



THE OHIO STATE UNIVERSITY

BYRD POLAR AND CLIMATE RESEARCH CENTER

STATE CLIMATE OFFICE OF OHIO

We All Have a Role to Play in Climate Change Education

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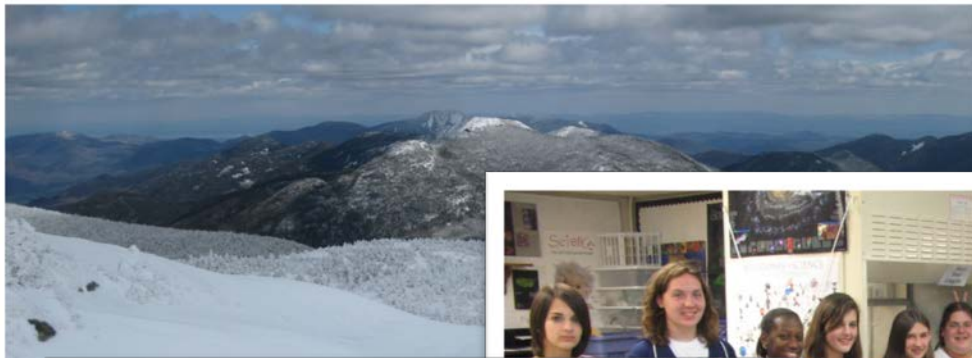
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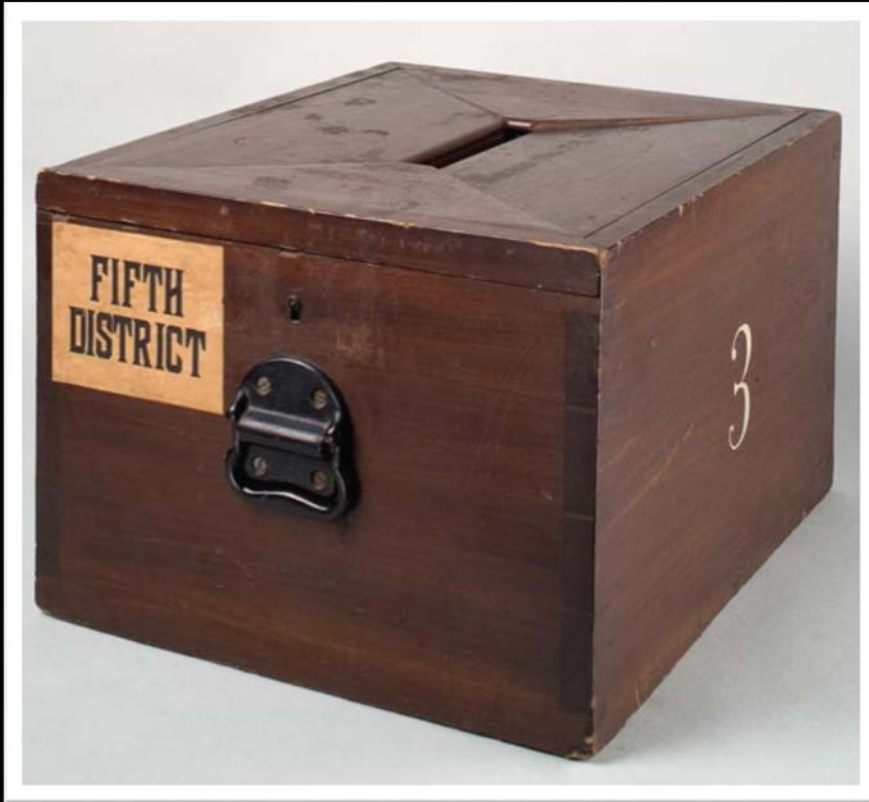


Jason Cervenec





Information for the Ballot Box and Cash Box



National Museum of American History



National Museum of American History

What role will you play in climate change education?



Toledo Symphony



Overview

Scientific Understanding

What are the greenhouse effect, climate change, and scientific consensus?

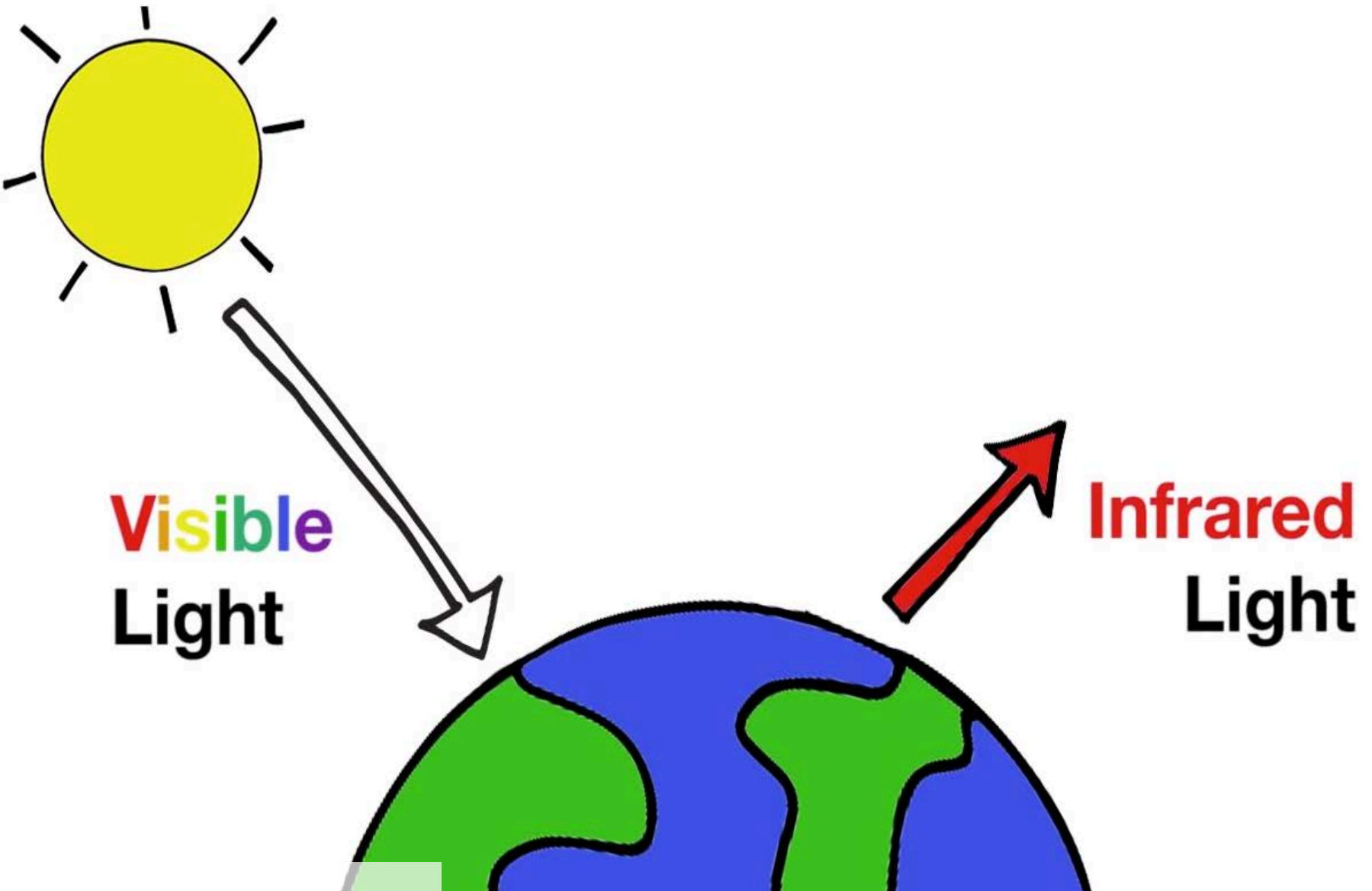
Climate Change Impacts

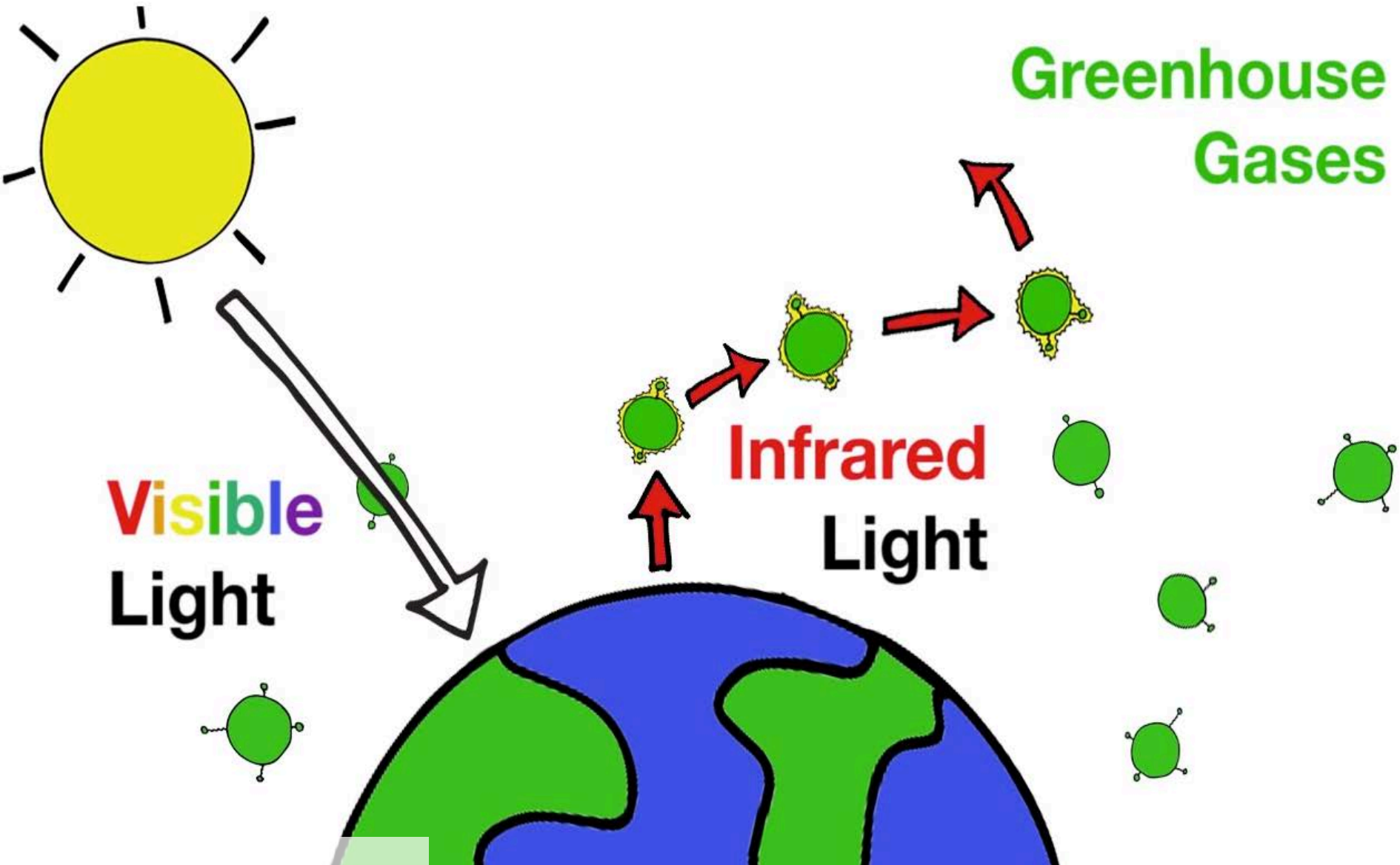
What changes and impacts will we see in Ohio and around the world?

