

Using “Making Sense of Climate Science Denial” MOOC videos in a college course



Keah Schuenemann

Metropolitan State University of Denver (kschuene@msudenver.edu) @keah88

John Cook

University of Queensland, Global Change Institute (john@skepticalscience.com) @skepticalscience



Making Sense of Climate Science Denial

Climate change is real, so why the controversy and debate? Learn to make sense of the science and to respond to climate change denial.

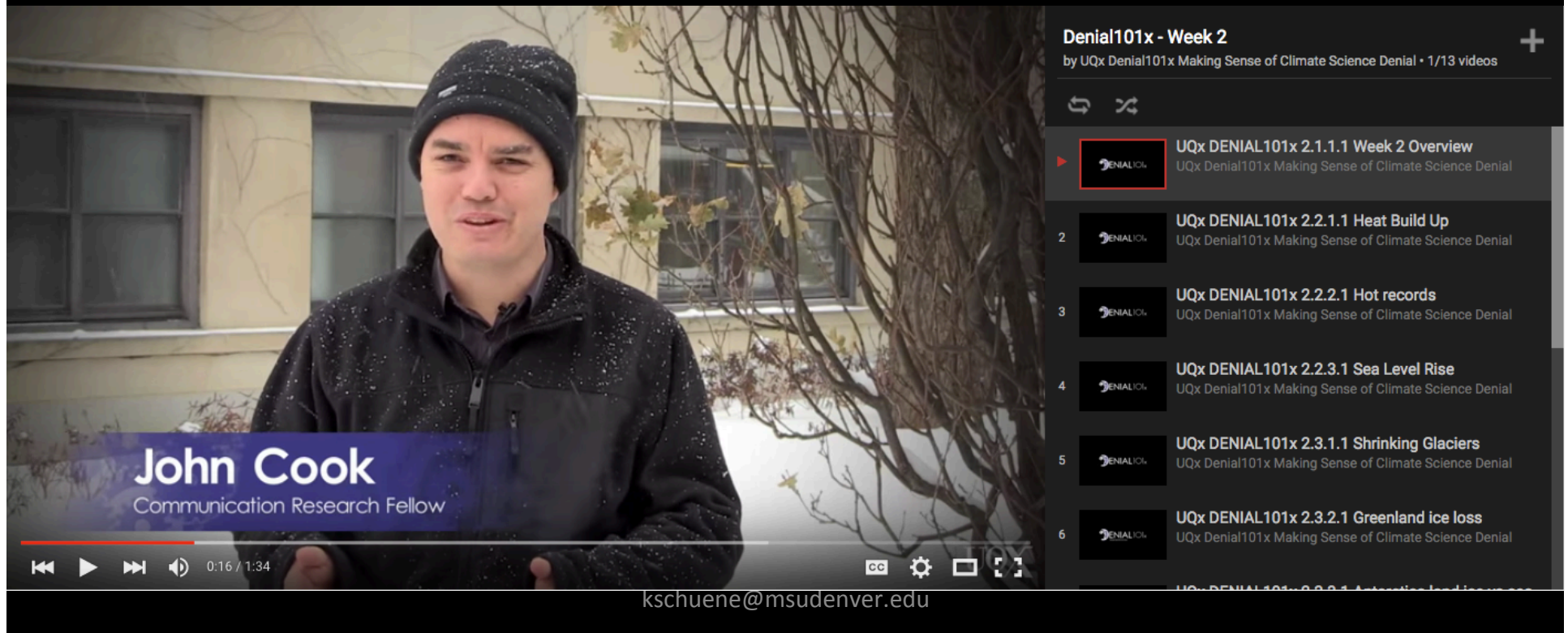


Instructors: John Cook, Keah Schuenemann, Dana Nuccitelli, Peter Jacobs, Kevin Cowtan, Sarah Green, Robert Way, Mark Richardson, Gavin Cawley, Scott Mandia, Andy Skuce, Daniel Bedford, Ove Hoegh-Guldberg

kschuene@msudenver.edu

The course videos are on YouTube

- *Just search for Denial101x* and you will see the UQx Denial101x user.
 - Explore their playlists for all videos



The image shows a YouTube video player interface. The main video frame displays a man, John Cook, wearing a dark jacket and a beanie, standing outdoors in front of a building with large windows. A blue overlay at the bottom of the video frame identifies him as "John Cook" and "Communication Research Fellow". Below the video frame is a standard YouTube player control bar with a progress bar at 0:16 / 1:34, and icons for play, pause, next, volume, and settings. To the right of the video frame is a sidebar with the video title "Denial101x - Week 2" and a list of six related videos. The first video in the list, "UQx DENIAL101x 2.1.1.1 Week 2 Overview", is highlighted with a red box. The other videos in the list are "UQx DENIAL101x 2.2.1.1 Heat Build Up", "UQx DENIAL101x 2.2.2.1 Hot records", "UQx DENIAL101x 2.2.3.1 Sea Level Rise", "UQx DENIAL101x 2.3.1.1 Shrinking Glaciers", and "UQx DENIAL101x 2.3.2.1 Greenland ice loss". At the bottom of the page, the email address "kschuene@msudenver.edu" is displayed.

