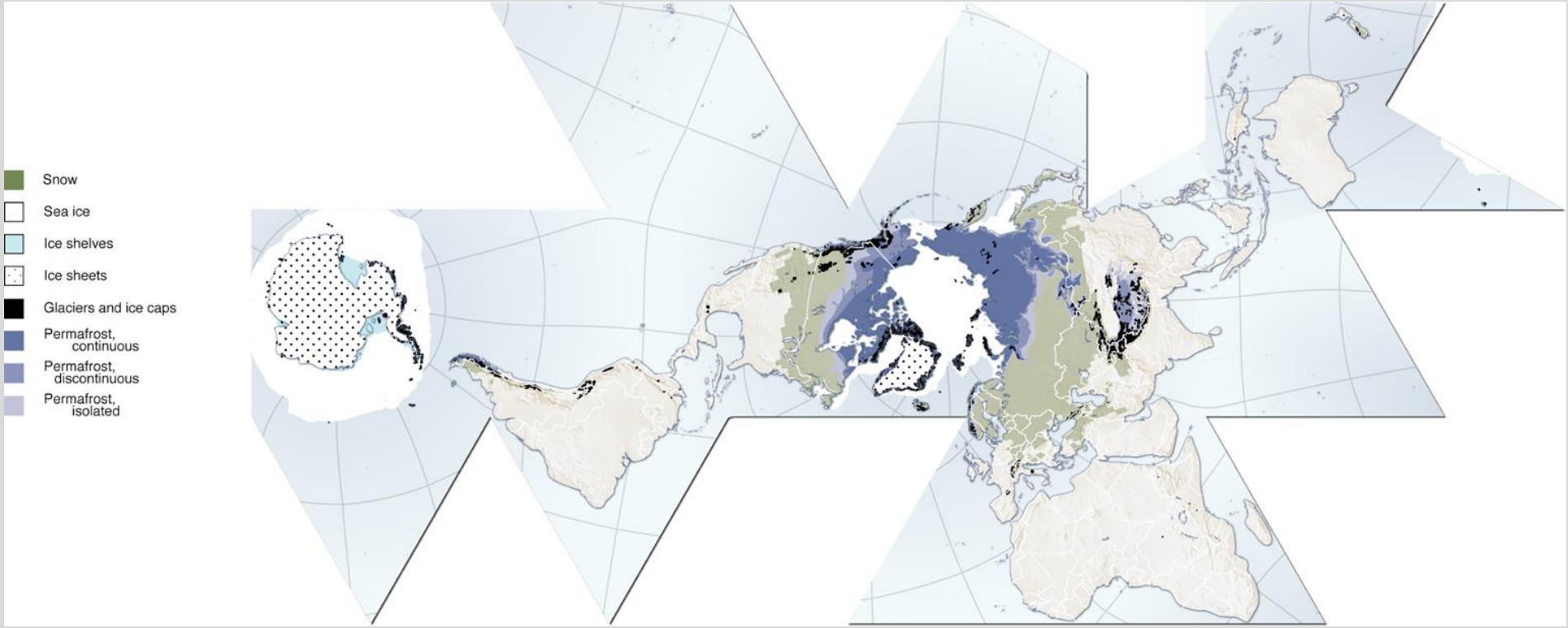
Source: Igor Shiklomanov's chapter "World fresh water resources" in Peter H. Gleick (editor), 1993, Water in Crisis: A Guide to the World's Fresh Water Resources. (Numbers are rounded).