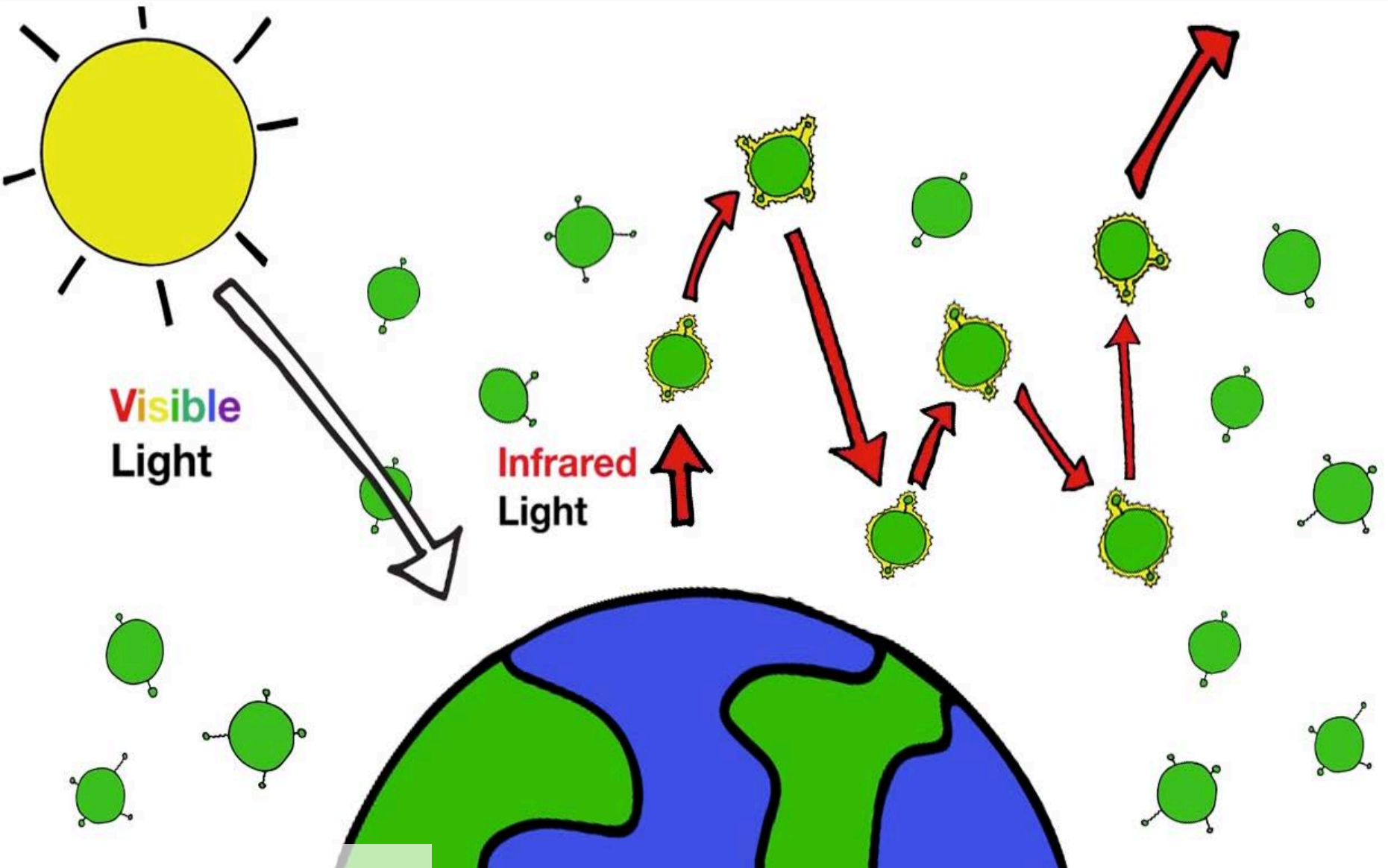
Climate Change Education

What are some of the diverse, and sometimes nonintuitive, roles that you can play in climate change education?

Question and Answer









Joseph Fourier

French, 1768-1830, Greenhouse Effect

John Tyndall

English, 1820-1893, greenhouse gases

Svante Arrhenius

Swedish, 1859-1927, calculated warming of
2x carbon dioxide concentration

Guy Callendar

English, 1898-1964, temperature anomaly
linked to combustion

Charles Keeling

American, 1928-2005, measured carbon
dioxide concentrations



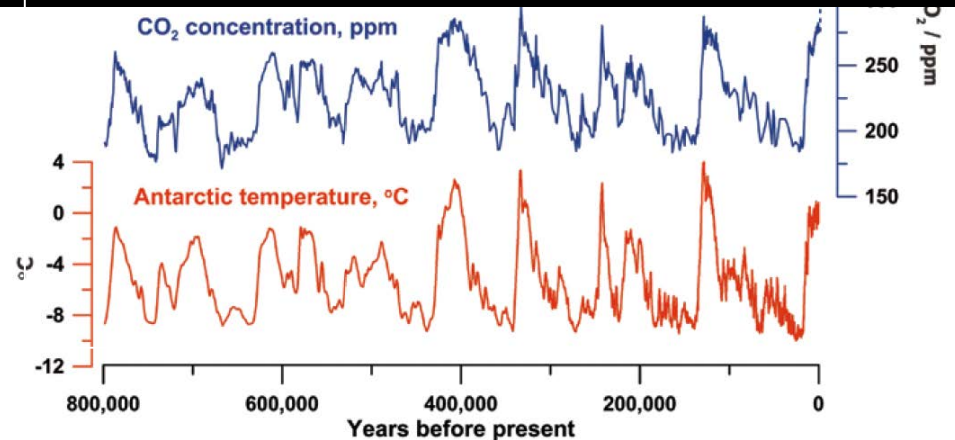
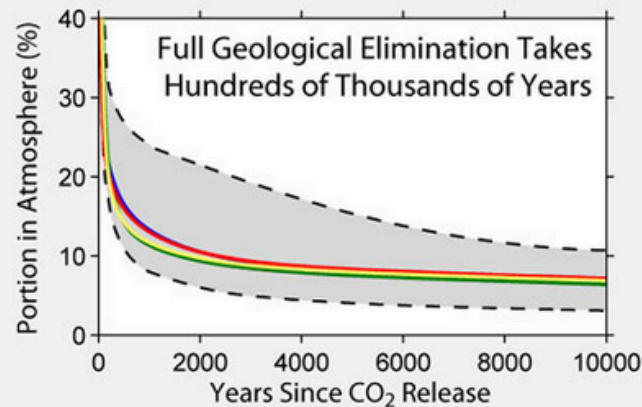
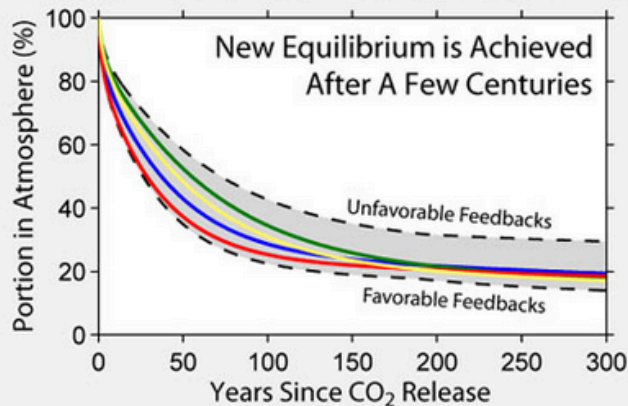
Photographs retrieved from Wikipedia, 2016





Carbon Dioxide in the Atmosphere

Carbon Dioxide Residence Time

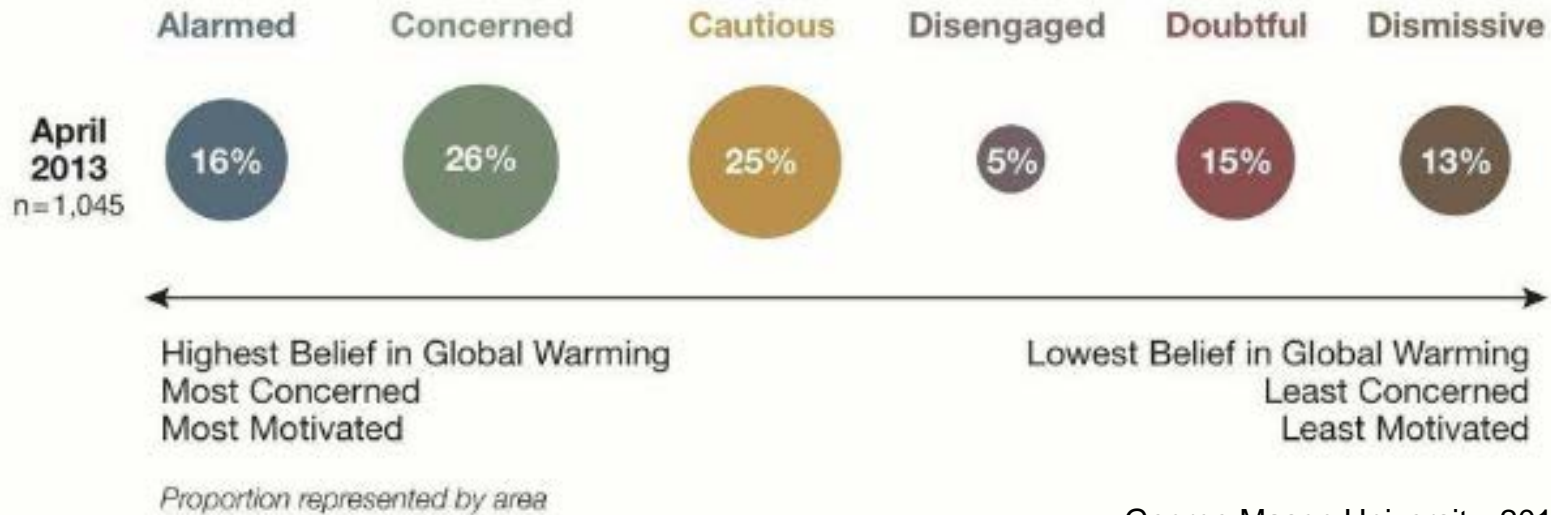




Over 97% of actively publishing climate scientists
think humans are changing global
temperature