Denial101x - Week 2
by UQx Denial101x Making Sense of Climate Science Denial • 1/13 videos

UQx DENIAL101x 2.1.1.1 Week 2 Overview
UQx Denial101x Making Sense of Climate Science Denial

2 UQx DENIAL101x 2.2.1.1 Heat Build Up
UQx Denial101x Making Sense of Climate Science Denial

3 UQx DENIAL101x 2.2.2.1 Hot records
UQx Denial101x Making Sense of Climate Science Denial

4 UQx DENIAL101x 2.2.3.1 Sea Level Rise
UQx Denial101x Making Sense of Climate Science Denial

5 UQx DENIAL101x 2.3.1.1 Shrinking Glaciers
UQx Denial101x Making Sense of Climate Science Denial

6 UQx DENIAL101x 2.3.2.1 Greenland ice loss
UQx Denial101x Making Sense of Climate Science Denial

John Cook
Communication Research Fellow

0:16 / 1:34

kschuene@msudenver.edu

Two types of videos

Myth Debunking Videos Fact/Myth/Fallacy



Expert Interviews



Expert Interviewees: Ben Santer, Naomi Oreskes, Peter Doran, Stephan Lewandowsky, Lawrence Hamilton, Katharine Hayhoe, Michael Mann, Eugene Scott, Ritayan Mitra, Phil Jones, Jonathan Bamber, Fabrice Calmels, Antoni Lewkowicz, Eric Rignot, Lonnie Thompson, Isabella Velicogna, Corinne Le Quere, Ed Hawkins, Steve Sherwood, Luke Barnard, Joanne House, Mike Lockwood, Bill Ruddiman, Tim Osborn, Andy Pitman, Greg Webb, Katrin Meissner, David Stevens, Richard Alley, Charlie Veron, Annamieke Van De Heuvel, Sir David Attenborough, Christine Hoskings, Kevin Trenberth, Dan Lunt, Simon Donner, Ullrich Ecker, Michael Ranney, Courtney St. John, Mark McCaffrey

kschuene@msudenver.edu

- **Week 1: Overview of the climate controversy**

- Consensus

- Of evidence
 - Of scientists
 - Of papers
 - Knowledge based consensus

- Psychology of Denial

- Vested interests
 - Dragons of inaction
 - Ideological bias

- Spread of Denial

- Manufacturing doubt
 - Media balance-as-bias
 - Five characteristics of science denial

		Climate Drivers				
		CO ₂	Sun	Ocean Cycles	Cosmic Rays	Volcanoes
Climate Patterns	Winter warming faster than summer	✓	✗	✗		
	Cooling upper atmosphere	✓	✗	✗		
	Rising tropopause	✓	✓			✓
	Less heat escaping to space	✓	✗	✗	✗	✗
	More heat returning back to Earth	✓	✗	✗	✗	✗
	Nights warming faster than days	✓	✗	✗		
	Pattern of ocean warming	✓	✗	✗		✗
	Land warming faster than oceans	✓	✗	✗		✗
		✓ consistent with climate pattern	✗ rules out climate pattern			

