

Finishing up Intro. to Geology

- Sustainability and geology, after this lecture will be over.
- ***Lab next week will be our comprehensive Final.***
 - Approx. 85% of the test questions will be from past tests, quizzes and labs. Minerals and rocks may appear, but there would be fewer than 10 samples and you may use your personal identification tables.
- I will be available after the Final on Dec. 10, If you need anything. We will not have class as scheduled after the final Wed. or Friday.

Lab tomorrow

- Volcano Debate Activity
- Physiographic Provenances (I will provide)
- Review – Q and A

THE QUEST FOR SUSTAINABILITY

C. E. Heinzl, University of Northern Iowa , Dept. of Earth and
Environmental Sciences

Sustainability and Geology

Noun

- 1. Sustainability** - the ability to be maintained at a certain rate or level "*the sustainability of economic growth*"
- 2. Sustainability** - avoidance of the depletion of natural resources in order to maintain an ecological balance. "*the pursuit of global environmental sustainability*"

Sustainable Development

Noun

Sustainable development - economic development that is conducted without depletion of natural resources. "*international policies should support sustainable development*"

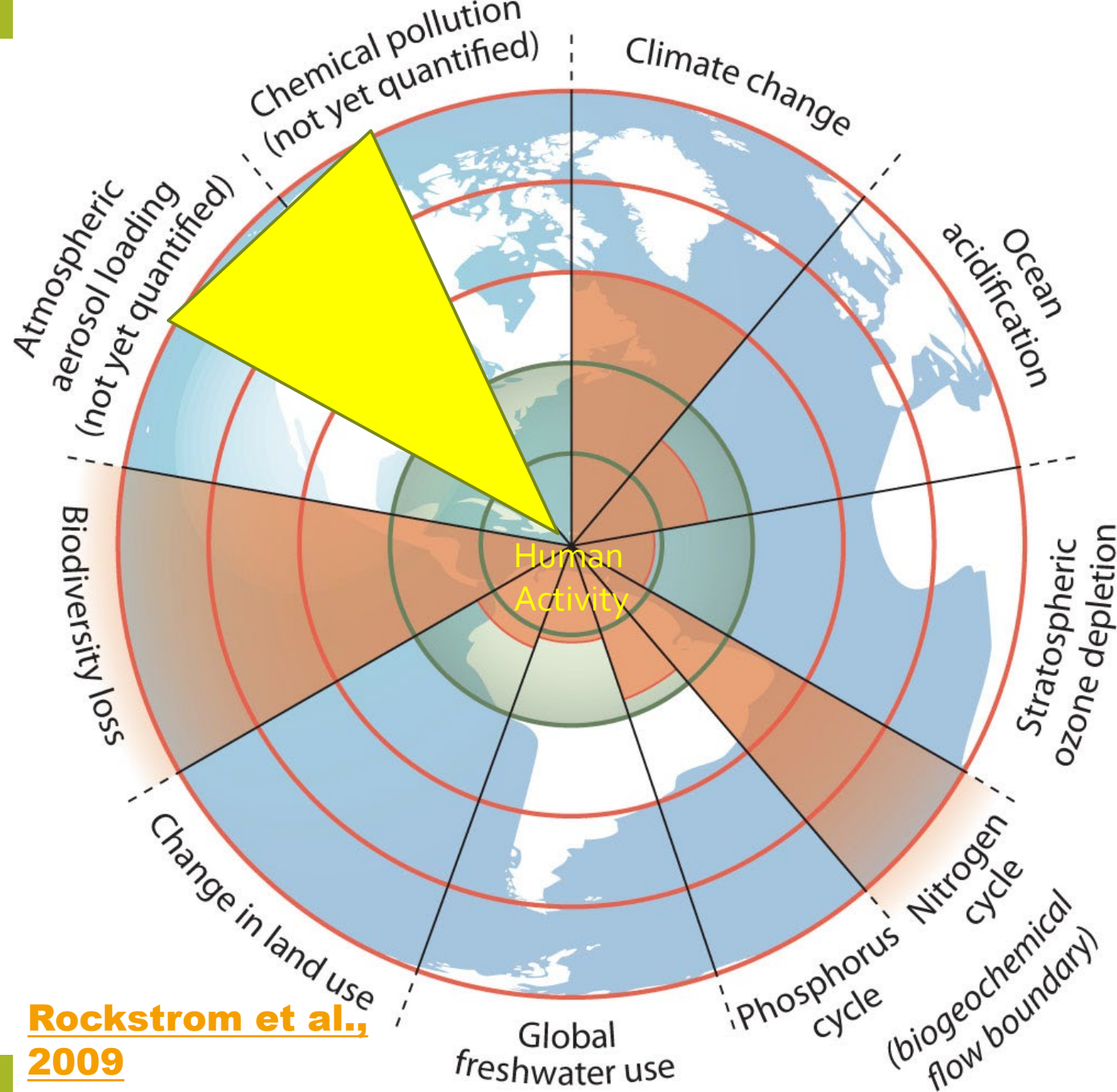
Complex human-environmental systems

- Natural resources
 - Minerals, rocks, soil, energy, water
- Uniformitarianism – The present is the key to the past
- Natural hazards
 - Climate Change, earthquakes, volcanoes, flooding, erosion, mass wasting
- BioGeoChemistry