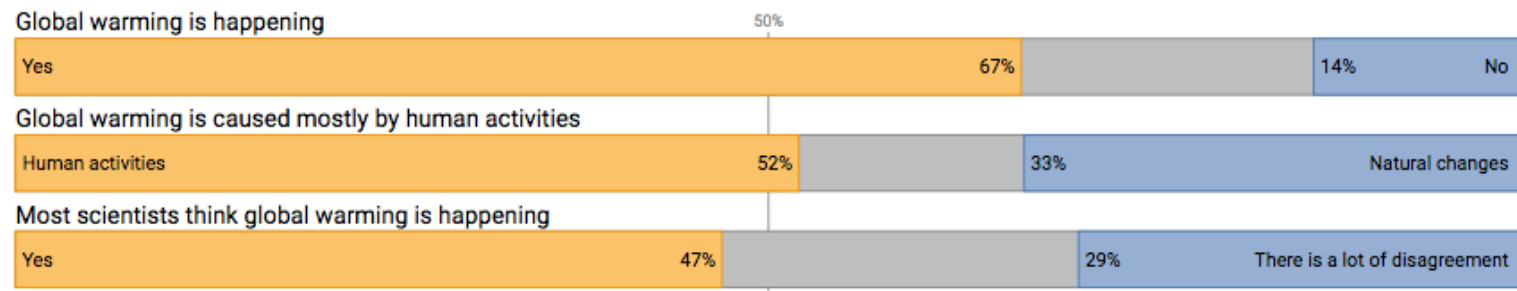
Doran et al 2009, Anderegg et al 2010



George Mason University, 2014

Public Opinion Estimates, Ohio, 2016

BELIEFS





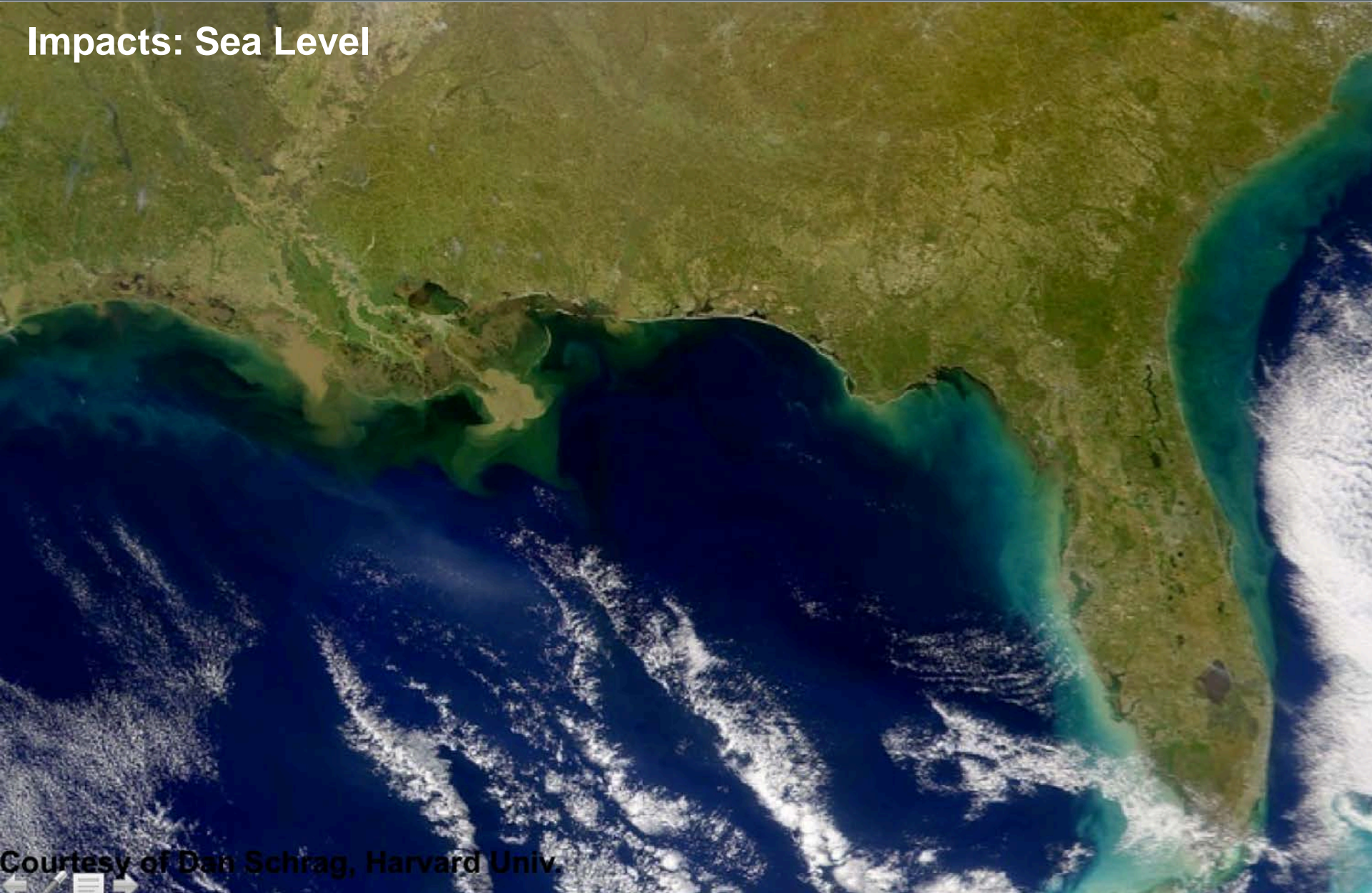
Impacts: Glaciers & Ice Sheets



Lonnie Thompson

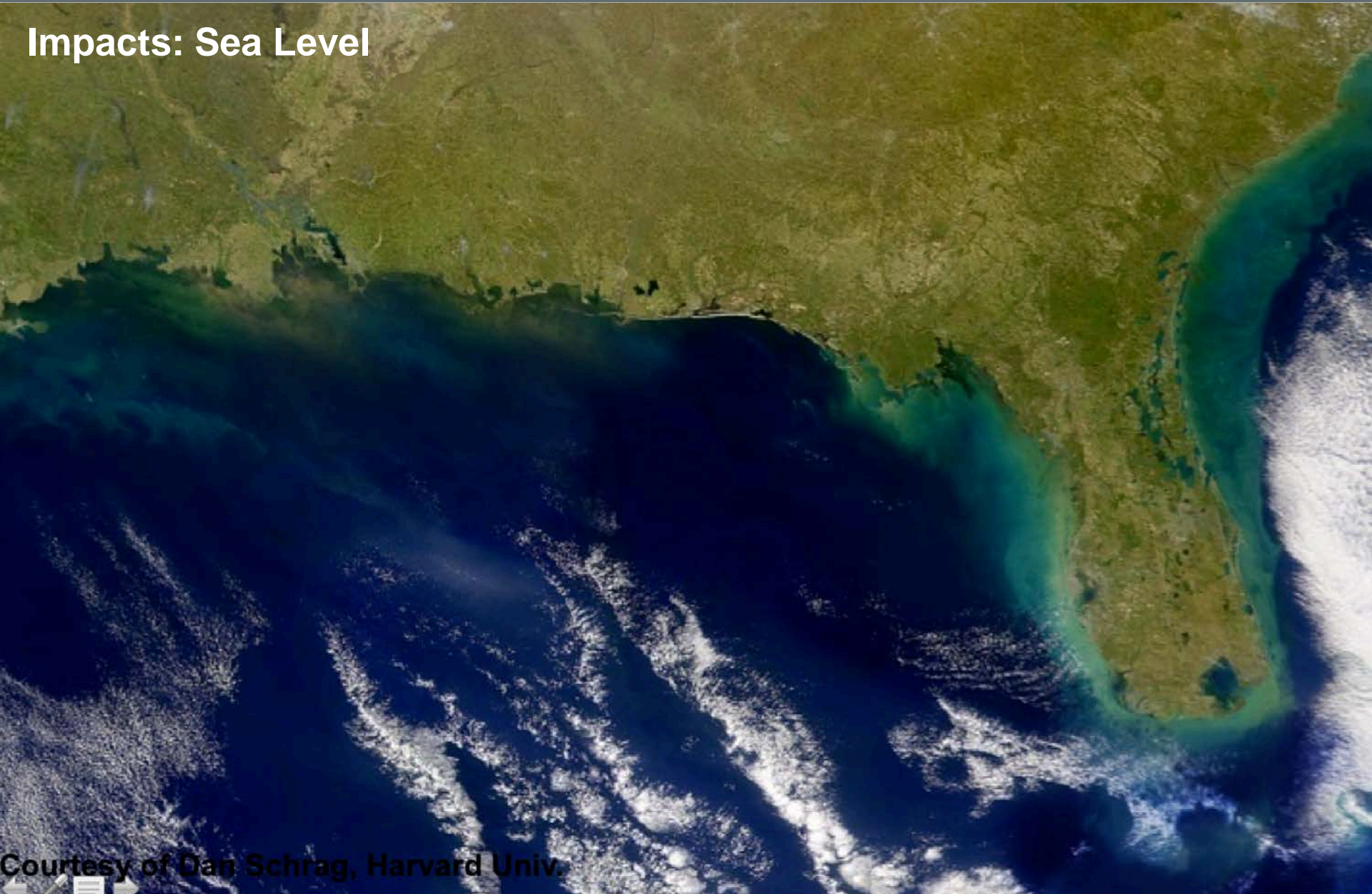


Impacts: Sea Level





Impacts: Sea Level



Courtesy of Dan Schrag, Harvard Univ.



Impacts: Temperature





(2004-2013)



SUMMER IN THE CITY: HOT AND GETTING HOTTER

<http://www.climatecentral.org/news/urban-heat-islands-threaten-us-health-17919>

CLIMATE CENTRAL

2014

SUMMER IN THE CITY

CLIMATE CENTRAL

SUMMER HEAT IN

Columbus

UP TO

24.0° HOTTER IN THE CITY
THAN IN NEARBY
RURAL AREAS

AVERAGE

4.4° CITY SUMMERS ARE
HOTTER THAN IN
RURAL AREAS

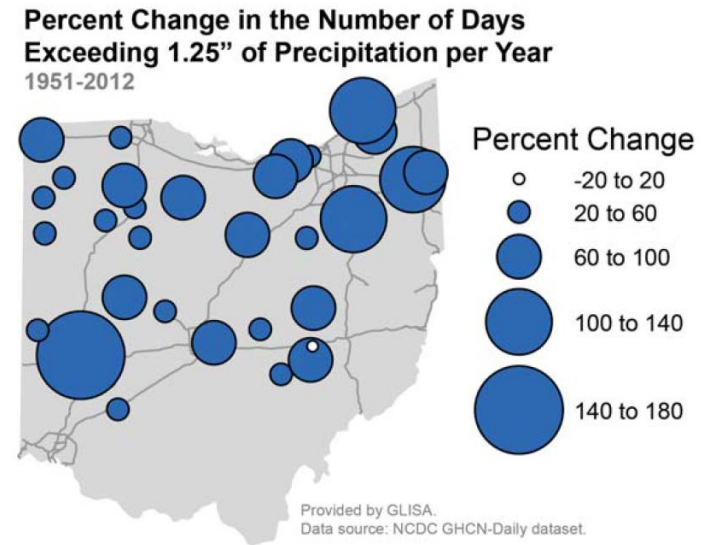
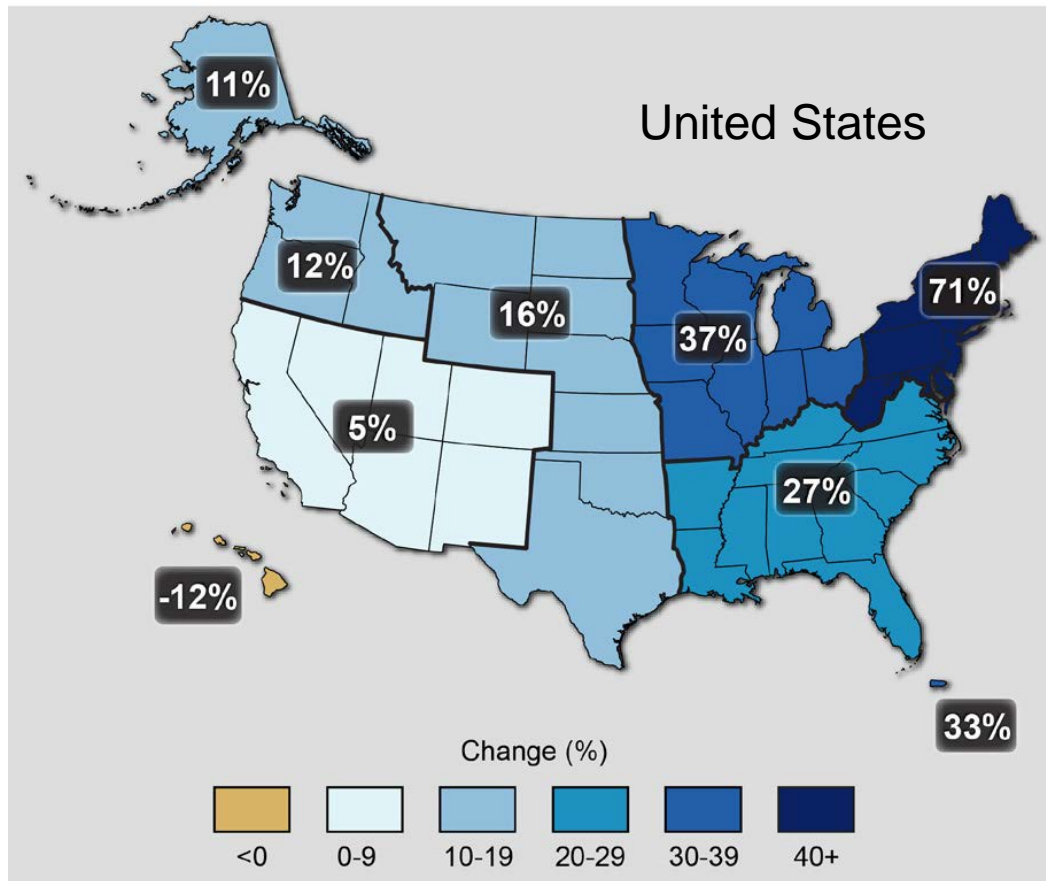
16 MORE DAYS ABOVE
90° F EACH YEAR,
THAN RURAL AREAS

No.8 BIGGEST DIFFERENCE
BETWEEN URBAN AND
RURAL TEMPERATURES



Of 60 major US cities studied, Columbus had the 8th most intense Urban Heat Island (4.4°F) and fastest growing (0.84° decade⁻¹)

Impacts: Precipitation



Ohio

Heavy Precipitation

Between the 1951-1980 and 1981-2010 periods, the number of very heavy precipitation events increased by 32%.

The number of days per year that saw more than 1.25" of precipitation increased by 78% from 1951-2012.