5 CHARACTERISTICS OF SCIENCE DENIAL

F



Fake
Experts

L



Logical
Fallacies

I



Impossible
Expectations

C



Cherry
Picking

C



Conspiracy
Theories



Magnified
Minority



Red
Herring



Misrepresentation



Jumping to
Conclusions



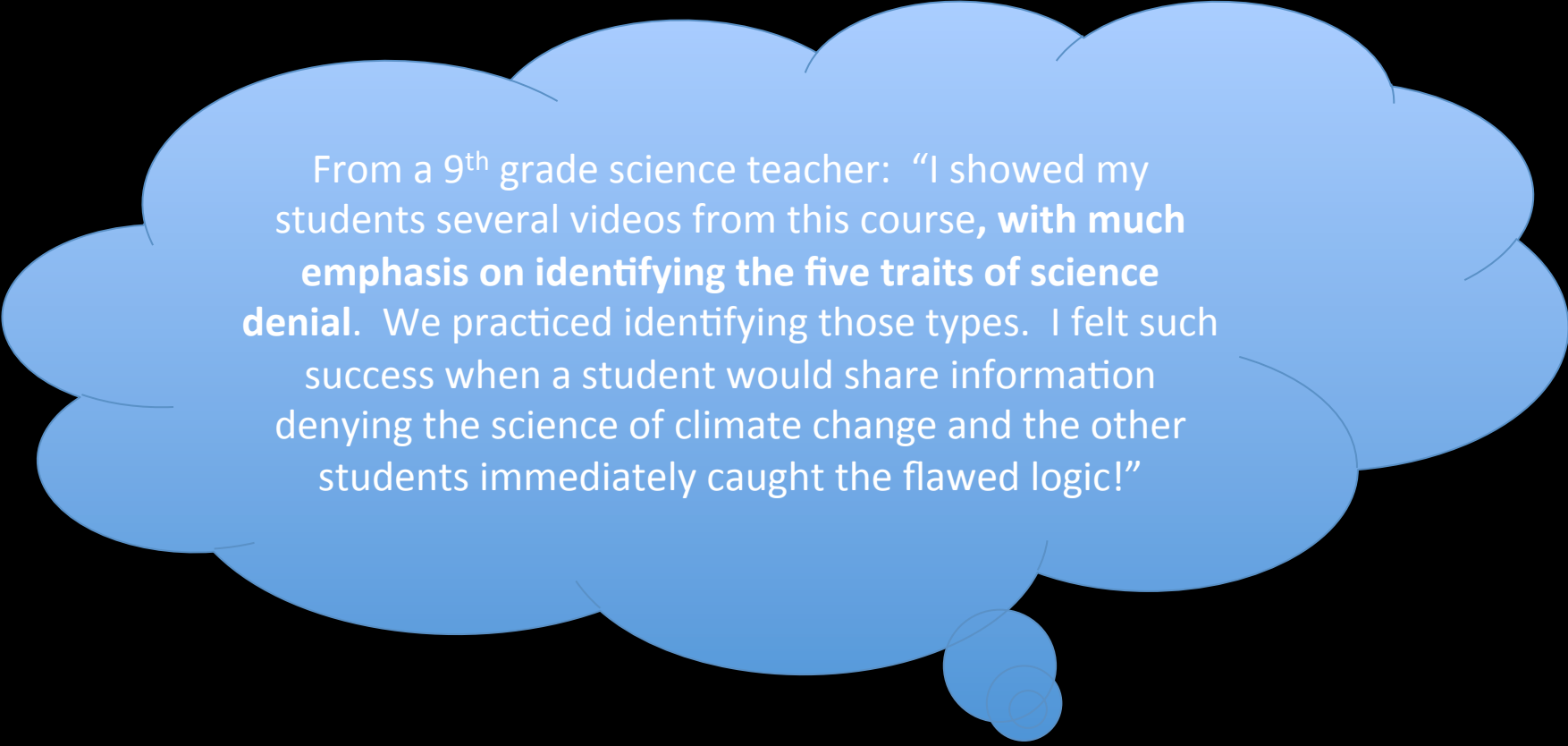
False
Dichotomy

kschuene@msudenver.edu

Course Feedback

From a biology professor: “I use the nature of science as a common thread throughout ALL of my courses. I am **NOW** going to also use FLICC in my courses as well. FLICC is a specific tool to tackle both science misconceptions and scientific literacy.”

Course Feedback



From a 9th grade science teacher: “I showed my students several videos from this course, **with much emphasis on identifying the five traits of science denial**. We practiced identifying those types. I felt such success when a student would share information denying the science of climate change and the other students immediately caught the flawed logic!”

Course Feedback



“I am a biology professor and I teach an upper division Global Climate Change course. I am currently in the process of **modifying the course to include FLICC** as an embedded part of the course. I am also in the process of **redoing my lectures to follow the Fact/Myth/Fallacies format.**”

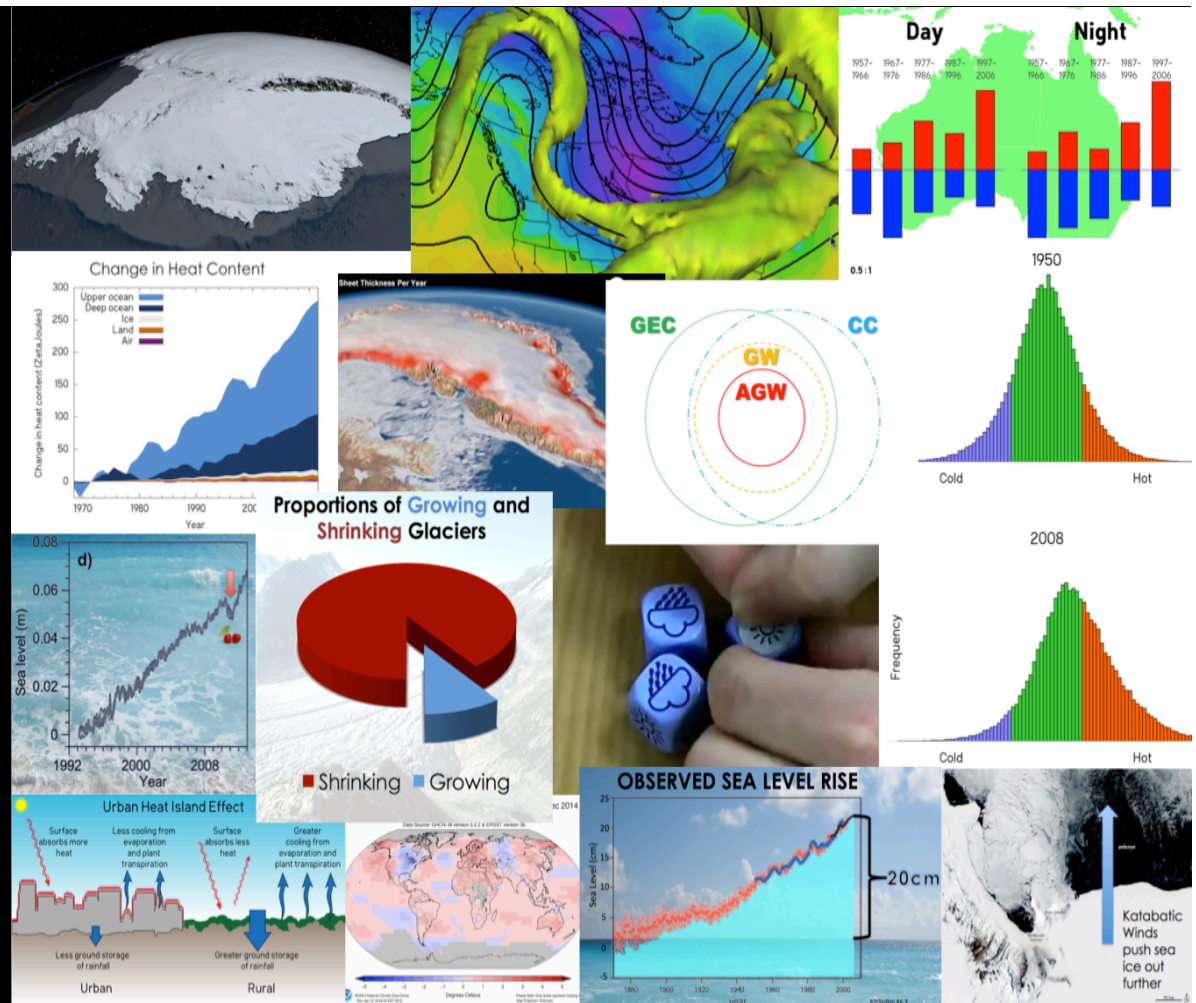
Sample Psychology Video

<https://youtu.be/5LvaGAEwxYs?list=PL-Xgw8LFaM3DqWBscgSyuDj-yg-EbT53x>



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- **Week 2: Global Warming is Happening**
 - Warming Indicators
 - Heat Build-up
 - Hot Records
 - Cryosphere
 - Shrinking glaciers
 - Greenland ice loss
 - Antarctic land ice vs sea ice
 - Temperature
 - Building a robust temperature record
 - Heat in the city
 - Wavy jet stream
 - Climate change vs global warming