Earth Systems Under Stress

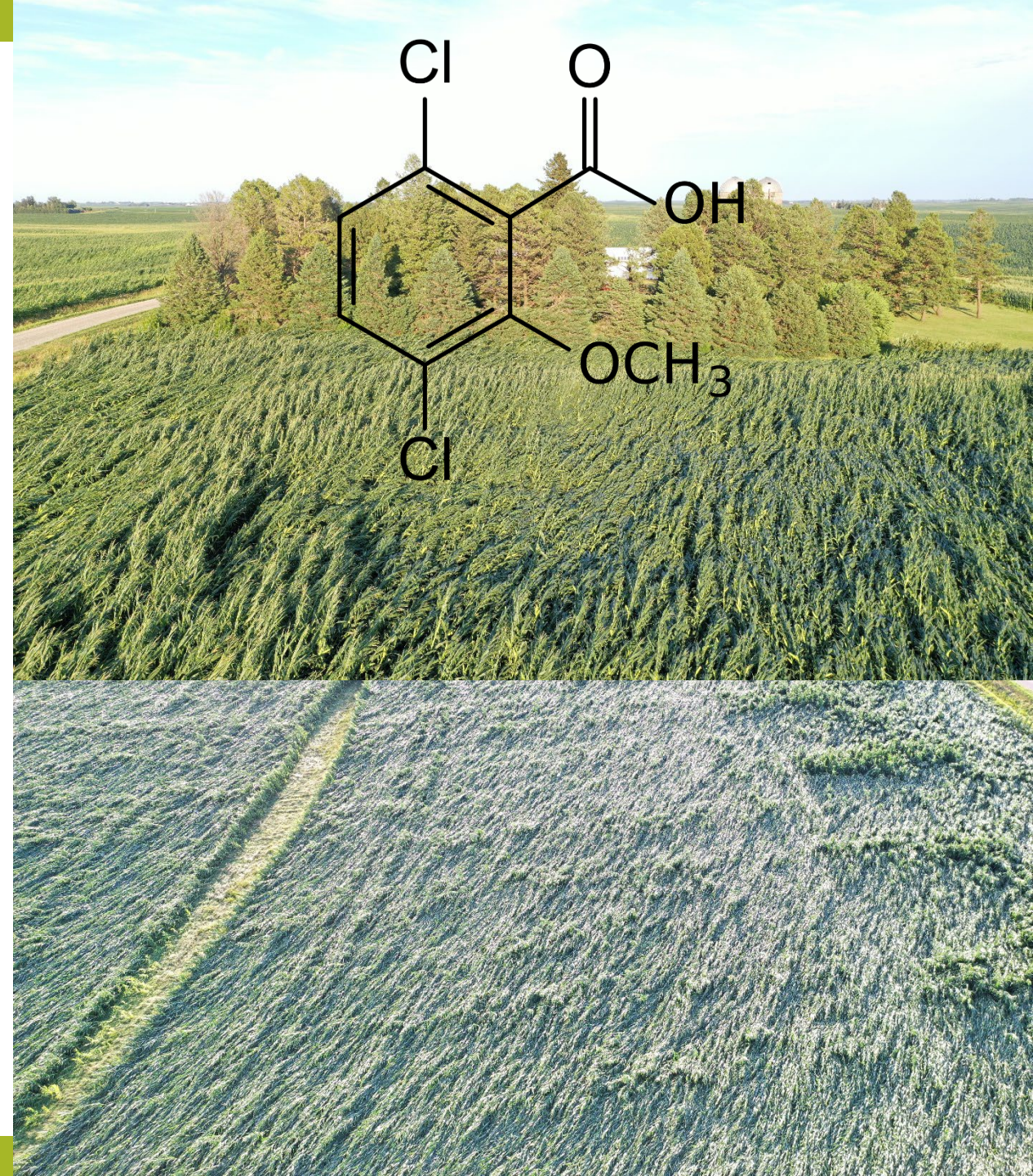
BioGeoChemistry



**Rockstrom et al.,
2009**

Iowa's Air and Water, 2020

- Quadruple D Summer
- Derecho
- Drought
- Dicamba 2020: What went wrong in Iowa?
 - Atmospheric Loading, Avg. daily wind speeds



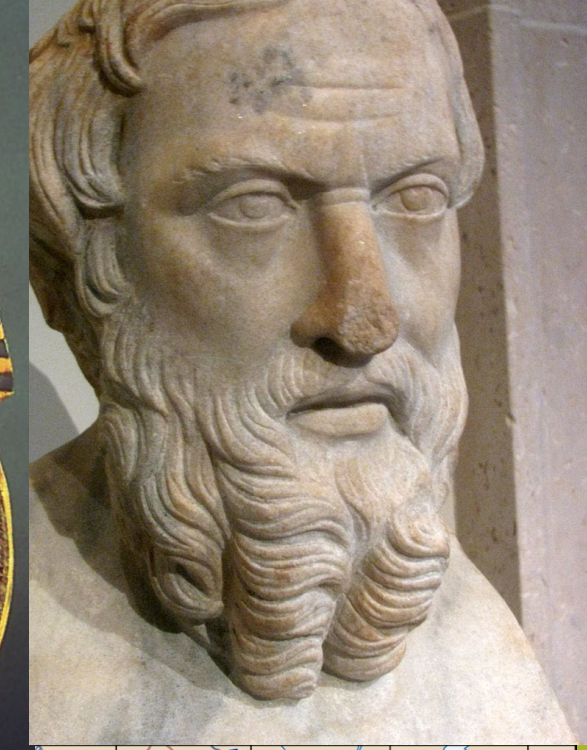
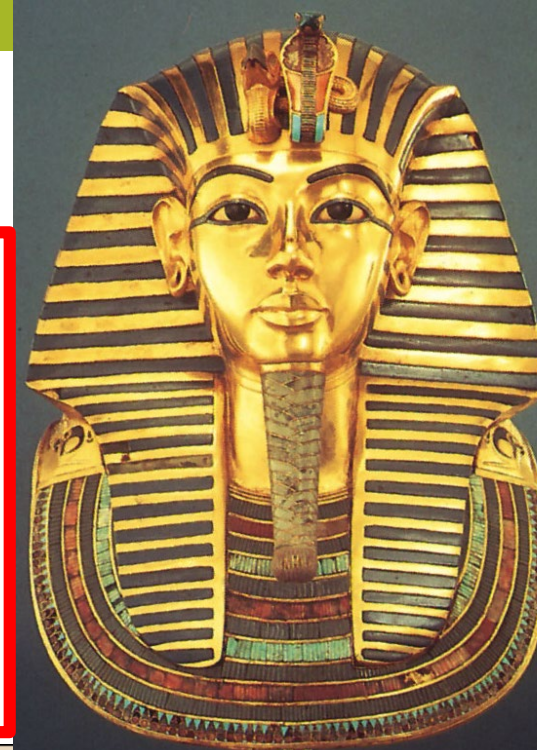
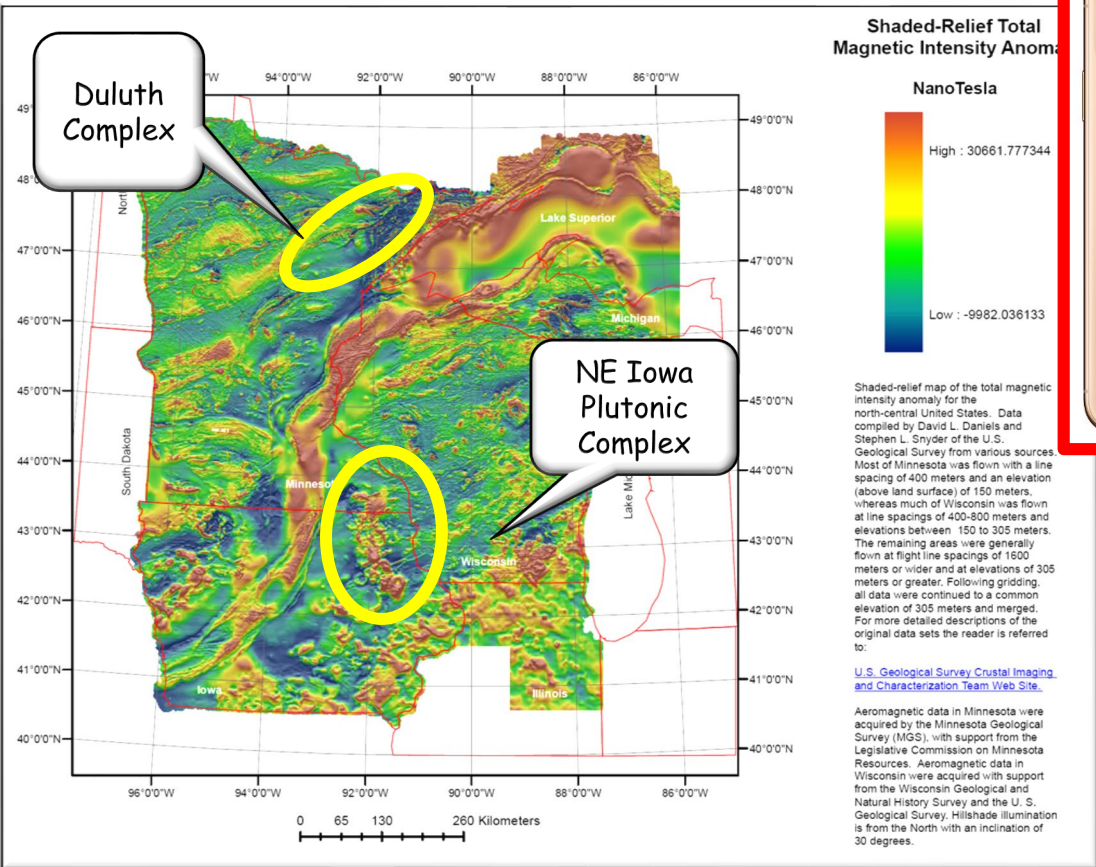
How do we get there?