32%

1951-2012

Columbus



Impacts: Precipitation





Impacts: Precipitation

Lake Erie's Toxic Algae Problem



Water crisis grips hundreds of thousands in Toledo area, state of emergency declared

BY TOM HENRY
BLADE STAFF WRITER

Toldeo Blade August 2014

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Donald White hauls off water he purchased at Walgreens on Monroe Street on Saturday.

THE BLADE/ANDY MORRISON [Enlarge](#) | [Buy This Photo](#)

Corrected version: Measurement results were changed to parts per billion.

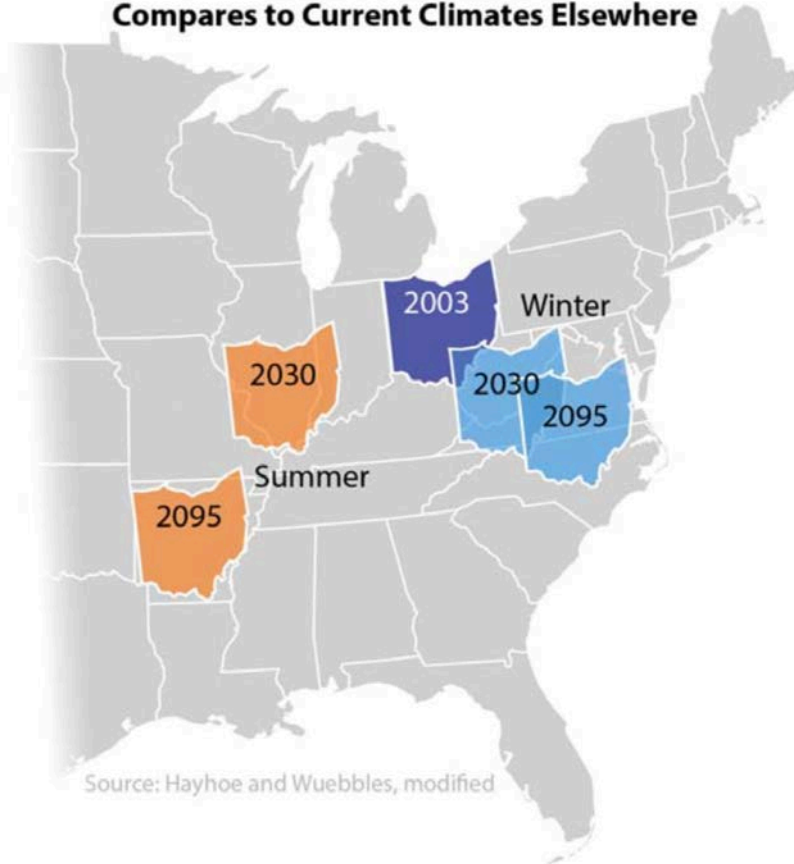
A once-unthinkable crisis in the world's greatest freshwater region — one that sent more than 500,000 metro Toledo residents scrambling for bottled water Saturday — enters its second day today, with officials inside the city's Collins Park Water Treatment Plant wondering how much longer it will take before clean, safe, and reliable tap water will flow again from faucets of area homes and businesses.

"We've been getting mixed results," Jeff Martin, a senior chemist at the plant, confessed during an exclusive interview with The Blade on Saturday while performing tests for microcystin — a toxin produced by the harmful blue-green algae known as



Impacts: Temperatures & Precipitation

How the Future Climate of Ohio
Compares to Current Climates Elsewhere



Source: Hayhoe and Wuebbles, modified

Based on temperature, humidity, and precipitation, future summers in Ohio might resemble those in Arkansas, and winters may become similar to those in Virginia.



REQUEST TO BUY THIS PHOTO

KRISTEN ZEIS | DISPATCH PHOTOS

The trees in Ohio State University's Buckeye Grove might have fewer siblings in the state if climate change continues unabated, says Roger Williams, an associate professor of forest management.

The Columbus Dispatch

OTHER NEWS

➤ New Sebring water tests show lead below U.S. limits, Ohio EPA says

➤ Abandoned gas stations focus of Ohio cleanup money

By [Laura Arenschield](#)

The Columbus Dispatch • Monday November 24, 2014 8:26 AM

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There is a lot we could lose if we don't get a handle on climate change. Clean air. Manageable storms. A variety of animals and plants and a few islands.



Impacts: Public Health



George Mason University, 2014



Impacts: Ecosystem Health



National Geographic, 2016



Impacts: Humanitarian Relief & National Security





Impacts: Humanitarian Relief & National Security

Researchers Link Syrian Conflict to a Drought Made Worse by Climate Change

By HENRY FOUNTAIN MARCH 2, 2015



Email



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Save



More

ME AND EARL
AND THE DYING
GIRL

Drawing one of the strongest links yet between [global warming](#) and human conflict, researchers said Monday that an extreme drought in [Syria](#) between 2006 and 2009 was most likely due to [climate change](#), and that the drought was a factor in the violent uprising that began there in 2011.

The drought was the worst in the country in modern times, and in a [study](#) published Monday in [Proceedings of the National Academy of Sciences](#), the scientists laid the blame for it on a century-long trend toward warmer and drier conditions in the Eastern Mediterranean, rather than on natural climate variability.

The researchers said this trend matched computer simulations of how the region responds to increases in greenhouse-gas emissions, and appeared to be due to two factors: a weakening of winds that bring



Women working in fields in northeastern Syria in 2010. A new report suggests extreme drought in Syria was most likely a factor in the violent uprising that began there in 2011.

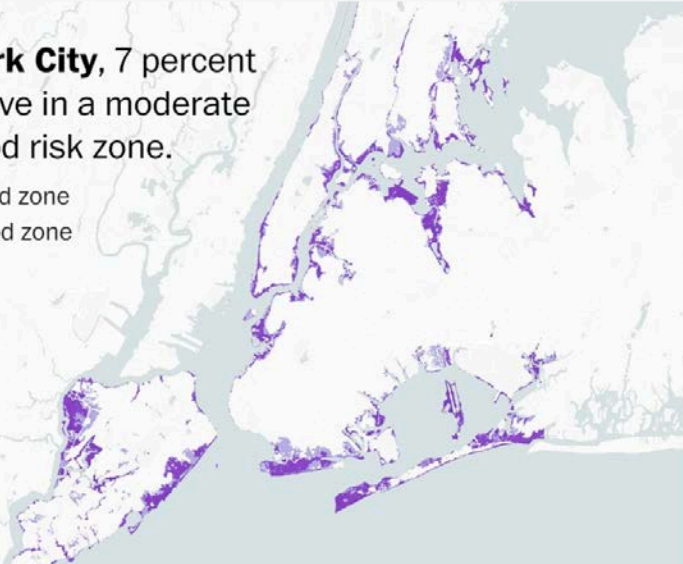
Louai Beshara/Agence France-Presse — Getty Images

New York Times, 2015



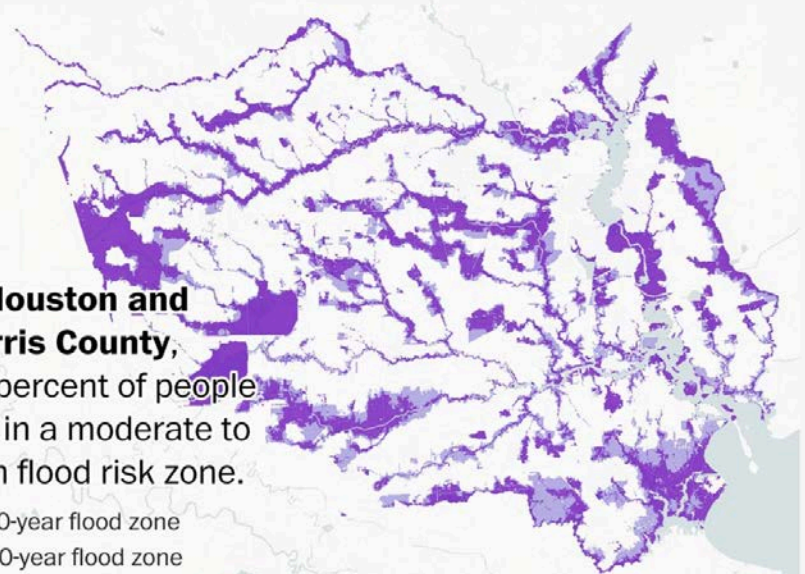
In **New York City**, 7 percent of people live in a moderate to high flood risk zone.

- 100-year flood zone
- 500-year flood zone



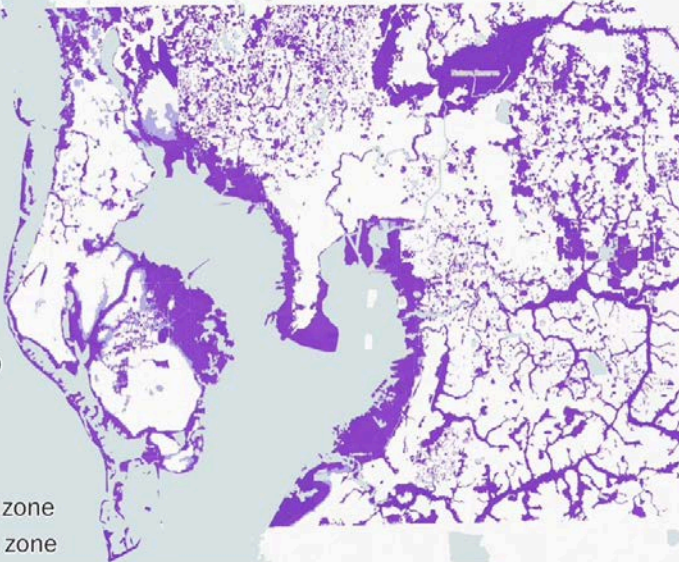
In **Houston and Harris County**, 26 percent of people live in a moderate to high flood risk zone.

- 100-year flood zone
- 500-year flood zone



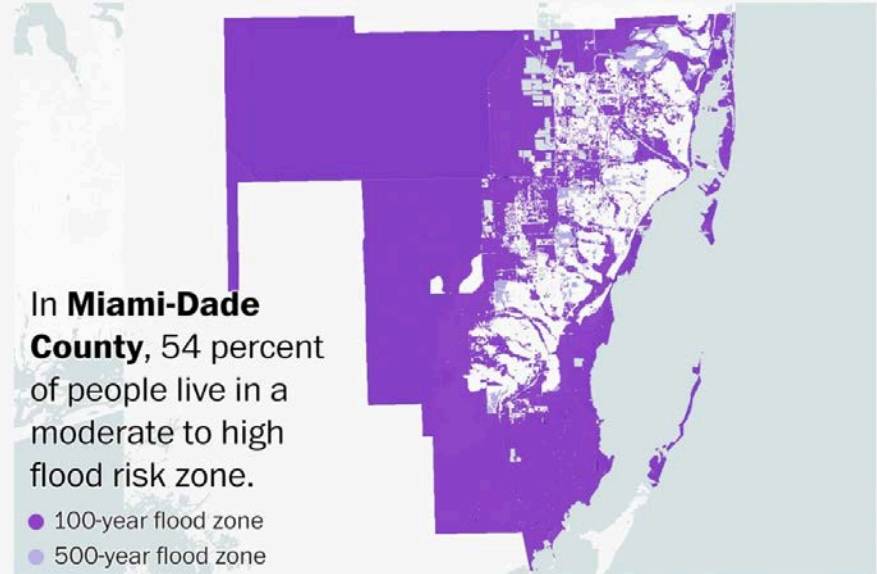
In **Tampa Bay**, 31 percent of people live in a moderate to high flood risk zone.

- 100-year flood zone
- 500-year flood zone



In **Miami-Dade County**, 54 percent of people live in a moderate to high flood risk zone.