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- **Week 3: We are causing global warming**

- Carbon Cycle

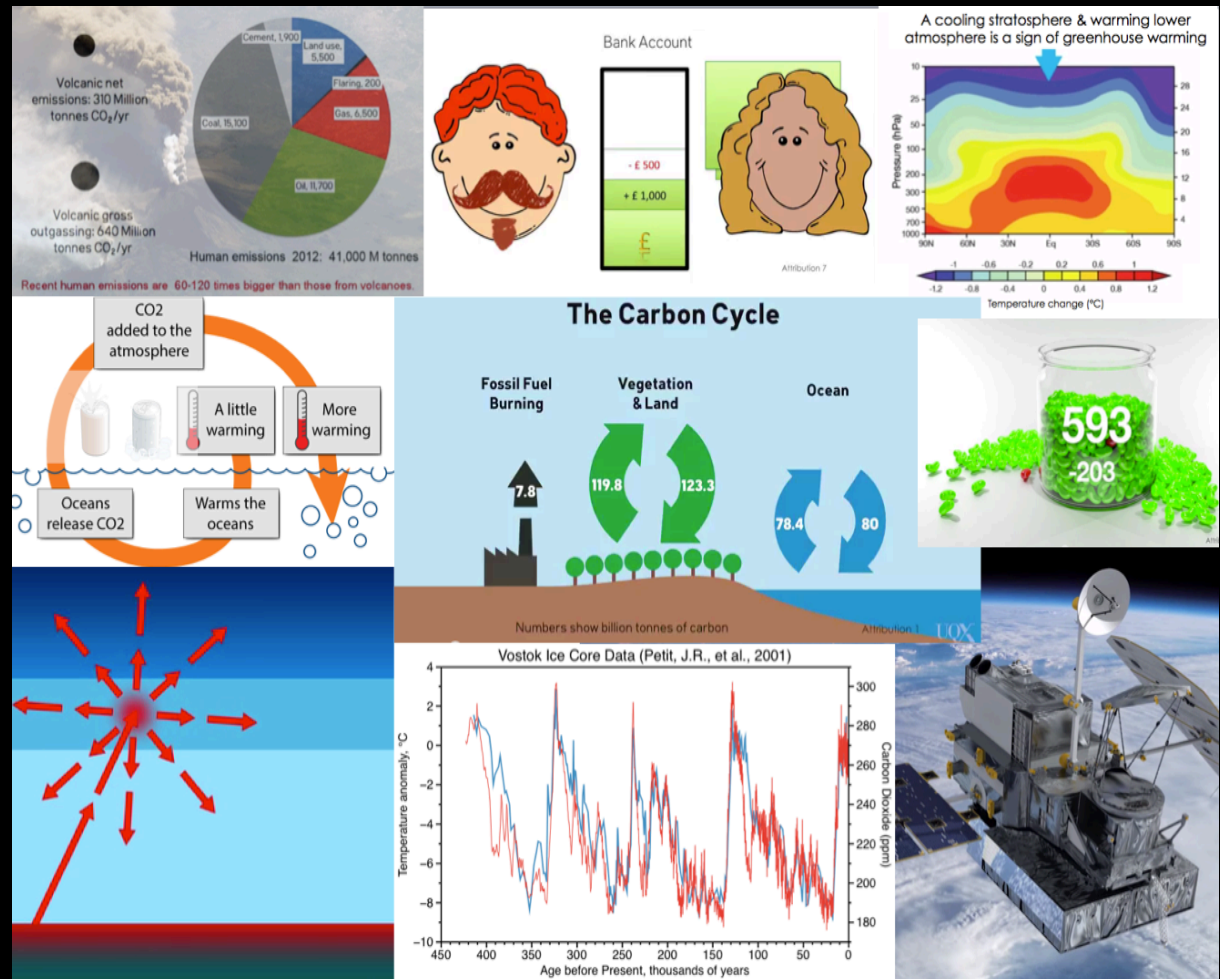
- Upsetting natural balance
 - The CO₂ rise is man-made
 - Taking up residence

- Greenhouse Effect

- Increasing the greenhouse effect
 - Reinforcing feedback
 - Structure of our atmosphere
 - Measuring from space

- Fingerprints

- Daily and yearly cycle



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• **Week 4: The past tells us about the future**