1. You, The Individual's Role in a Civilization
2. Extreme ownership
3. Quality Education to meaningful/purposeful careers
4. Think Critically
5. Effective and open communication
6. Creativity, ingenuity and hard work
7. Social awareness
8. Connection to and understanding of our Environments
9. Health and security
10. Understand scale and time



Many
Hands
Make
Light
Work

Natural Resources and Civilizations



Environmental Work



 Black Hawk Soil and Water Conservation District



The Leader In
Environmental
Testing



United Nations

Oct. 24, 1945

San Francisco

50 Countries

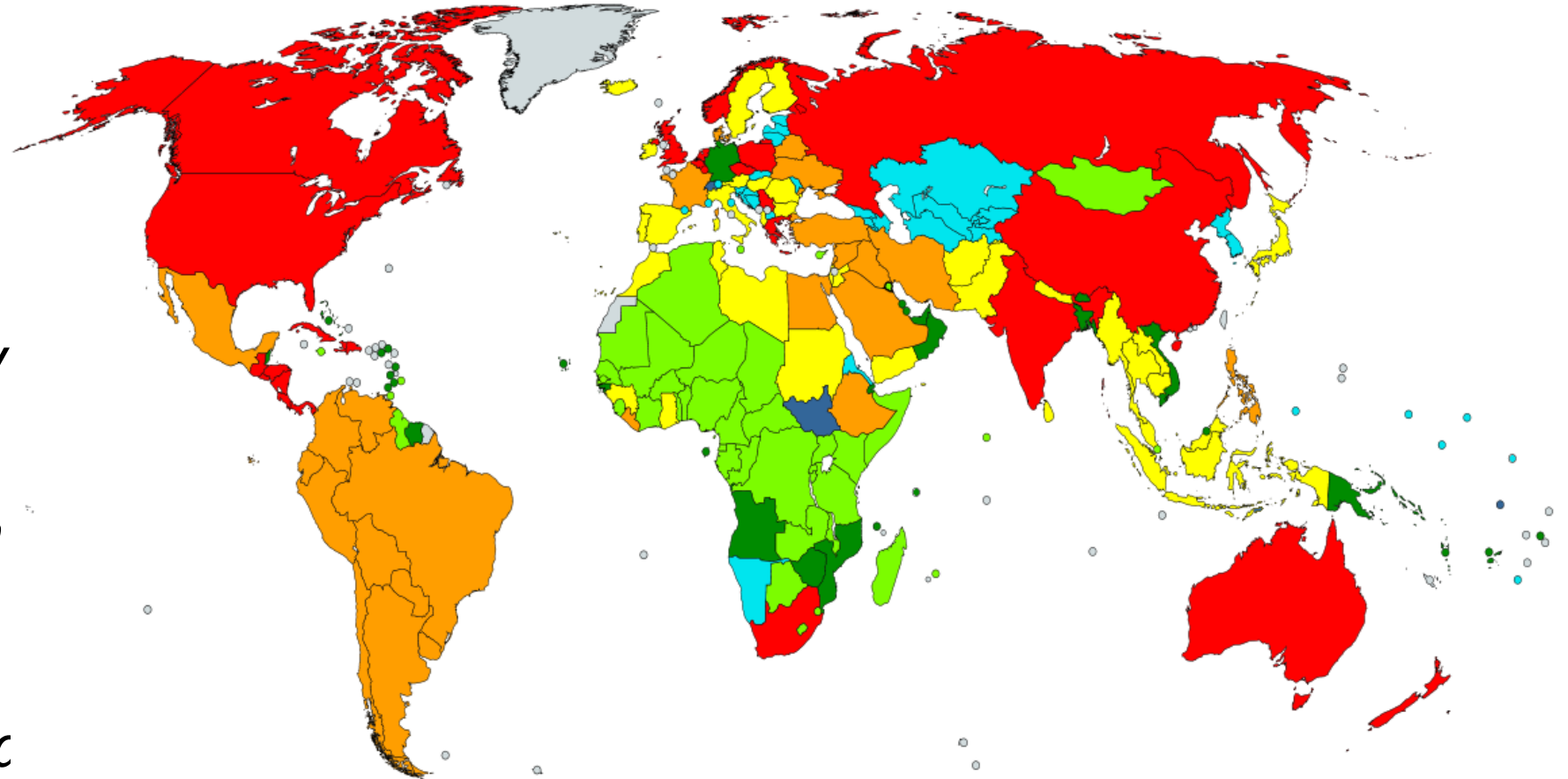
Peace, dignity, and equality on a healthy planet