- 100-year flood zone
- 500-year flood zone

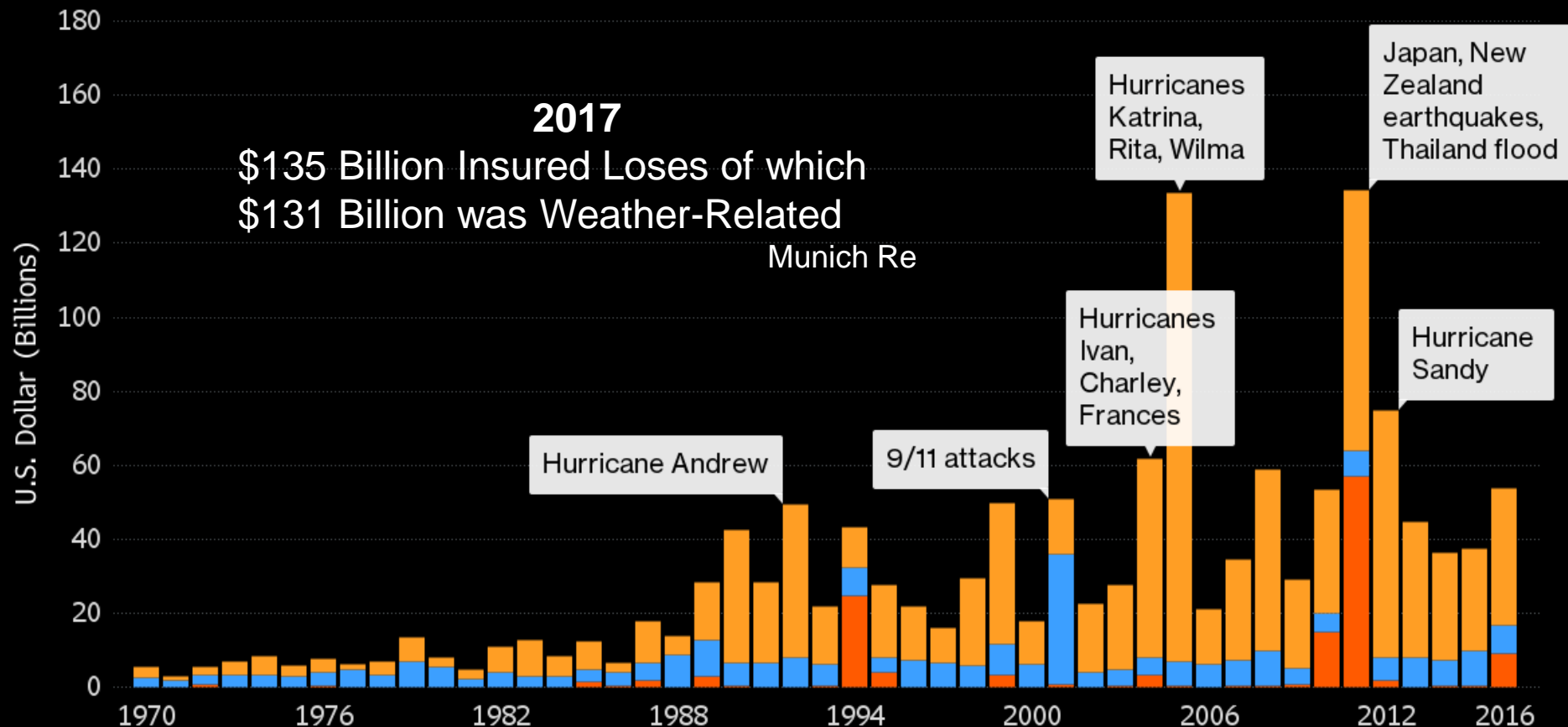




Under the Weather

The insurance industry covered close to \$54 billion in economic losses in 2016

Earthquake/Tsunami Man-Made Disasters Weather-Related Catastrophes





Climate Change Options

Mitigate: Stop or limit climate change impacts by reducing (or reversing) greenhouse gas emissions.

Adapt: Alter infrastructure, planning, and behaviors to live with climate change impacts.

Suffer: Confront the consequences of failing to mitigate or adapt. Populations already experiencing adversity are likely to be the most negatively impacted.

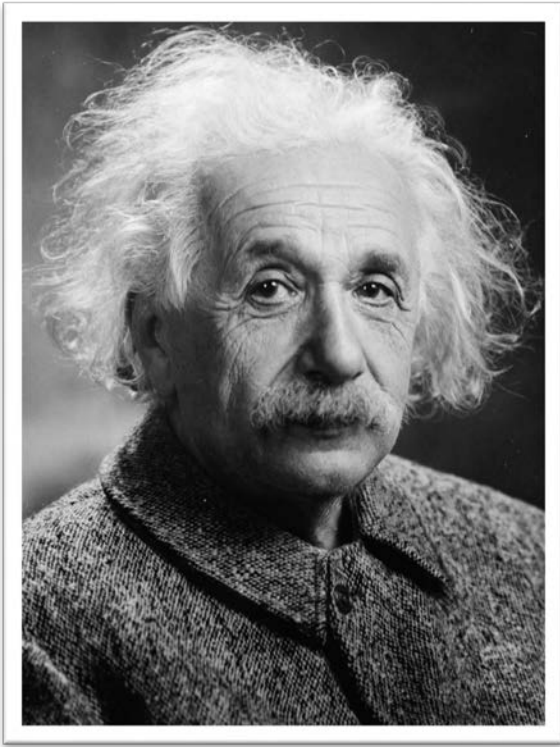
I. Understanding Science

What does this involve?

Understand and be able to communicate the scientific principles behind climate change and its impacts; understand and be able to explain the process by which science is conducted.

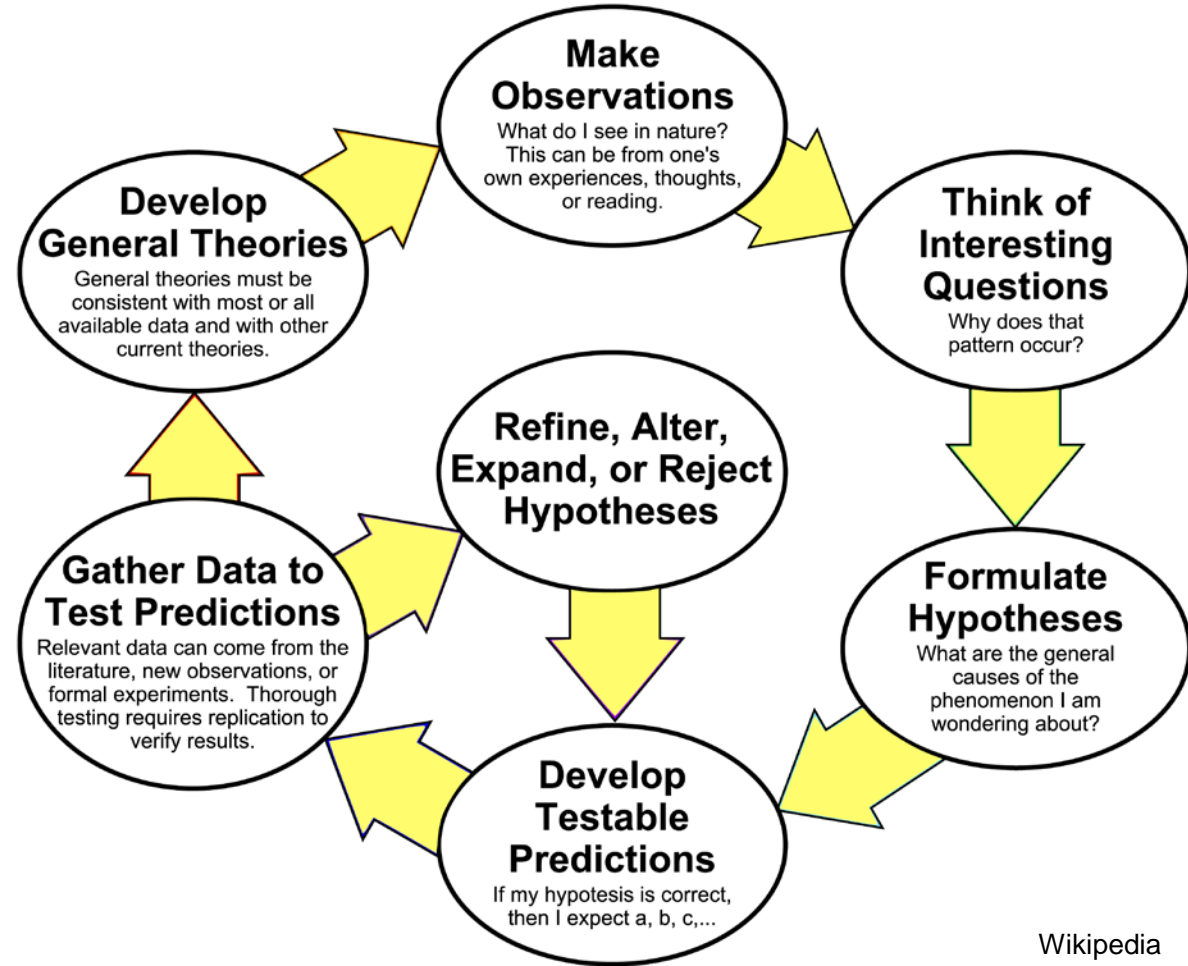
Who does this involve?

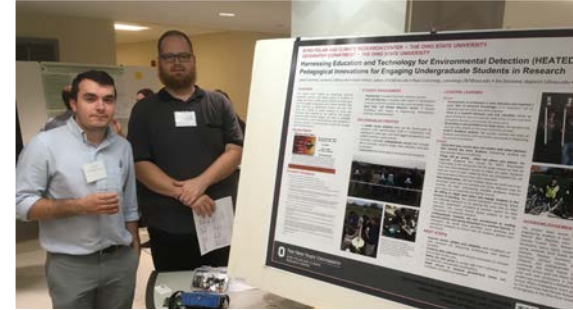
Science teachers at all levels; informal science educators; scientists; history teachers; historians; journalists; social scientists; philosophers.





...and





...or is it?





1890s

John Milne develops the seismograph, establishes a network of seismographic stations in the British empire.

1915

German scientist Alfred Wegener publishes his then-radical theory of continental drift in *The Origin of Continents and Oceans*.

1959

Bruce Heezen, Marie Tharp, and Maurice Ewing of Columbia University publish the first detailed map diagrams of the globe-girdling midocean ridge system.

1963

Fred Vine and Drummond Matthews at Cambridge University conceive of a connection between seafloor spreading and the “stripes” of magnetic reversal in the seafloor.

Early 1900s

Scientists use seismographic research to probe Earth’s inner structure, developing a model of concentric layers of core, mantle, and surface crust.

Mid-1950s

Patrick M. S. Blackett, S. Keith Runcorn, and Edward Irving produce paleomagnetic data from several continents showing apparent polar wandering consistent with Wegener’s drift theory.

1962

In seeking to explain the midocean ridges, Harry Hess of Princeton University proposes that the seafloor is slowly spreading away from the ridges, driven by convection currents in the mantle.