— Past

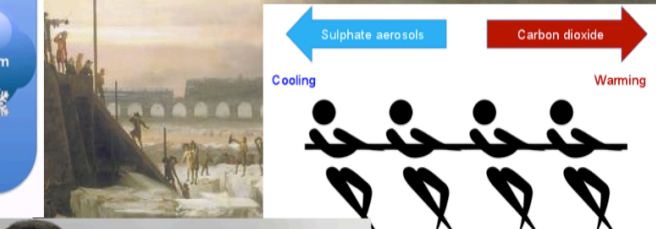
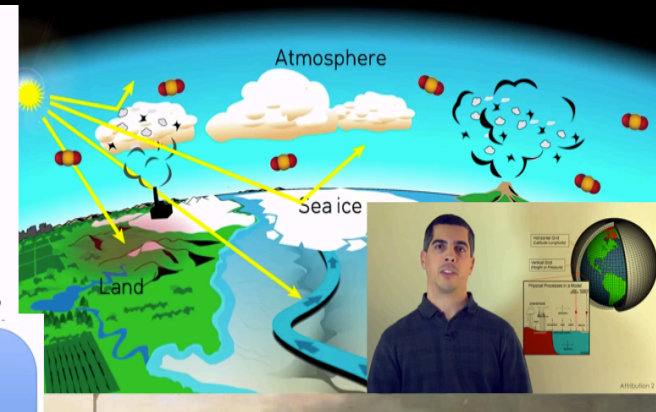
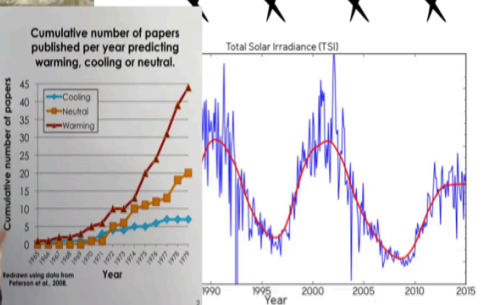
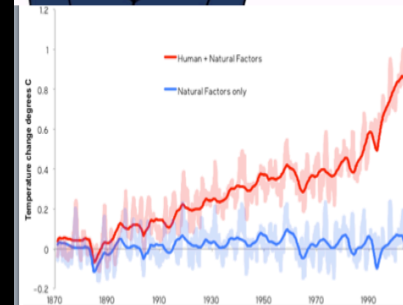
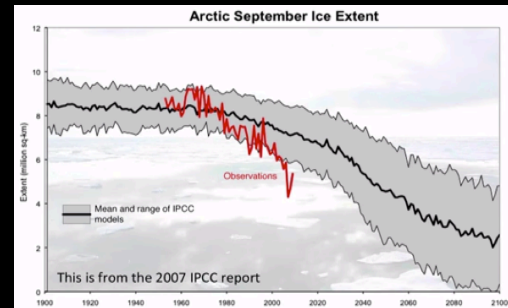
- Message from the past
- The Little Ice Age
- Ancient CO₂ levels

— Hockey Stick

- Medieval warm period
- Confused decline

— Models

- Principles that models are built on
- Success stories
- Weather vs Climate
- Climate science in the 1970s
- Future ice age
- Tendency to underestimate impacts



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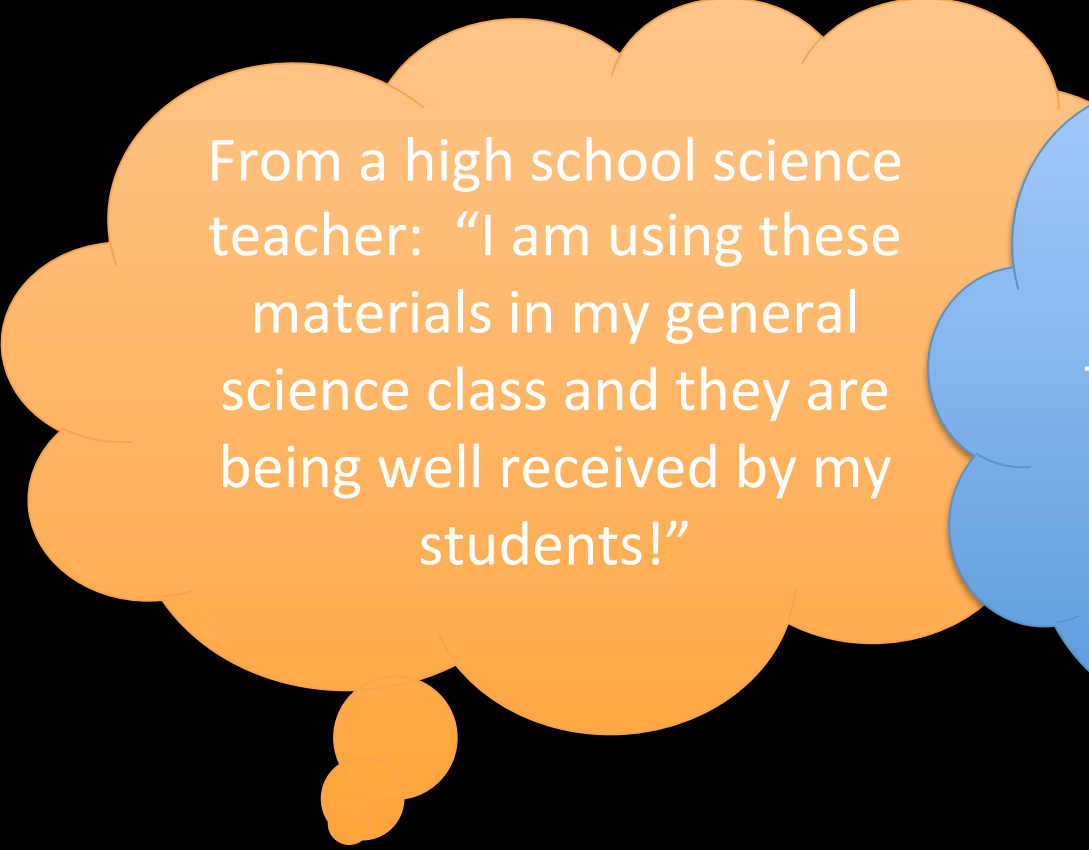
Sample Science Video

