Locking Up Carbon

Numerous studies have found that atmospheric CO_2 has increased significantly, and is continuing to increase. The carbon cycle is being shifted out of balance, with plants, algae, and bacteria unable to absorb carbon as fast as it's being produced.

A recent study found a big increase in carbon sequestration (that is, drawing carbon out of the atmosphere) by land plants. Usually, large draw-downs are seen in big, old-growth forests, such as those in the Amazon or North America.

Design Pics/Chris Knorr

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Scientists found that this time, however, the carbon was being sequestered by arid and desert scrub plants–shrubs and grasses–in South Africa and Australia.

The problem with carbon sequestration by smaller, short-lived plants is that they don't sequester the carbon for very long. They have short life-spans, releasing the sequestered carbon back into the atmosphere within a couple of years.

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Get Started!

Scientists and engineers are continuing to look for ways to sequester carbon dioxide–to get it out of the atmosphere and into long-term storage.

A subset of these strategies are known as "geoengineering"–making large-scale changes to the oceans, lands, and biospheres in hopes of changing a global cycle.

Your goal for this project is to research and critique geoengineering strategies for sequestering carbon dioxide. Then, come up with your own design for a way to draw down and sequester carbon from the atmosphere.

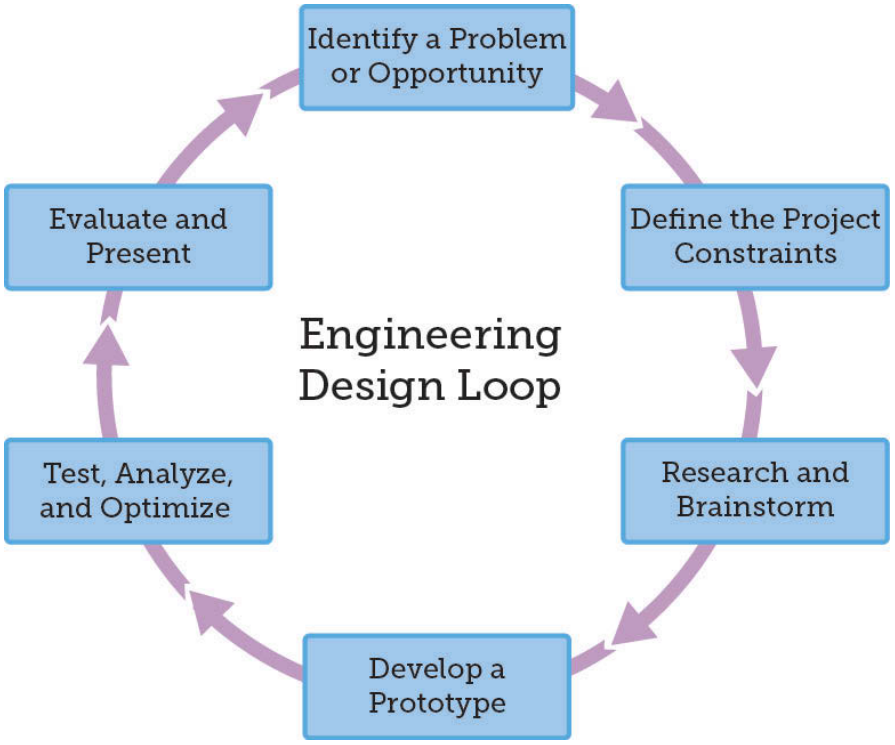
Get Started! continued

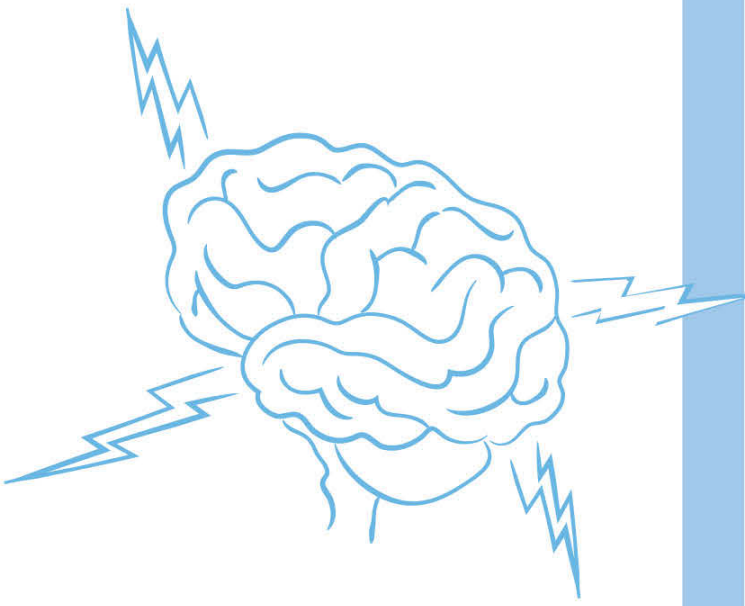
As you research various geoengineering proposals, keep the following questions in mind:

- Where is carbon naturally stored?
- Which carbon reservoirs are under-utilized?
- What technological solutions have been proposed?
- What geoengineering solutions have been proposed?
- What strengths do the proposed solutions have? What weaknesses?

Brainstorm Solutions!

As you research previous solutions and design your own, keep the engineering design process in mind:





Work Through It!

After completing your research, you should be well on your way to designing your own solution. Keep the following questions in mind:

- Have you adequately explored existing options?
- What are the constraints (financial, environmental, political, etc.) to your design?
- How could your design be implemented?
- What makes it preferable to other geoengineering solutions?

Finish Up!

Now that you have completed your research and designed your own solution, present your idea to the class. Be sure to include:

- How your solution draws down carbon
- Why your solution is better than previous designs
- The time and spatial scale over which your device will operate