USA withdraws from Human Rights Commission with North Korea, Iran and Eritrea



SUSTAINABLE DEVELOPMENT GOALS

17 GOALS TO TRANSFORM OUR WORLD



Members of the United Nations

Founding members (1945) and original signatories of the declaration of the United Nations (1942)

New members (1946-1959)

New members (1970-1989)

New members (2000-2014)

Other founding members (1945)

New members (1960-1969)

New members (1990-1999)

1 NO POVERTY



2 ZERO HUNGER



3 GOOD HEALTH AND WELL-BEING



4 QUALITY EDUCATION



5 GENDER EQUALITY



6 CLEAN WATER AND SANITATION



7 AFFORDABLE AND CLEAN ENERGY



8 DECENT WORK AND ECONOMIC GROWTH



9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



10 REDUCED INEQUALITIES



11 SUSTAINABLE CITIES AND COMMUNITIES



12 RESPONSIBLE CONSUMPTION AND PRODUCTION



13 CLIMATE ACTION



14 LIFE BELOW WATER



15 LIFE ON LAND



16 PEACE, JUSTICE AND STRONG INSTITUTIONS



17 PARTNERSHIPS FOR THE GOALS




**SUSTAINABLE
DEVELOPMENT
GOALS**



Group Definitions			Geological Sciences										Notes
Earth Materials, Processes & Management	Understanding of 'Earth Materials, Processes & Management' is important to one or more targets/means of implementation relating to the given SDG.	Colour	Earth Materials, Processes & Management							Skills & Practice			
Skills & Practice	Sharing of and/or changes to geological 'Skills and Practice' is important to one or more targets/means of implementation relating to the given SDG.	Grey	Agrogeology	Climate Change	Energy	Engineering Geology	Geohazards	Geoheritage & Geotourism	Hydrogeology & Contaminant Geology	Minerals & Rock Materials	Education*	Capacity Building*	
Sustainable Development Goals (SDGs)	1	No Poverty	End poverty in all its forms everywhere.										
	2	No Hunger	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.										
	3	Good Health	Ensure healthy lives and promote well-being for all at all ages.										
	4	Quality Education	Ensure inclusive and equitable quality education and promote life-long learning opportunities for all.										
	5	Gender Equality	Achieve gender equality and empower all women and girls.										[a]
	6	Clean Water & Sanitation	Ensure availability and sustainable management of water and sanitation for all.										
	7	Clean Energy	Ensure access to affordable, reliable, sustainable, and modern energy for all.										
	8	Good Jobs & Economic Growth	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.										
	9	Innovation & Infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.										[b]
	10	Reduced Inequalities	Reduce inequality within and among countries.										[c]
	11	Sustainable Cities & Communities	Make cities and human settlements inclusive, safe, resilient and sustainable.										
	12	Responsible Consumption	Ensure sustainable consumption and production patterns.										[d]
	13	Protect the Planet	Take urgent action to combat climate change and its impacts.										
	14	Life Below Water	Conserve and sustainably use the oceans, seas and marine resources for sustainable development.										[e]
	15	Life on Land	Protect, restore and promote sustainable use of terrestrial ecosystems...*										
	16	Peace & Justice	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.										[f]
	17	Partnerships for the Goals	Strengthen the means of implementation and revitalize the global partnership for sustainable development.										

Abbreviated SDG titles from Global Goals (2015). Full SDGs from United Nations (2015a).

* (Abbreviated) Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

* Education and Capacity Building are important to some degree within every goal.

Miscellaneous

[a] Promoting equality of opportunities to all (including access to geoscience education). Eliminating all forms of violence and discrimination against women and girls in public and private spheres.

[b] Supporting research and development.

[c] Promoting equality of opportunity, and ending discrimination.

[d] Shared responsibility to improve sustainable practice, particularly in the private sector.

[e] Increased international cooperation on marine protection and research.

[f] Transparency of payments and contracts, helping to fight corruption.



Margaret Mead

"Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it's the only thing that ever has."

Informed Citizens

Science

Education

Government

Religion

Business

Health



Individuals can't solve the climate crisis, alone; Governments need to step up!

Anders Levermann

People do have a responsibility – to stay informed and demand the politicians make the planet their priority



Jared Diamond – *Collapse*

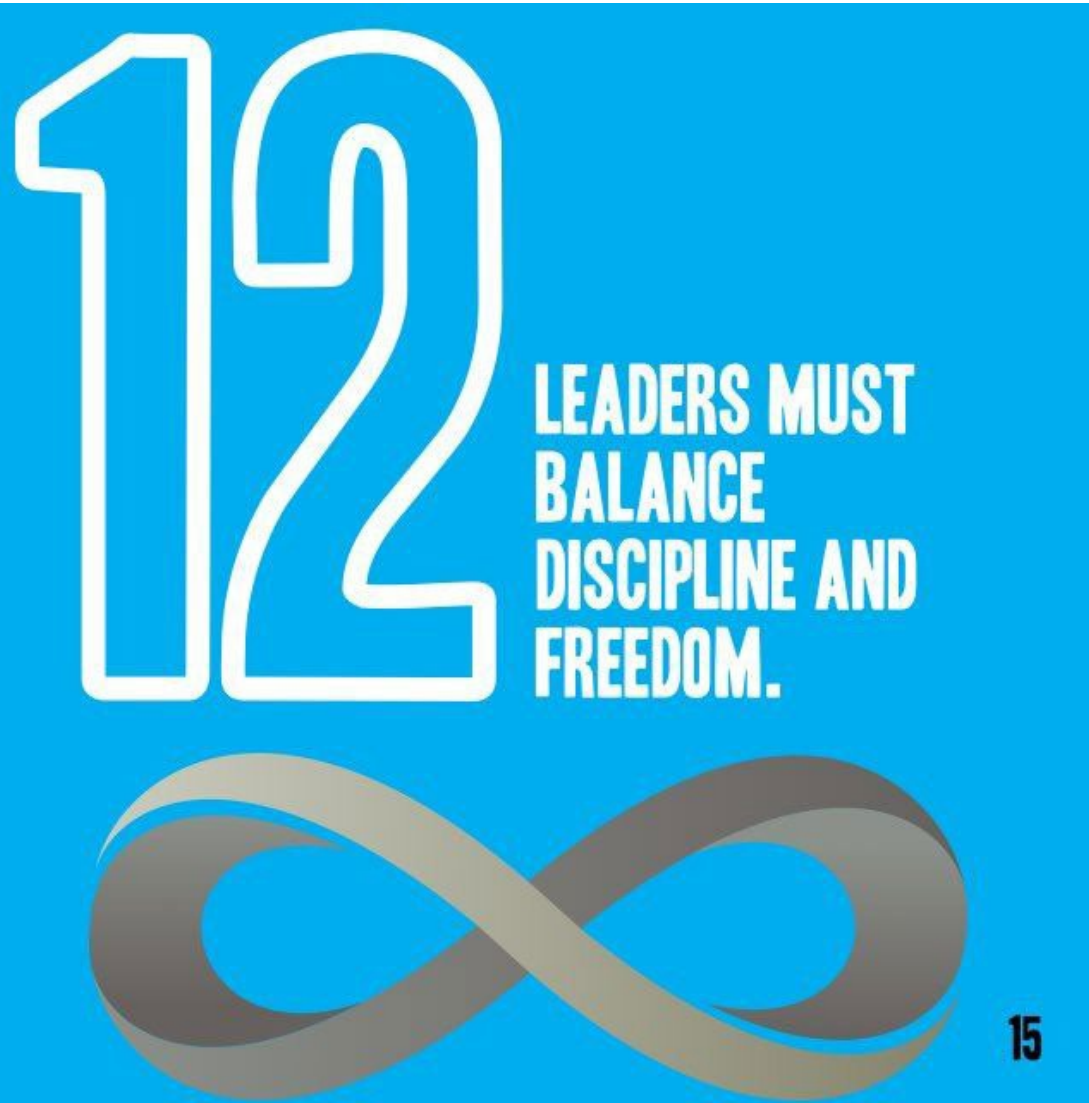
1. Environmental destruction
 - Inadvertently destroying the resource base your society depends on...
2. Climate change (warming or cooling)
3. Hostile neighbors (War- someone wants your resources and is willing to fight for them)
4. Once friendly neighbors choose not to support you
5. Political, social, culture factors