<https://youtu.be/u9L49p9Y8Mg>

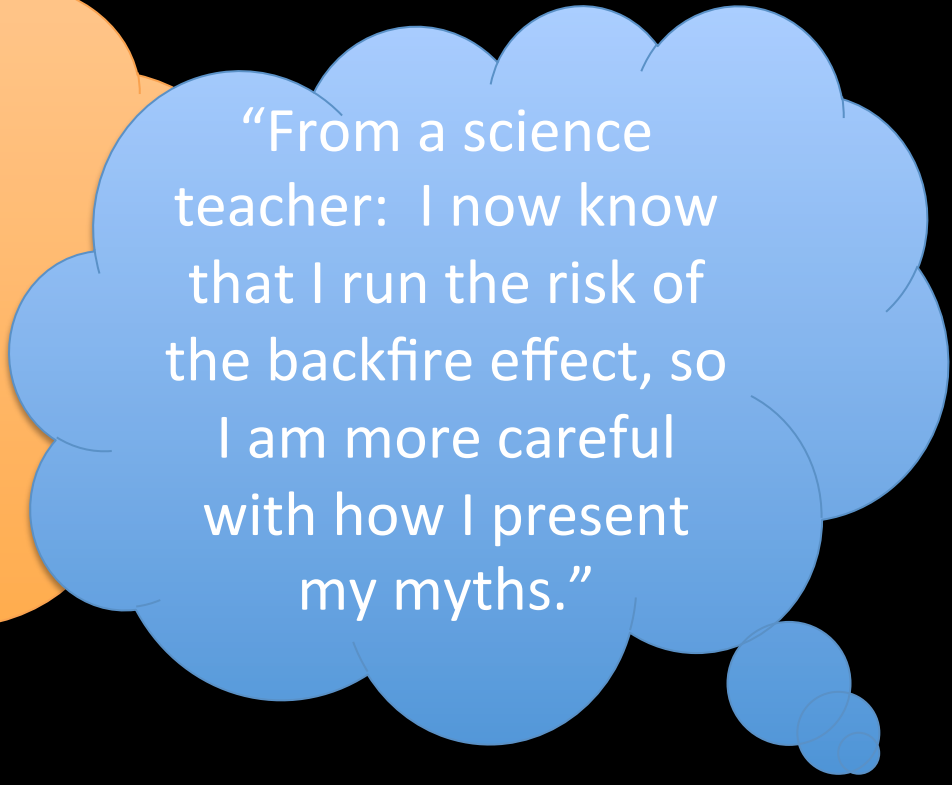


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Course Feedback

A large, irregular orange thought bubble with a small tail pointing towards the bottom left.

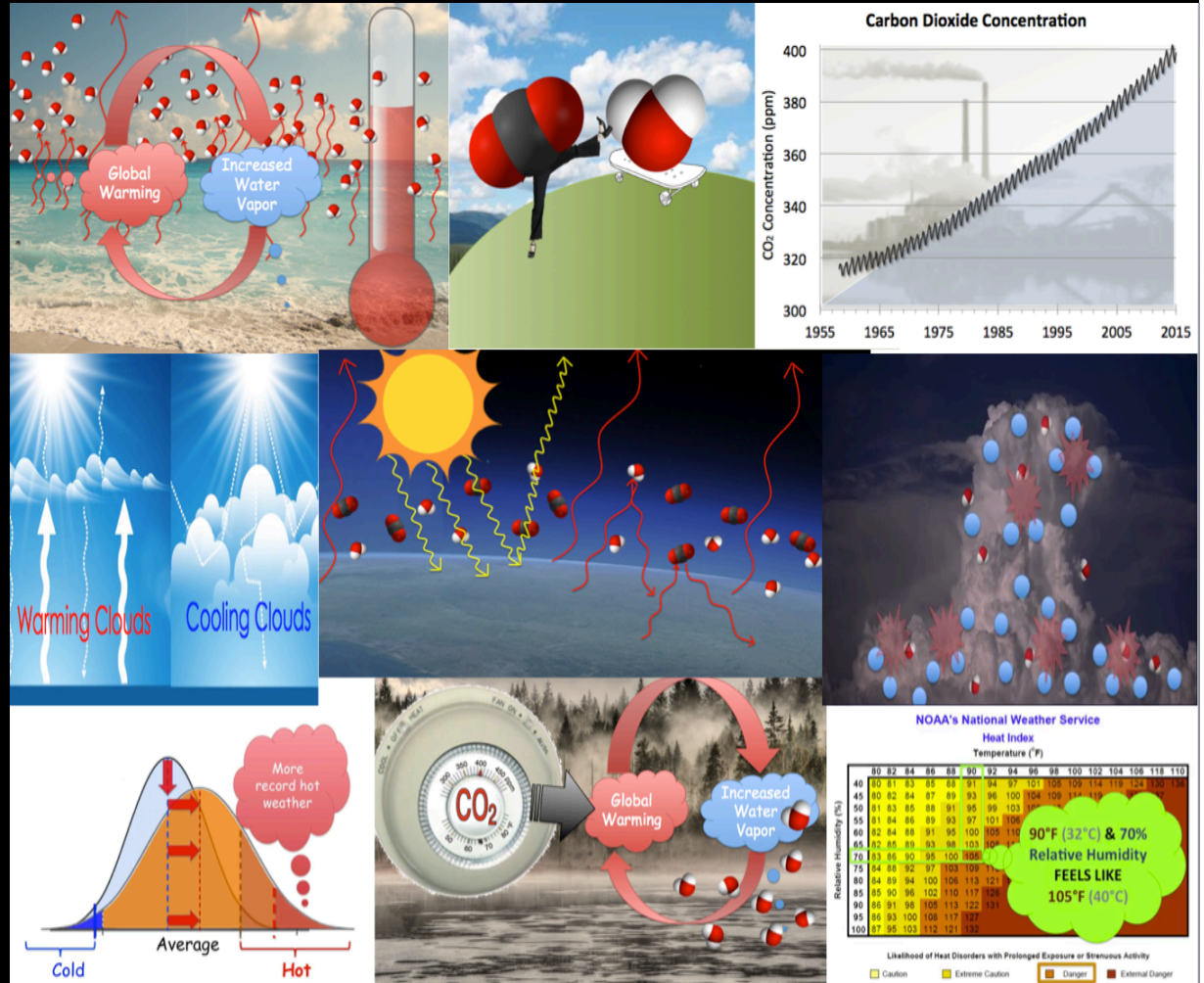
From a high school science teacher: “I am using these materials in my general science class and they are being well received by my students!”