Cryosphere

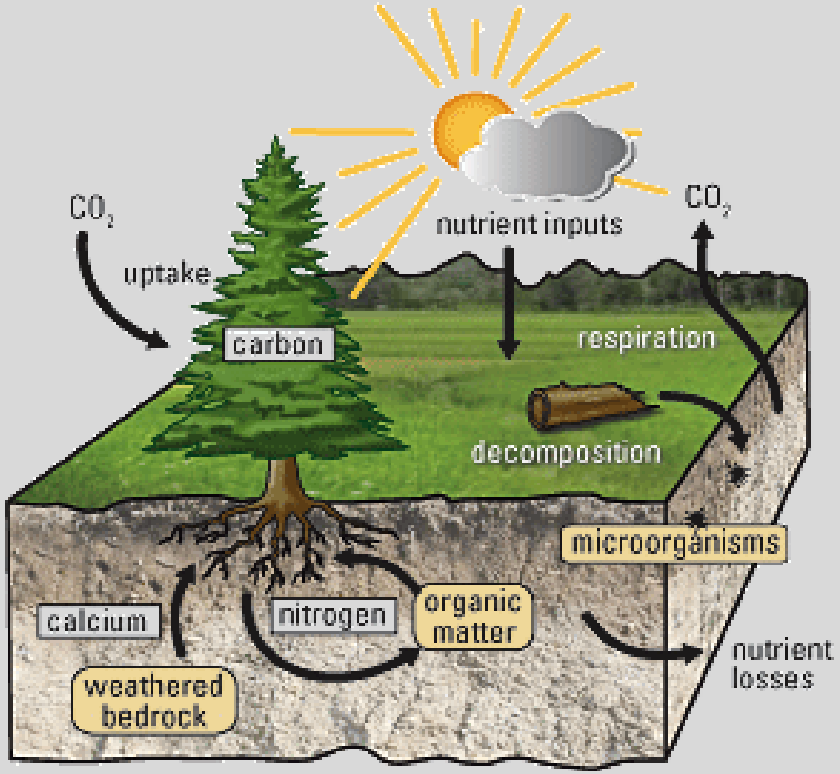


The cryosphere plays a role in mediating global and regional climate.

The polar cryosphere acts as an air conditioner for the Earth.


Snow
Sea ice
Ice shelves
Ice sheets
Glaciers and ice caps
Permafrost, continuous
Permafrost, discontinuous
Permafrost, isolated

Biosphere



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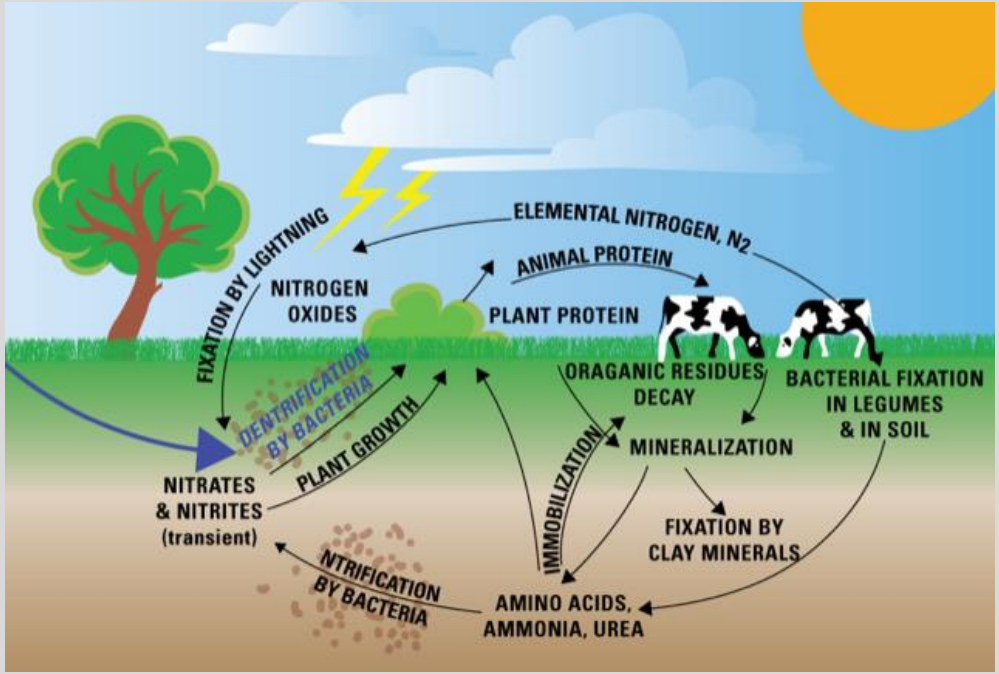


https://images.app.goo.gl/DMKRJ6q1G8J5jKzu8

Biodynamic Engine- Biogeochemical Cycles

What patterns did you notice?

What components of the Biodynamic Engine are these young people interacting?