Collapse cont. - Societal reactions

1. Failure to perceive the problem
2. Recognize the problem but choose to do nothing about it
2020 version recognize the problem, work to mislead the public for short term economic gain
3. Recognize the problem work effectively together, but it is not enough

Stage of Denial	Coronavirus	Climate Change
<p>Stage 1 It's not happening</p>	<p>"The Democrats are politicizing the coronavirus ... This is their new hoax" - [REDACTED]</p>	<p>"It's a hoax; I think the scientists are having a lot of fun." - [REDACTED]</p>
<p>Stage 2 It's not our fault</p>	<p>"China is to blame because the culture where people eat bats and snakes and dogs and things like that, these viruses are transmitted from the animal to the people" - Sen. [REDACTED]</p>	<p>"China does not do anything to help climate change. They burn everything you could burn; they couldn't care less" - [REDACTED]</p>
<p>Stage 3 It's not that bad</p>	<p>"One day like a miracle it will disappear" - [REDACTED]</p>	<p>"[The climate] will change back." - [REDACTED]</p>
<p>Stage 4 Solutions are too costly</p>	<p>"We cannot let the cure be worse than the problem itself." - [REDACTED]</p>	<p>"I think the climate change is just a very, very expensive form of tax." - [REDACTED]</p>
<p>Stage 5 It's too late</p>	<p>"It is going to spread further and I must level with you ... many more families are going to lose loved ones before their time" - [REDACTED]</p>	<p>"The climate apocalypse is coming. To prepare for it, we need to admit that we can't prevent it." - Author [REDACTED]</p>

Extreme ownership/Leadership



Quality Education/ Lifelong learning



- A. General Education Prep
- B. Never stop learning
- C. Be adaptive and flexible
- D. Use digital technologies as a tool not a crutch