A large, irregular blue thought bubble with a small tail pointing towards the bottom right.

“From a science teacher: I now know that I run the risk of the backfire effect, so I am more careful with how I present my myths.”

Week 5: We are feeling the impacts of climate change

- Climate Feedbacks
 - Climate is sensitive
 - Water vapor amplifies warming
 - The role of clouds
 - Methane clathrate feedback
- Environment
 - Adaptation takes time
 - Ecological impacts
 - Polar Bears
 - Ocean acidification
 - Coral Bleaching and ocean acidification
 - Overall Impacts
 - Carbon Dioxide is a pollutant
 - Agricultural Impacts
- Impacts on Society
- Extreme Weather
 - Heat Waves
 - Hurricanes



- **Week 6: Responding to Denial**

- Psychology of Denial

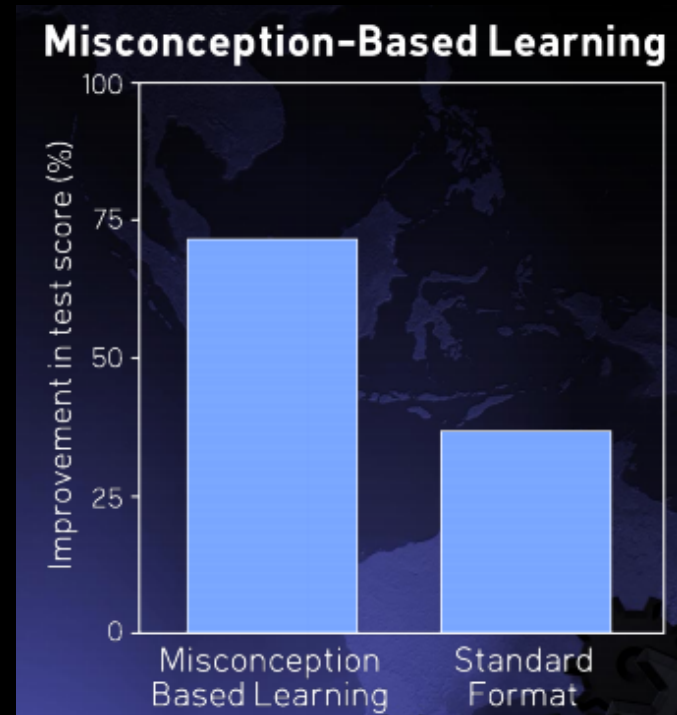
- Vocal Minority

- Debunking

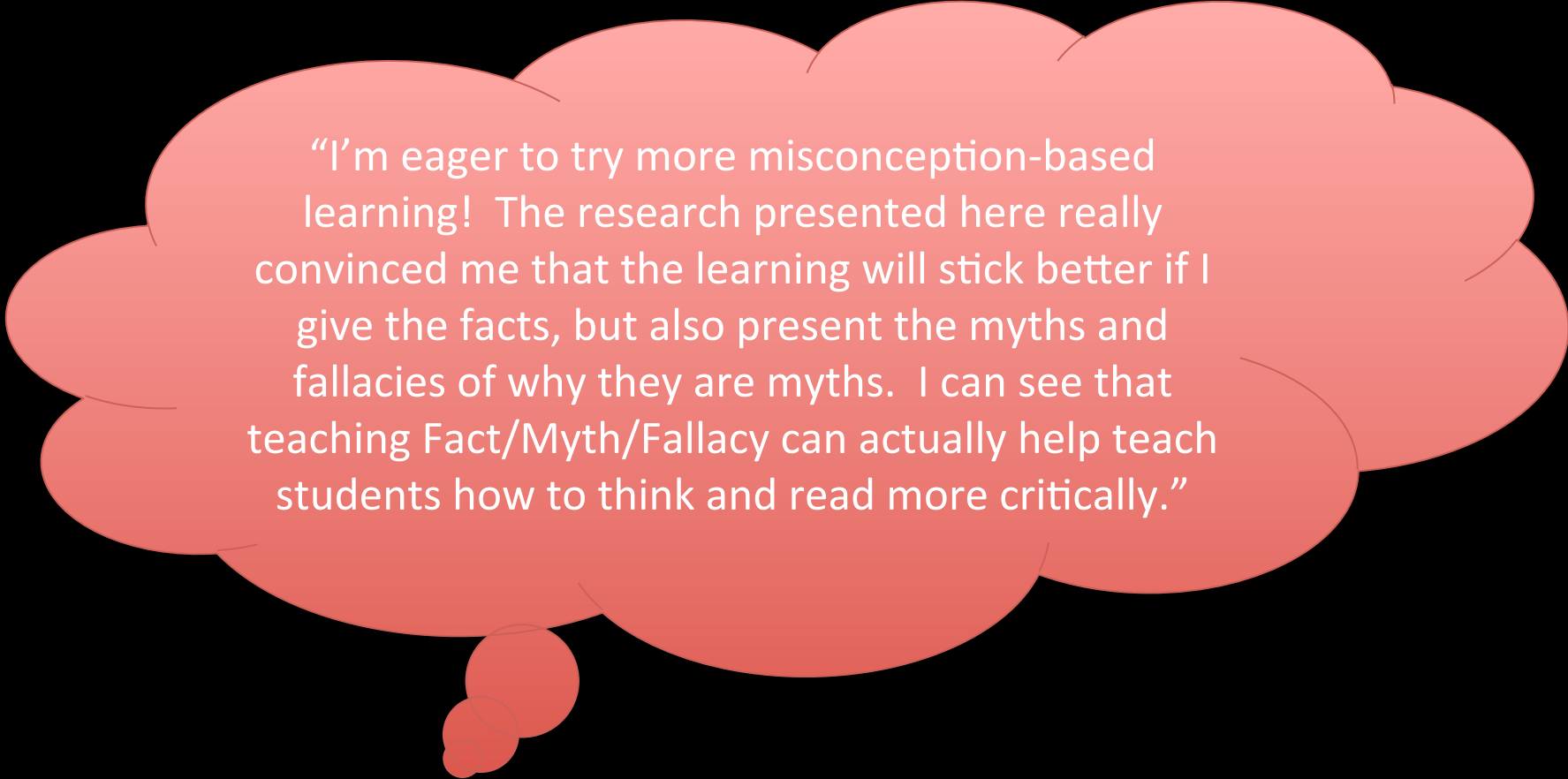
- Inoculation Theory

- Flu Shots

- Sticky Science



Course Feedback