Biogeochemical Cycles

Atmosphere

Lithosphere

Cryosphere

Hydrosphere

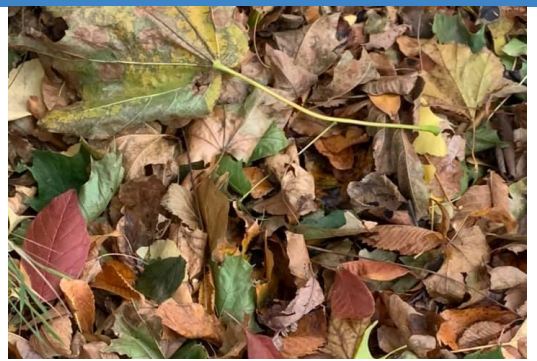
Biosphere

What components of the Biodynamic Engine are interacting here?

A

B

What components of the Biodynamic Engine are interacting here?



Animation 1

What components of the Biodynamic Engine are interacting here?

1 out of every three bites of food you eat is there because of pollinators.

Klein AM., Vaissiere B, Cane JH, Steffan-Dewenter I, Cunningham SA, Kremen C (2007) *Importance of crop pollinators in changing landscapes for world crops.* Proceedings of the Royal Society B: Biological Sciences 274: 303–313;

Buchmann S, Nabhan GP (1996) *The Forgotten Pollinators.* Island Press, New York.

What components of the Biodynamic Engine are interacting here?

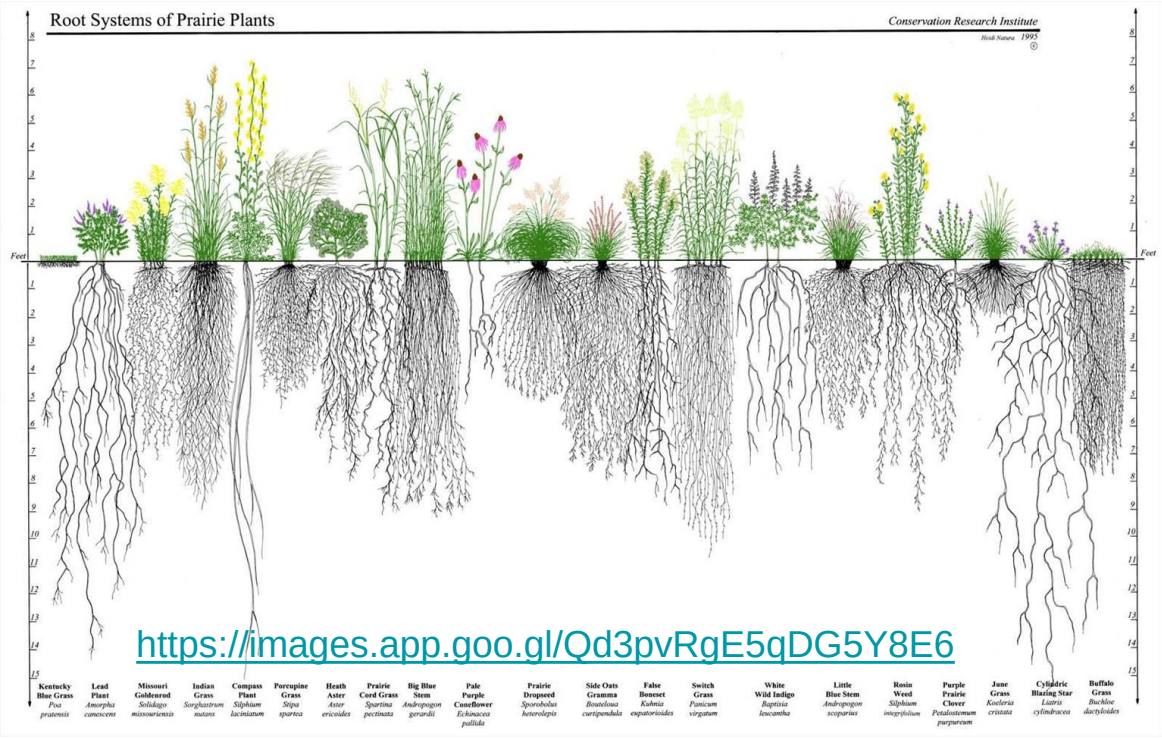
https://images.app.goo.gl/8rev9WYWMyDQBdXw8

Earth’s

Self- Sustaining Mechanisms

https://images.app.goo.gl/VyHoCDAKUqttLvrT7

Interrupting the Self-Sustaining Mechanisms



https://images.app.goo.gl/Qd3pvRgE5qDG5Y8E6

Biodynamic Engine

MAROONS

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