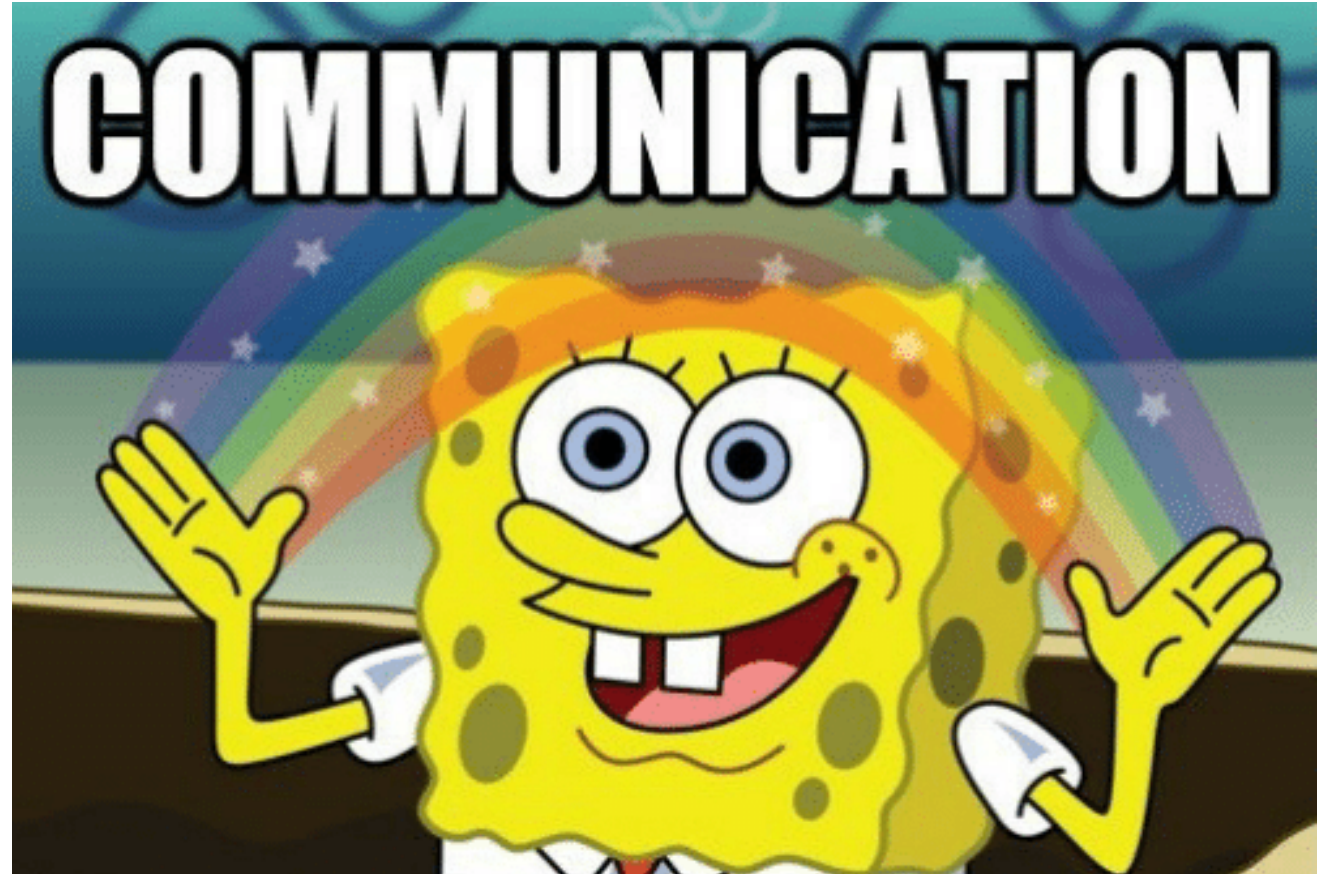


Intro. to Environmental Earth Science



Effective & open communication

- Reading, writing, speaking (personally and digitally)
- Qualitative and Quantitative
- KNOW YOUR AUDIENCE
- Be able and willing to peacefully interact with people that have different backgrounds, beliefs, ideals...



Think & Act Critically

- Know where and how to access reliable information



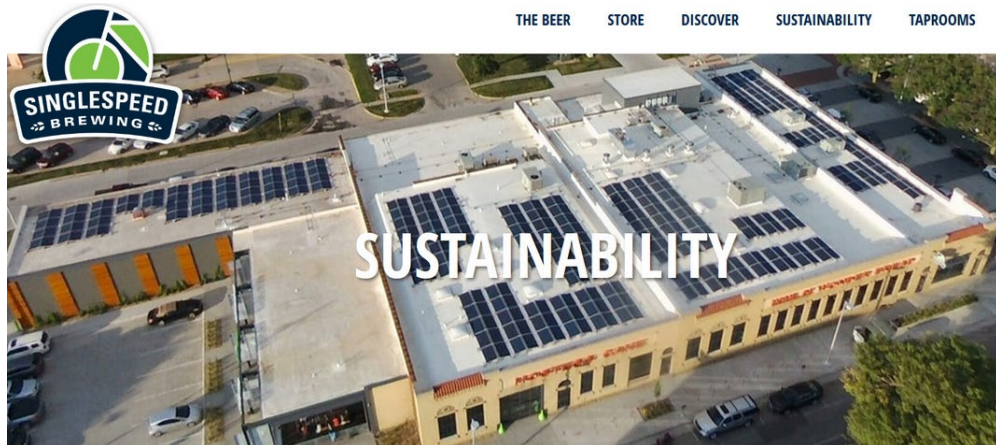
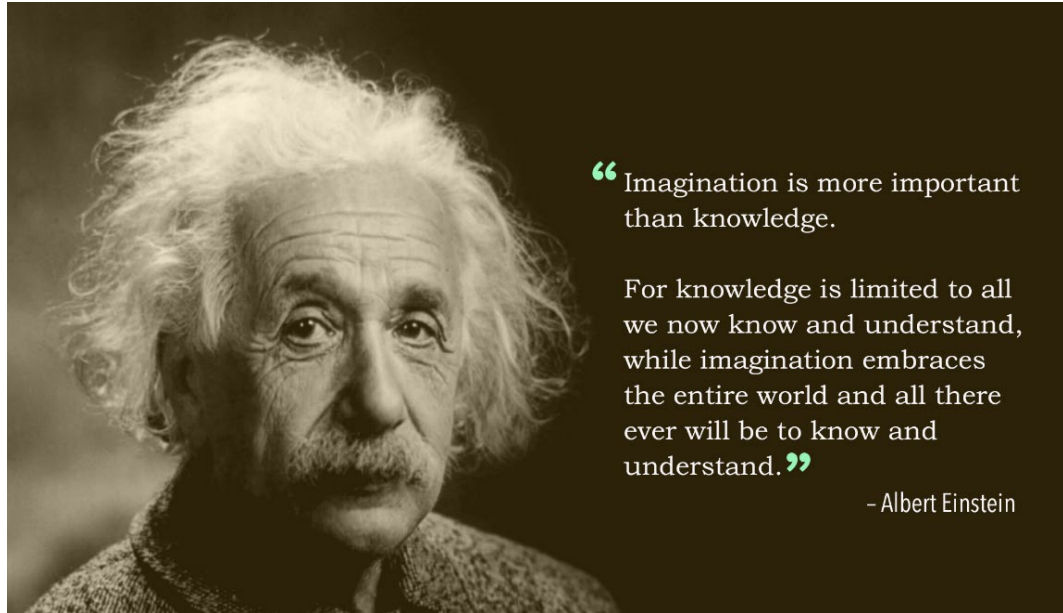
- Ability to distinguish knowledge from opinion
 - 2019 - Only 14% of American were able to do this!

- Be comfortable incorporating new information into your past and current life experiences to make informed decisions