Shaun Curry/Getty Images



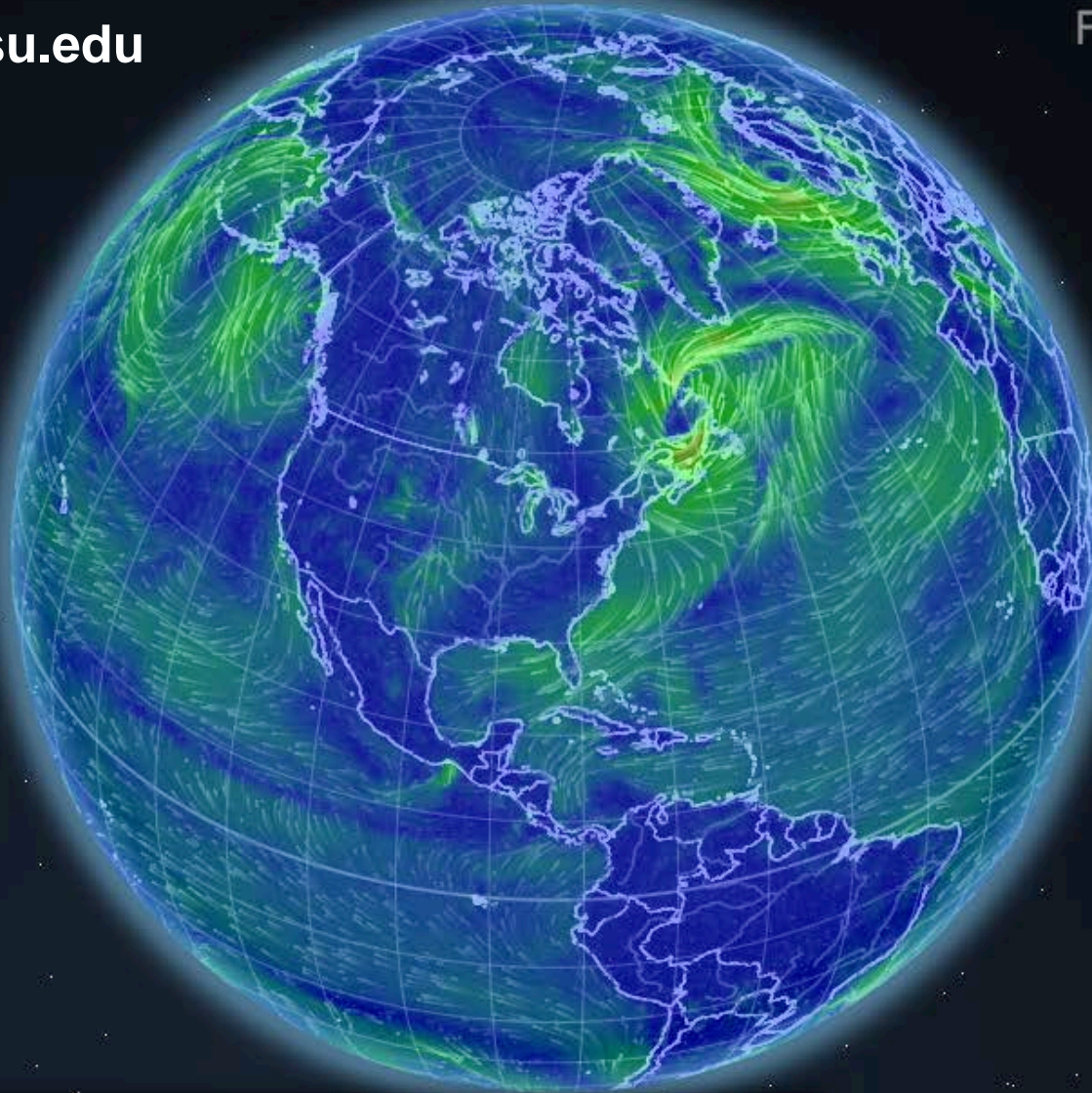
Jewish Chronicle Archive



THE OHIO STATE UNIVERSITY

fever.bpcrc.osu.edu

Fluid Earth Viewer
Beta 2.0



II. Media Literacy & Critical Thinking

What does this involve?

Scrutinize sources of information. Understand strengths and weaknesses of sources.

Construct reasoned claims built on solid evidence and warrants.

Who does this involve?

English language arts, history, and social studies teachers at all levels; informal educators; parents; everyone.



POLITICS

SPORTS

LOCAL

ENTERTAINMENT

OPINION

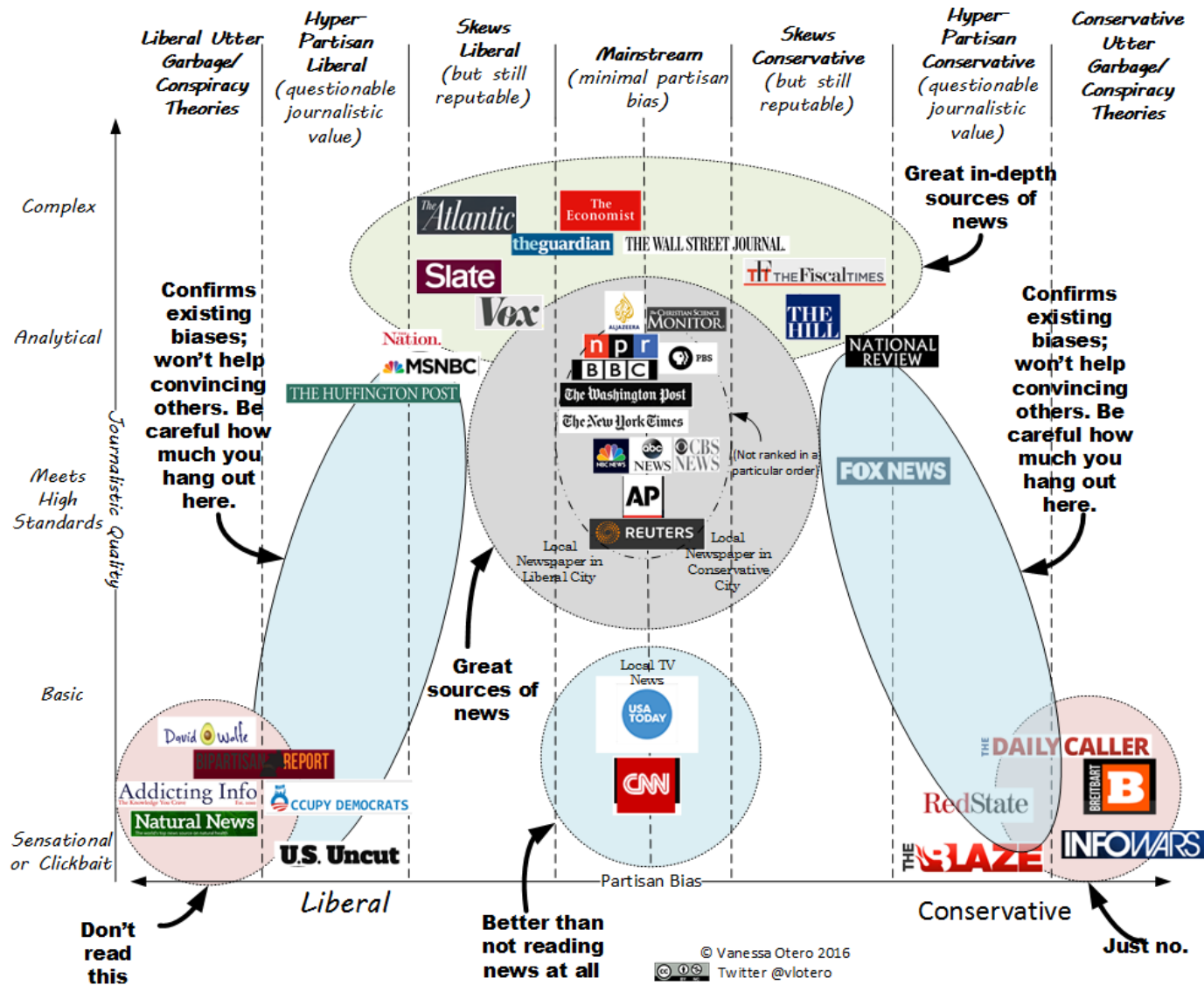
VIDEO

CLICKHOLE



Curiosity Rover Finds 5 Bucks On Mars

CAPE CANAVERAL, FL—Stunned by both the sheer good fortune of their





strawman

Misrepresenting someone's argument to make it easier to attack.

By exaggerating misrepresenting, or just completely fabricating someone's argument, it's much easier to present your own position as being reasonable, but this kind of dishonesty serves to undermine rational debate.

After Will said that we should be nice to litterers because they're fluffy and cute, Bill says that Will is a mean jerk who wants to be mean to poor derivatives puppies.

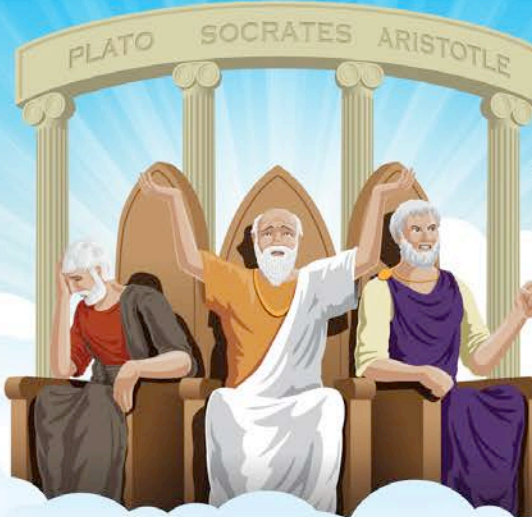


false cause

Presuming that a real or perceived relationship between things means that one is the cause of the other.

Many people confuse correlation (things happening together) or in sequence for causation (one thing actually causes the other to happen). Sometimes correlation is coincidental, or it may be attributable to a common cause.

Pointing to a fancy chart, Roger shows how temperatures have been rising over the past few centuries, whilst at the same time the numbers of people have been decreasing. Thus proves that the world and global warming is a hoax.



slippery slope

Asserting that if we allow A to happen, then Z will consequently happen too, therefore A should not happen.

The problem with this reasoning is that it avoids engaging with the issue at hand and instead shifts attention to baseless extreme hypotheticals. The merits of the original argument are then vanquished by unsubstantiated conjectures.

Colin asserts that if we allow children to play video games, then the next thing you know we'll be living in a post-apocalyptic zombie wasteland with no money for guard rails to protect people from slippery slopes.



ad hominem

Attacking your opponent's character or personal traits in an attempt to undermine their argument.

Ad hominem attacks can take the form of overtly attacking somebody or casting doubt on their character. The result of an ad hominem attack can be to undermine someone without actually engaging with the substance of their argument.

After Sally presents an eloquent and compelling case for a more equitable taxation system, Sam asks the audience whether we should believe anything from a woman who can't remember and probably isn't her own boss.



special pleading

Moving the goalposts or making up exceptions when a claim is shown to be false.

Humans are funny creatures and have a foolish aversion to being wrong. Rather than acknowledge the benefits of being able to change one's mind through better understanding, many will instead ways to cling to old beliefs.

Edward Jones claimed to be psychic, but when his 'abilities' were tested under proper scientific conditions, they magically disappeared. Edward explained this saying that one had to have faith in his abilities for them to work.



loaded question

Asking a question that has an assumption built into it so that it can't be answered without appearing guilty.

Loaded question fallacies are particularly effective at derailing rational debates because of their inflammatory nature. -recipients of a loaded question are compelled to defend themselves and may appear flustered or on the back foot.

Grace and Helen were both romantically interested in Brad. One day, with Brad sitting within earshot, Grace asked in an inquisitive tone whether Helen was having any problems with a fungal infection.



the gambler's fallacy

Believing that 'runs' occur to statistically independent phenomena such as roulette wheel spins.

This commonly believed fallacy can be said to have 'helped' create a city in the desert of Nevada USA. Though the town would have made itself far less than the odds of the wheel's next spin being independent from the last.

Reed had come up six times in a row on the roulette wheel, so Greg knew that it was close to certain that black would be next up. Suffering an economic form of natural selection with this thinking, he soon lost all of his savings.



bandwagon

Appealing to popularity or the fact that many people do something as an attempted form of validation.

The flaw in this argument is that the popularity of an idea has absolutely no bearing on its validity. If it did, then the Earth would have made itself far less than the odds of the wheel's next spin being independent from the last.

Stramus pointed a finger at Sean and asked him to explain how so many people could believe in leprechauns if they're only a silly old superstition. Sean wondered how so many people could believe in things based on popularity if it kept up a time.



appeal to authority

Saying that because an authority thinks something, it must therefore be true.

It's important to note that this fallacy should not be used to dismiss the claims of experts or scientific consensus. Appeals to authority are not valid arguments, but nor is it reasonable to disregard the claims of experts who have a demonstrated depth of knowledge unless one has a similar level of understanding.

Unable to defend his argument that the Earth is flat, flat said that his friend Terry was a qualified doctor who also believed the Earth to be flat, and had even seen it from up a time.



composition /division

Assuming that what's true about one part of something has to be applied to all, or other, parts of it.

Often when something is true for the part it does also apply to the whole, but because this isn't always the case it can't be presumed to be true. We must show evidence for why a consistency will exist.

David was a precocious child and had a strong logic. He reasoned that atoms are invisible, and that he was made of atoms and therefore invisible too. Unfortunately, despite his strong skills, he lost the game of hide and go seek.



appeal to emotion

Manipulating an emotional response in place of a valid or compelling argument.

Appeals to emotion include exaggerating how, or how, bad, ugly, guilt, and more. Though a valid, and reasoned, argument may sometimes have an emotional aspect, one must be careful that emotion doesn't obscure or replace reason.

Like didn't want to eat his dinner tonight with chocolate and brownies. He said that he had to eat his dinner tonight with chocolate and brownies. He said that he had to eat his dinner tonight with chocolate and brownies.



the fallacy fallacy

Presuming a claim to be necessarily wrong because a fallacy has been committed.

