# Geoengineering

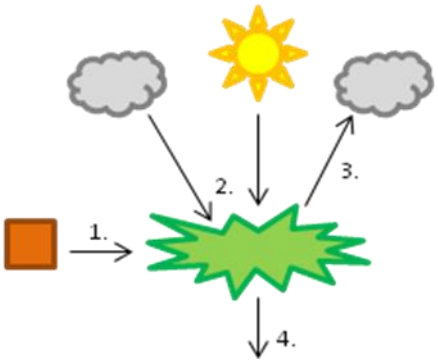
What is it?

- Sometimes referred to as climate engineering, geoengineering is an approach to mitigating climate change by intentionally intervening with the atmosphere to offset the impacts of rising GHGs.
- An alternative to reducing emissions caused by burning fossil fuels

Categories:

- *Carbon dioxide removal (CDR)* → Exactly what it sounds like: reversal of climate change by removing some $CO_2$ from the atmosphere, reducing $CO_2$ concentration
- *Solar radiation management (SRM)* → Reflect sunlight and alter Earth's albedo, cooling surface layer of the Earth (think mirrors in space)

## Iron Fertilization




1. Iron stimulates phytoplankton bloom
2. $CO_2$ and sunlight used for photosynthesis
3. $O_2$ released as product of photosynthesis
4. Organism dies, sequesters $CO_2$ on ocean floor

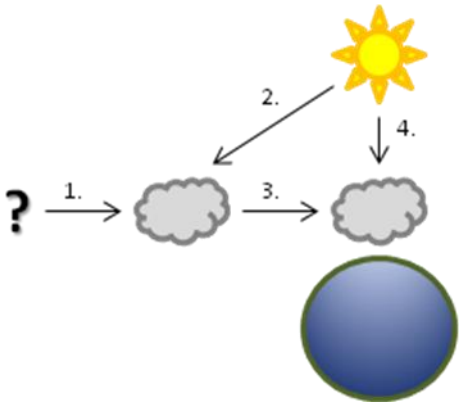
*Relevant Chemistry:*

$6CO_2 + 6H_2O + hv \rightarrow C_6H_{12}O_6 + 6O_2$
Reduction of $[CO_2]$

*Issues:*

- Efficacy of process still inconclusive, unknown whether $CO_2$ sequestion is permanent
- Unintended biogeochemical and ecological impacts, dispersed due to ocean circulation

## Stratospheric Sulfur Aerosols




1. $SO_2$ deposited in stratosphere by airplane (or volcano)
2. Sunlight and OH react with $SO_2$, forming $H_2SO_2$
3. $H_2SO_2$ condenses and forms aerosols
4. Aerosols block sunlight from reaching Earth's surface

*Relevant Chemistry:*

$SO_2 + OH + hv \rightarrow H_2SO_2$
$\Delta$ Albedo = Warmer stratus./cooler tropos.

*Issues:*

- Cannot run large-scale tests needed to determine environmental impacts, size of aerosols needed for desired effects
- Concerns regarding localized climate changes and disruption of agricultural output