Think for yourself, Question authority
Tool, Third Eye

Creativity, ingenuity & hard work



Rachel Beck



Social awareness – Courage & Empathy

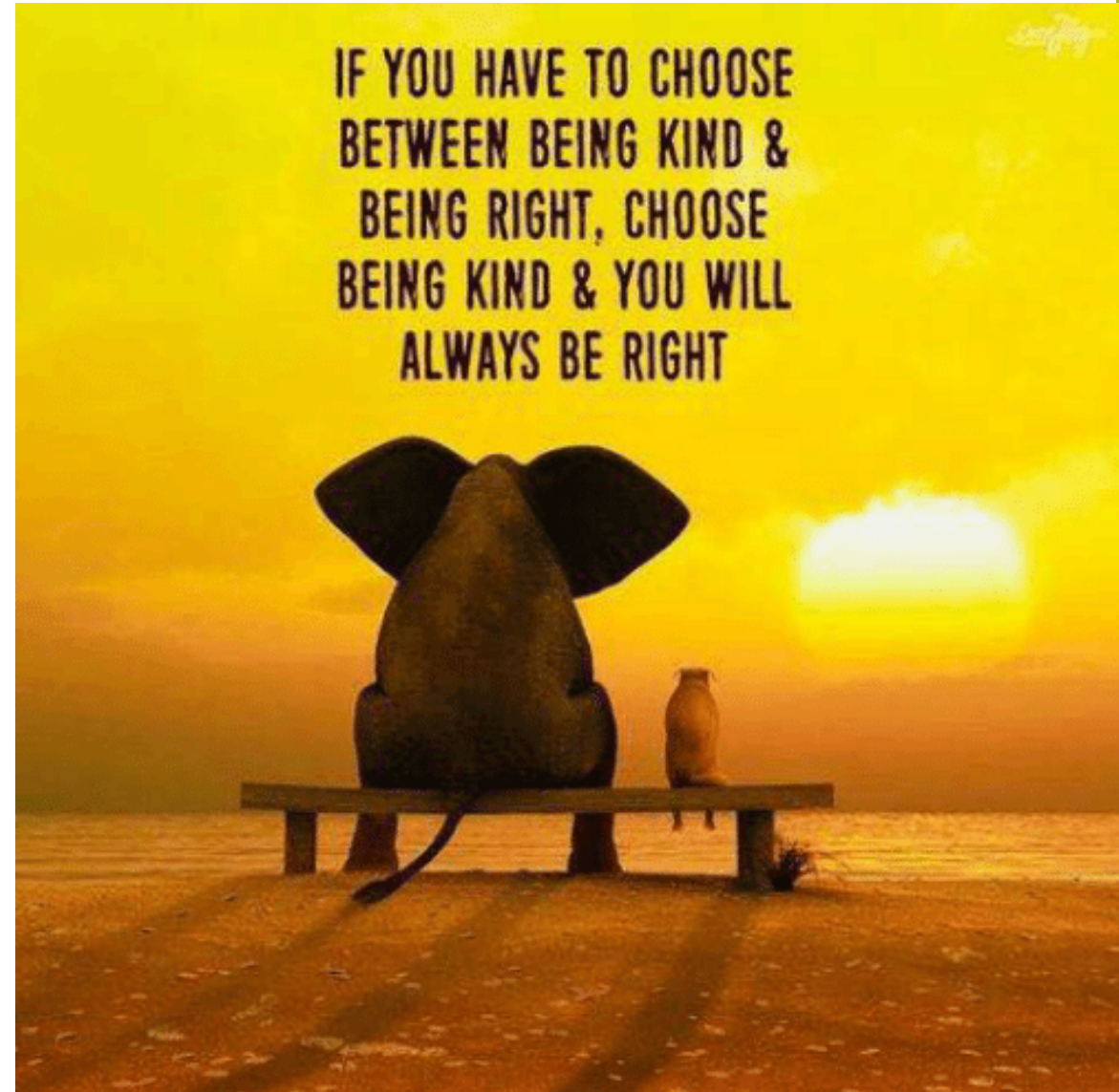
Are we working together,
looking out for one another?

NO – Can we be better - YES

Is *Social Media* the answer OR
the problem?

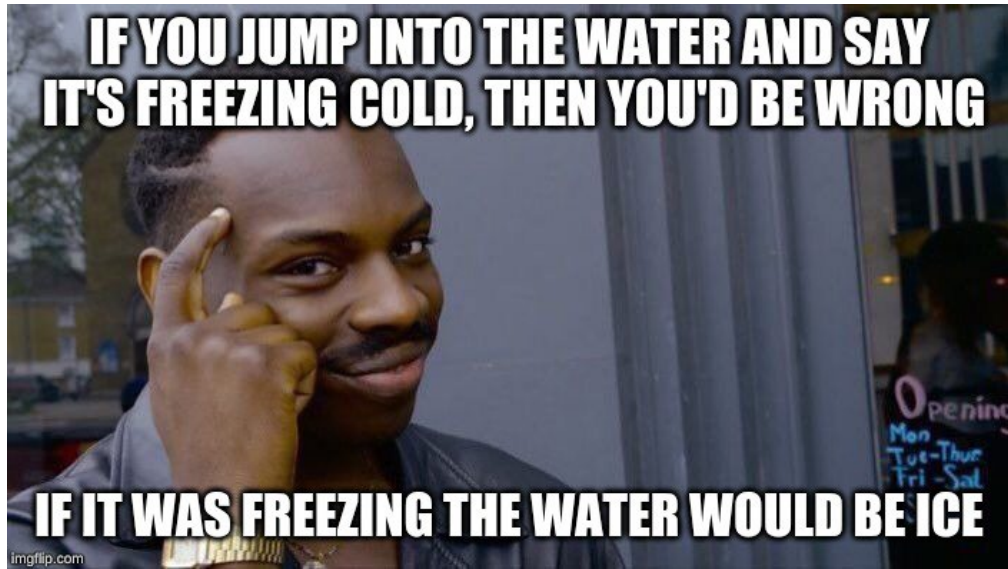
What do you truly like Vs. What
are you marketed to like

<https://www.theatlantic.com/magazine/archive/2020/03/climate-change-peer-pressure/605515/>



Connection to & understanding of our Environments

Science



Nature deficient Order/No child left inside

Outdoor recreation

Sense & connection to place



Health & security

Poverty

Hunger/Food security

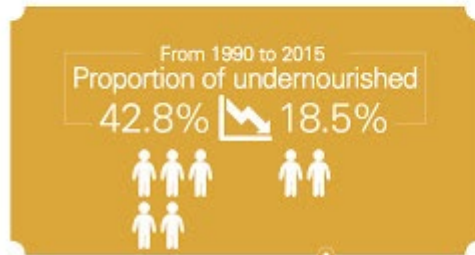
Equality

Wellness

3 GOOD HEALTH AND WELL-BEING



2 ZERO HUNGER

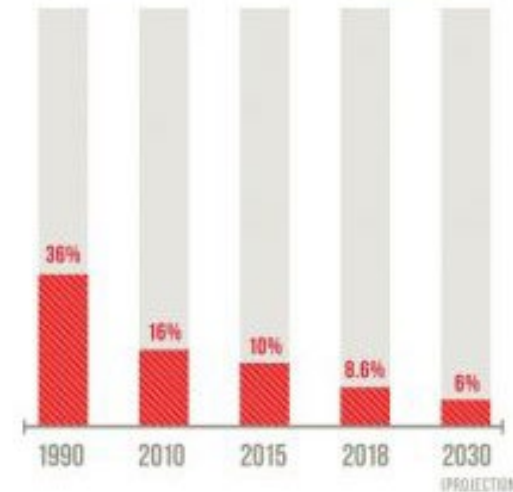


Source: Lao PDR Country Analysis Report 2015, Lao Social Indicator Survey 2016/17