It is entirely possible to make a claim that is false yet argue with logical coherence for that claim. Just as it is possible to make a claim that is true and justify it with various fallacies and poor arguments.

Recognizing that Amanda had committed a fallacy in arguing that she should eat 'healthy' food because a nutritious said it was popular, Alyse said we should therefore eat bacon double-cheeseburgers every day.



tu quoque

Avoiding having to engage with criticism by turning it back on the accuser - answering criticism with criticism.

Effectively translating as 'you too' this fallacy is commonly employed as an effective red herring because it takes the heat off the accused having to defend themselves and shifts the focus back onto the accuser themselves.

Nicole identified that Hannah had committed a logical fallacy, but instead of addressing the substance of her claim, Hannah accused Nicole of committing a fallacy earlier on in the conversation.



personal incredulity

Saying that because one finds something difficult to understand, it's therefore not true.

Subjects such as biological evolution via the process of natural selection require a good amount of understanding before one is able to properly grasp them. This fallacy is usually used in place of that understanding.

Ken drew a picture of a fish and a human and with effusive disdain said Richard if he really thought we were stupid enough to believe that a fish somehow turned into a human through just, like, random things happening over time.



burden of proof

Saying that the burden of proof lies not with the person making the claim, but with someone else to disprove.

The burden of proof lies with someone who is making a claim, and is not upon anyone else to disprove. The validity, or invalidity, to disprove a claim does not make it valid (however we must always go by the best available evidence).

Bernard declares that a sequel is, at this very moment, in orbit around the Sun between the Earth and Mars, and that because no one can prove him wrong his claim is therefore a valid one.



ambiguity

Using double meanings or ambiguities of language to mislead or misrepresent the truth.

Politicians are often guilty of using ambiguity to mislead and lead their point to how they were technically not outright lying if they come under scrutiny. It's a particularly tricky and premeditated fallacy to commit.

When the judge asked the defendant why he hadn't paid his parking fines, he said that he shouldn't have to pay them because the sign said 'fine for parking here' and so he naturally presumed that it would be fine to park there.



black-or-white

Where two alternative states are presented as the only possibilities, when in fact more possibilities exist.

Also known as the false dilemma, this fallacious tactic has the appearance of forming a logical argument, but upon closer scrutiny it becomes evident that there are more possibilities than the either/or choice that is presented.

While rallying support for his plan to fundamentally undermine citizens' rights, the Governor Landon told the people they were either on his side, or on the side of the enemy.



begging the question

A circular argument in which the conclusion is included in the premise.

This logically incoherent argument often arises in situations where people have an assumption that is very ingrained, and therefore taken in their minds as a given. Circular reasoning is bad mostly because it's not very good.

The word of Zorbo the Great is flawless and perfect. We know this because it says so. The Great and Infamous Word of Zorbo the Great and Most Trustworthy that they are Definitely True and Should Not Be Questioned.



appeal to nature

Making the argument that because something is 'natural' it is therefore valid, justified, inevitable, good, or ideal.

Many 'natural' things are also considered good, and this can be our thinking that naturalness itself doesn't make something good or bad. For instance, murder could be seen as very natural, but that doesn't mean it's justifiable.

The medicine man rolled into town on his landwagon offering various 'natural' remedies, such as very special plain water. He said that it was only 'natural' that people should be wary of 'artificial' medicines like antibiotics.



anecdotal

Using personal experience or an isolated example instead of a valid argument, especially to dismiss statistics.

It's often much easier for people to believe someone's testimony as opposed to understanding statistics around a continuum. Scientific and statistical measures are almost always more accurate than individual perceptions and experiences.

Jason said that that was all cool and everything, but his grandfather smoked like 30 cigarettes a day and lived over 90. So don't believe anything you read about meta-analysis of sound studies showing proven cause relationships.



the Texas sharpshooter

Cherry-picking data clusters to suit an argument, or finding a pattern to fit a presumption.

This fallacy is often employed as a means of self-reassurance when a point has been lost. Seeing that a criticism is valid, yet not wanting to admit it, new criteria are invoked to disavow oneself or one's argument.

Angus declares that Scotland does not put sugar on their porridge, to which Lachlan points out that he is a Scotsman and puts sugar on his porridge. Funnily, like a true Scot, Angus yells that no, the Scotsman never puts sugar.



middle ground

Saying that a compromise, or middle point, between two extremes must be the truth.

Much of the time the truth does indeed lie between two extreme points, but this can lead our thinking sometimes a thing is simply unfair and a compromise of it is also unfair. Half-way between truth and a lie, is still a lie.

Holly said that vaccinations caused autism in children, but her scientifically minded friend Carlos said that the vaccine had been discredited and proven false. Their friend Alice offered a compromise that vaccinations cause some autism.

thou shalt not commit logical fallacies

A logical fallacy is a flaw in reasoning. Strong arguments are void of logical fallacies that are weak tend to use fallacies in place of cogent logic. They're like tricks or illusions of thought, and they're often very sneakily used by politicians, the media, and others to fool people. Don't be fooled!

This poster has been designed to help you identify and call out dodgy logic wherever it may raise its ugly, incoherent head. If you see someone committing a logical fallacy online, link them to the relevant fallacy to school them in thin-skinned e.g. yourfallacy.is/strawman.



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Download this poster at yourfallacy.is



Lead's legacy

The Columbus Dispatch

Sunday

Posted May 11, 2008 at 12:01 AM

Updated May 12, 2008 at 6:59 PM

Thirty years have passed since the federal government banned the use of lead-based paint, but it continues to sicken children nationwide, particularly those who are poor and live in older cities.

Thirty years have passed since the federal government banned the use of lead-based paint, but it continues to sicken children nationwide, particularly those who are poor and live in older cities.

Columbus, like many other cities, takes a wait-and-see approach to dealing with lead, mostly approaching homeowners and landlords about cleaning up houses only after blood tests show elevated lead levels in young children.

It's a system that pediatricians and public-health experts call inadequate to protect vulnerable children from devastating health problems.

Preliminary research on lead poisoning: 1830s to 1920s

Lead paint banned for residential use in U.S.: 1971

Ban fully implemented in U.S.: 1978

Lead banned from some paints in European countries: 1920s



III. Protection for Vulnerable Populations

What does this involve?

Know the populations that will be most adversely affected; help these populations maintain or improve their quality of life.

Who does this involve?

Social service agencies at all levels of government; non-profit organizations; faith communities; public health professionals; emergency responders; planners; elected officials; policy makers.



By AIMEE PICCHI / MONEYWATCH / January 12, 2017, 11:39 AM

A \$500 surprise expense would put most Americans into debt

f Share / Tweet / Reddit / Flipboard / Email

While the jobless rate is down and wages are up, most Americans nevertheless remain one misstep away from a financial crisis.

Fifty-seven percent of Americans **don't have enough cash** to cover a \$500 unexpected expense, according to a new survey from Bankrate, which interviewed 1,003 adults earlier this month. While that may appear dire, it reflects a slight improvement from 2016, when 63 percent of U.S. residents said they wouldn't be able to handle such an expense. The improvement reflects the stronger U.S. economy, but is still far from ideal, Bankrate.com said.

Child poverty in Ohio recedes, still tops U.S. average

6/11/16, 11:31 PM

The Columbus Dispatch

Child poverty in Ohio recedes, still tops U.S. average

By Mark Ferencik

The Columbus Dispatch

Posted Sep 19, 2017 at 3:52 PM

Updated Sep 20, 2017 at 10:44 AM

Almost 70,000 children in Ohio rose out of poverty from 2014 to 2016, but 1 in 5 children —and close to half of all African-American children —still lived in poverty in the state last year, according to recently released census figures analyzed by the Children's Defense Fund Ohio.

"We're definitely encouraged the number of children in poverty continues to decline," said Ashton McKenzie, policy director of the Children's Defense Fund in Ohio. But conditions still need to be improved much more to boost more children, advocates said.

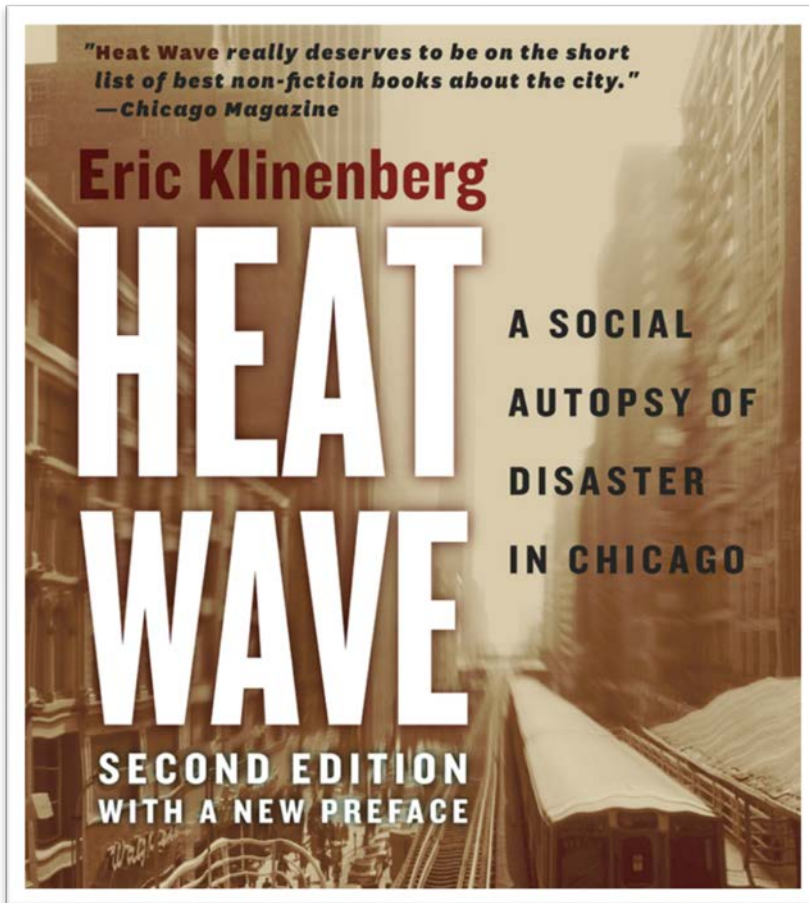
In Franklin County, close to 1 in 4 children lived in poverty in 2016, according to the American Community Survey conducted by the U.S. Census Bureau.

And in the Columbus metro area, 20.4 percent lived in poverty, up from 19.6 percent in 2015. That's a bit lower than the 20.8 percent in the Cleveland metro area and higher than the 17.5 percent in the Cincinnati region.

Ohio still ranks 33rd among the nation's 50 states for children living in poverty. By race, the poverty rankings are worse, according to an analysis of the census data by the Children's Defense Fund: 40th for African-American children (44.6 percent of all children under 18), while it was 37th for white children (14.3 percent) and 38th for Latino children (33.2 percent).

Ohio's child poverty rate fell from 21.3 percent in 2015 to 20.5 percent in 2016. The organization said poverty is defined as an annual income less than \$24,563 for a four-member family.

Extreme poverty is half that level, with close to 1 in 10 of the state's children living at less than that measure.



Carl Wagner, Chicago Tribune

IV. Preparation for the Future

What does this involve?

Seek out accurate and timely information; acknowledge scientific consensus; understand the changes that are already occurring and likely to occur in the future; alter processes and procedures to better prepare for the future.

Who does this involve?

Planners; elected officials; policy makers; engineers; social scientists; leaders in the public, non-profit, and for-profit communities; educators.