1 NO POVERTY

END POVERTY IN ALL ITS FORMS EVERYWHERE

THE WORLD IS NOT ON TRACK TO END POVERTY BY 2030



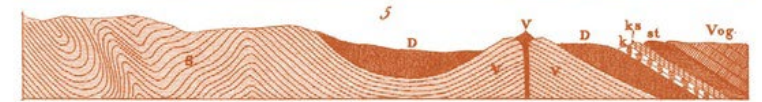
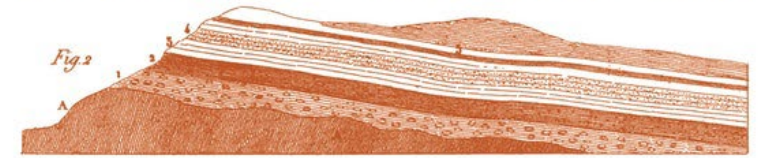
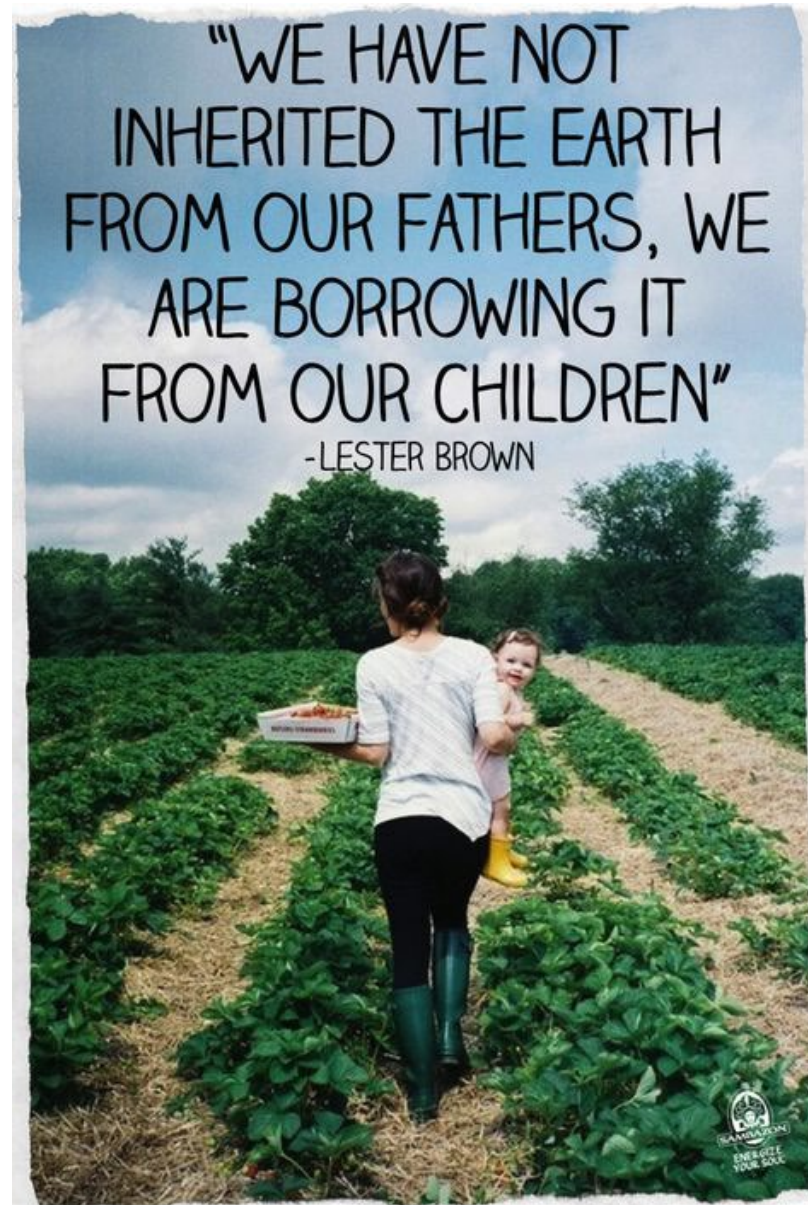
55% OF THE WORLD'S POPULATION HAVE NO ACCESS TO SOCIAL PROTECTION

736 MILLION PEOPLE LIVED IN EXTREME POVERTY IN 2015, 413 MILLION IN SUB-SAHARAN AFRICA



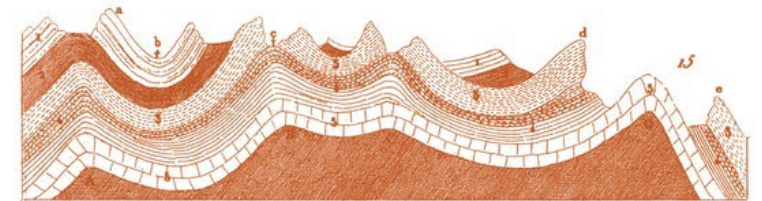
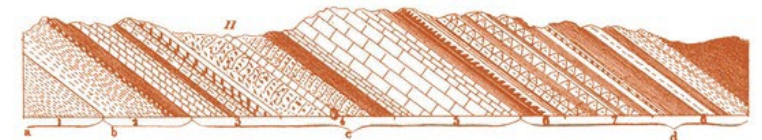
MORE THAN 90% OF DEATHS DUE TO DISASTERS OCCUR IN LOW- AND MIDDLE-INCOME COUNTRIES

Scale & time



TIMEFULNESS

HOW THINKING LIKE A GEOLOGIST
CAN HELP SAVE THE WORLD



MARCIA BJORNERUD

Jared Diamond – *Collapse*

1. Environmental mismanagement
- Inadvertent, *Connection to and understanding of our Environments*
- Intentional, *because your society depends on...*
2. Climate change (warming or cooling)
3. Hostile neighbors
willing to fight *Effective and open communication*
if someone wants your resources and is
4. Once friendly neighbors
Creativity, ingenuity and hard work : you
Social awareness
5. Political, social, culture factors



#SustainableUNI

CERTIFICATE *in*
SUSTAINABILITY
University of Northern Iowa

- Are we perfect? No, but we are able and working toward the Quest 😊
- Get involved
- Work small , Think big
- Sustainability Certificate
- IGEIN Sustainability webpage



Moving Forward

- Work to stay positive
 - Resist anxiety & apathy
- Be active
- Start local move global
- Acknowledge and celebrate gender and cultural differences
- Never stop learning and communicating



Winter 2024

1. Take a week off – You have earned it
2. Develop a new skill that complements your developing career OR might lead you to a different career – Be creative
3. Plan – Work the plan – Divide & Conquer
4. Start a sustainable business
5. Grow or build something
6. Be creative
7. Write and mail letters
8. Try to have fun



Thanks for taking my course!

I hope you learned a lot!

If there is anything I can help you with please let me know 😊