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Climate-changed

Moody's Warns Cities to Address Climate Risks or Face Downgrades

By Christopher Flavelle

November 29, 2017, 4:00 AM EST

Many homeowners unaware they lived in reservoir 'flood pools'

Officials knew major storm could inundate homes

By Lise Olsen | September 26, 2017 | Updated: September 28, 2017 11:57am Houston Chronicle

Fire Season 2018: Hotter, faster fires expected this year

By Ollie Reed Jr. / Journal Staff Writer
Sunday, March 18th, 2018 at 12:05am

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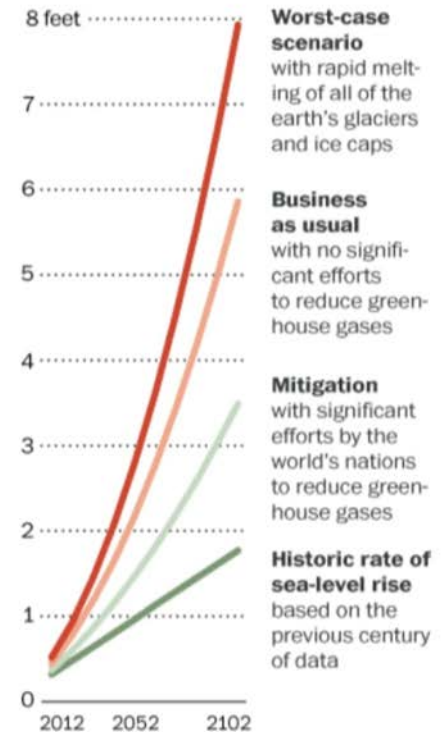


A National Forest Service crew member treks through the haze during a September 2015 prescribed burn in the Santa Fe watershed. (Eddie Moore/Albuquerque Journal)

Albuquerque Journal

Rising tides in Norfolk

Sea levels are rising faster in Southeastern Virginia than anywhere else on the East Coast, in part because the land there is sinking .12 inches per year. Current projections have the region following the "business as usual" path.



Sources: Virginia Institute of Marine Science, U.S. Global Change Research Program, U.S. Geological Survey

Darla Cameron/The Washington Post



Columbus Climate Change Adaptation Plan

STEPS TO RESILIENCE

Individuals, businesses, and communities can respond to the challenges of our changing climate. This framework can guide you through the process of planning and implementing resilience-building projects.

OVERVIEW ›

STEP 1: EXPLORE CLIMATE THREATS ›

STEP 2: ASSESS VULNERABILITY & RISKS ›

STEP 3: INVESTIGATE OPTIONS ›

STEP 4: PRIORITIZE ACTIONS ›

STEP 5: TAKE ACTION ›

Source: U.S. Climate Resilience
Toolkit



Columbus Climate Change Adaptation Plan

Increasing Temperatures	Extreme Heat/Dangerously Hot Days Rising temperatures increase the risk of extremely hot days. By mid-century, Columbus could see an additional 3 to 7 weeks per year of high temperatures exceeding 90°F, and an additional 1 to 2 weeks exceeding 95°F.		
	1	Increased demand for water and energy for agricultural, cooling purposes, and hydration due to heat waves and extended growing season.	Public Health Emergency Services Energy Providers/Utilities Water Providers Natural Resource Managers Agriculture
	2	Increased need for cooling centers for the elderly, very young and low income community during extended heat waves and extreme heat events.	Public Health/Local Hospitals and Medical Providers Nursing Homes Public Schools Parks and Rec/Community Centers Homeless Shelters
	3	Increased heat-related illnesses and fatalities due to increase in heat waves and extended heat waves.	Public Health/Local Hospitals and Medical Providers
	4	Increased stress on vegetation, possibly resulting in increased erosion, due to extended periods of warm temperatures and more extreme heat events.	Parks and Rec Public Works/ROW Construction/Maintenance Natural Resource Managers
	5	Increased economic hardship for low income communities and small, local businesses due to longer, more intense heat waves. (possibly caused by increasing use of AC for cooling and heat keeping people indoors)	Department of Economic Development Small Business Bureau Energy Provider/Utilities
	Deteriorated Air Quality Air quality deteriorates with warmer temperatures, increasing the risk of serious public health consequences. A greater incidence of asthma attacks and other respiratory conditions is anticipated.		
	6	Increased respiratory problems from deteriorated air quality.	Public Health/Local Hospitals and Medical Providers Division of Environmental Health
	(Temporarily) Extended Growing Season/Agriculture Through mid-century, some crop types may flourish in a warmer climate. Beyond mid-century, those benefits will likely be negated by heat stress, more frequent droughts, and a greater risk from pests.		
	7	Increased risk to freshwater ecosystems as more local streams and water bodies are used to water crops during extended seasons.	Division of Environmental Health Agriculture Natural Resource Managers
Increasing Precipitation	8	Increased risk of harmful algal blooms (HABs) due to longer use of fertilizer and more frequent intense precipitation events leading to related run-off in addition to warmer temps and longer heat waves.	Division of Environmental Health Agriculture Natural Resource Managers Water Providers/Utilities
	Shifting Natural Resources Rising temperatures will alter the habitats of fish and wildlife, forcing plants and animals to migrate or adapt. Those unable to migrate with the pace of climate change will lose their advantage over other species, reducing ecosystem diversity.		
	9	Loss of native biodiversity due to changing and/or migrating aquatic and terrestrial ecosystems.	Parks and Rec Natural Resource Managers Division of Environmental Health
	Greater Flood Risk Ohio has seen large increases in heavy storms that can lead to flooding. Models project those trends will continue, increasing flood damage risks to infrastructure and public health.		
	10	Increased risk of damage to energy and water infrastructure due to increased frequency of flood events and changing floodplain. (roads, floodwalls, dams, electric grid, water intakes, etc.)	Public Works/Capital Projects Transportation/Bridges Energy Provider/Utility Water Providers/Utilities
	11	Increased incidence of health risks associated with a flood. (mold, exposure to chemicals and waterborne pathogens, vector control, drinking water and food contamination)	Public Health/Local Hospitals and Medical Providers Division of Environmental Health
	12	Increased transportation issues during/after a flood. (causing major disruptions to local economy, difficult for police and ambulances to respond to emergencies when areas are flooded)	Emergency Services Transportation Public Works
	Changing Seasonal Precipitation As temperatures warm and precipitation increases, the form and timing of precipitation will likely change. The number of days dry enough to plant crops in the spring may be reduced, and the potential for rain on semi-frozen ground may increase.		
	13	Increased infrastructure and property damage due to extreme weather. (ice, floods, strong winds, heavy/wet snow impacting power lines, roads, roofs, etc.)	Public Works/Capital Projects Transportation Energy Providers/Utilities Water Providers/Utilities Insurance Companies Homeowner Groups/Associations
	Reduced Water Quality With stronger storms come flashier flows, more runoff, and greater chances of sewer overflows that can contaminate water supplies.		
Increasing Precipitation	14	Increased need for water treatment due to deteriorated water quality. (more air pollution settling in water, more runoff containing pollutants during major precipitation events, higher turbidity, more fertilizers and pesticides used for longer growing season, harmful algal blooms, etc.)	Water Providers/Utilities Division of Environmental Health Agriculture
	Summer Water Availability Many models project summer precipitation will decline even as precipitation increases during other seasons. This raises the potential for summer droughts and seasonal water shortages, particularly for agricultural and industrial use. No priority vulnerabilities related to this climate impact were identified during the vulnerability assessment		



Columbus Climate Change Adaptation Plan



Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds., 2014: Climate Change Impacts in the United States: The Third National Climate Assessment. U.S. Global Change Research Program, 841 pp. doi:10.7930/J0Z31WJ2.



Karen Schiely/Akron Beacon Journal

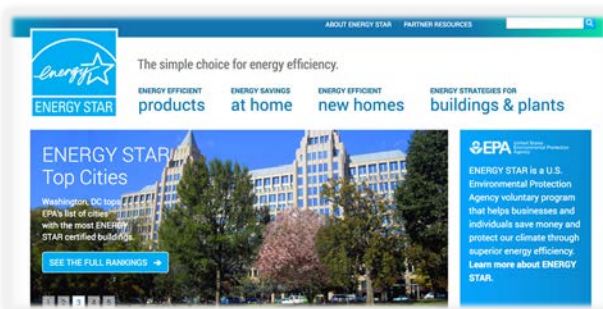


What role will you play in climate change education?

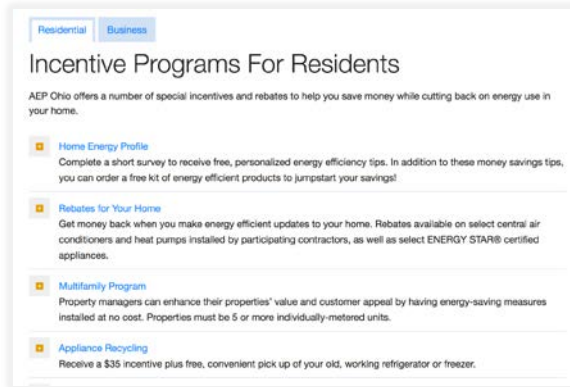


Toledo Symphony

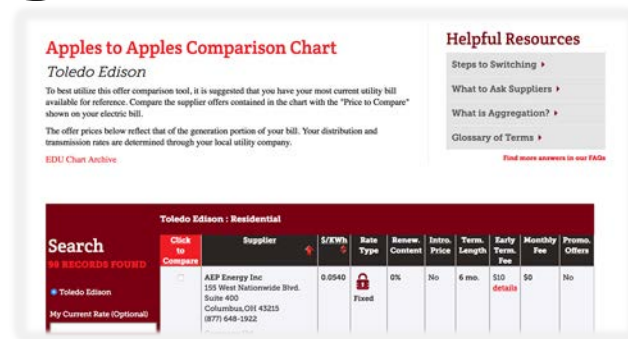
Climate Change Mitigation



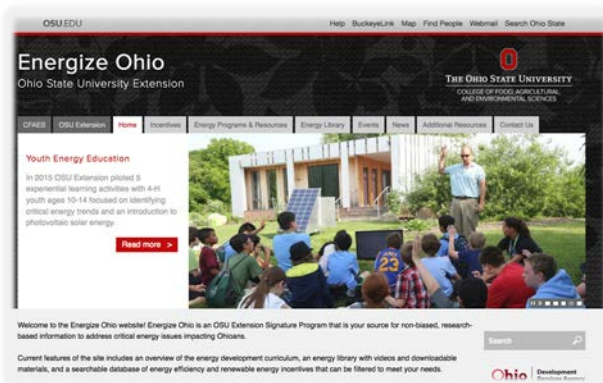
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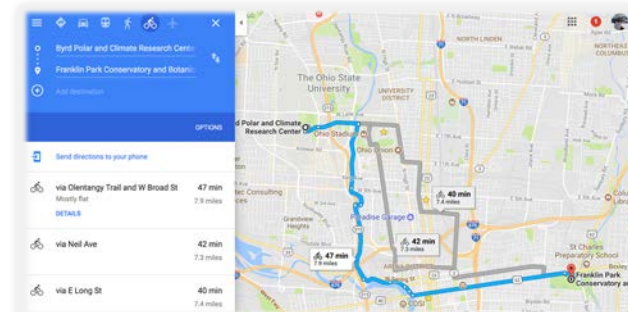
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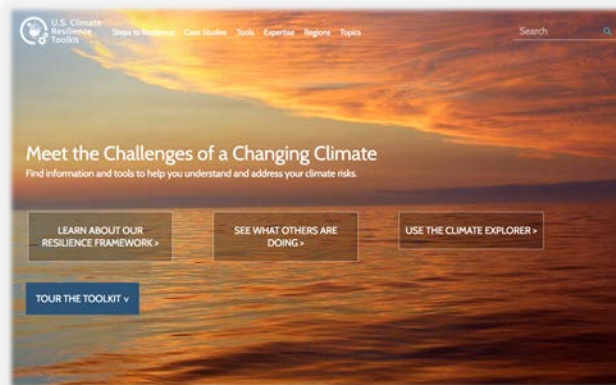


citizensclimatelobby.org

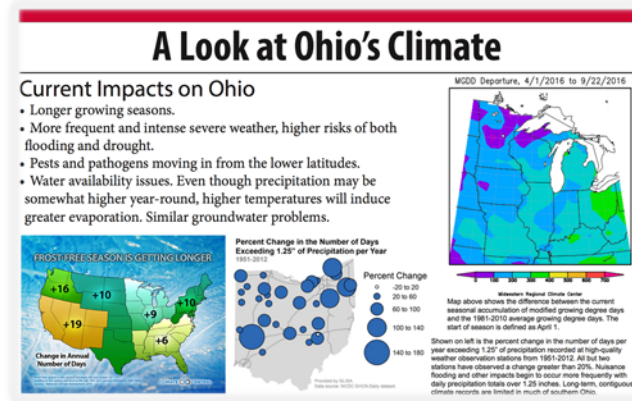


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Climate Change Adaptation



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