“I’m eager to try more misconception-based learning! The research presented here really convinced me that the learning will stick better if I give the facts, but also present the myths and fallacies of why they are myths. I can see that teaching Fact/Myth/Fallacy can actually help teach students how to think and read more critically.”

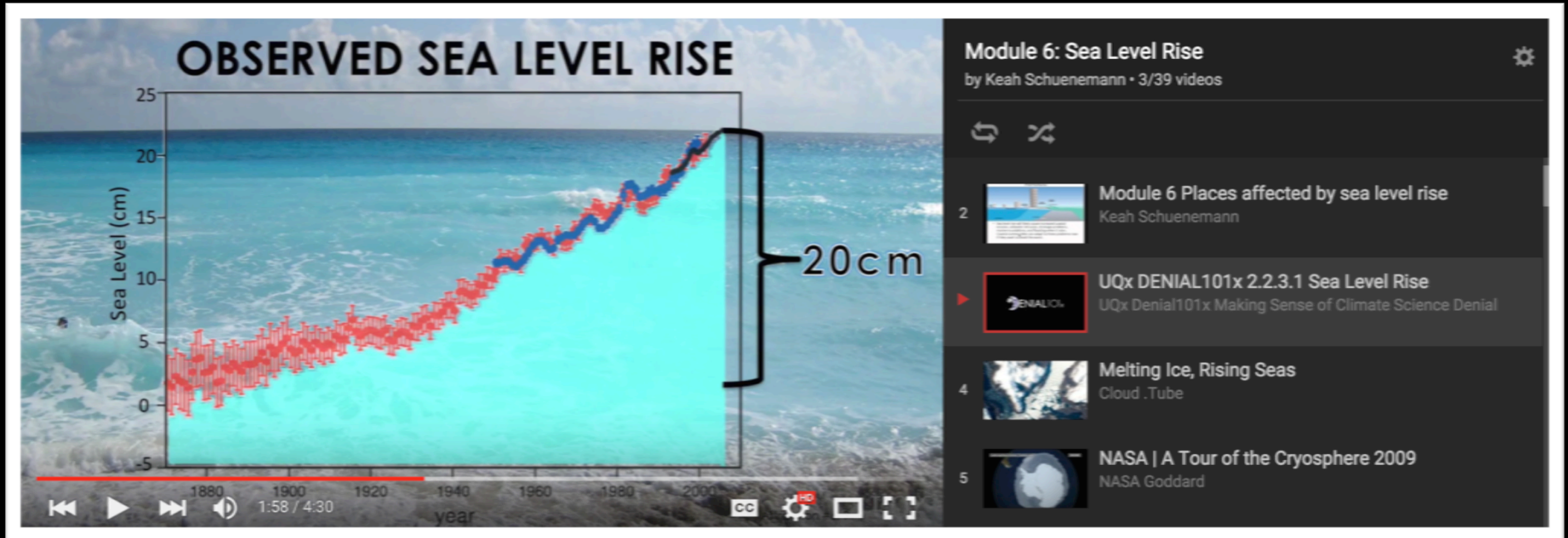
These videos can be used as a resource in several ways

- In online courses
- During lectures to punctuate points
- As a response to student questions
- Using them in non-atmospheric science courses
- For teacher professional development
- On social media

kschuene@msudenver.edu

Introductory Global Climate Change Summer Online College Course

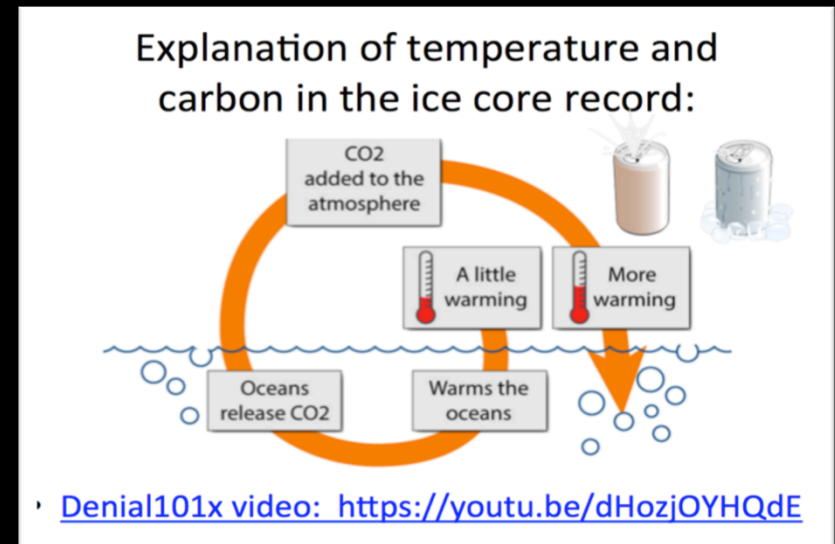
- Sprinkled among my online class playlists



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Introductory Global Climate Change in-person college course

- Relevant videos used to punctuate points in the lecture
- Occasionally just a link dropped on a slide so students can revisit topics with these 5-minute videos when they study



Using videos in courses of other disciplines

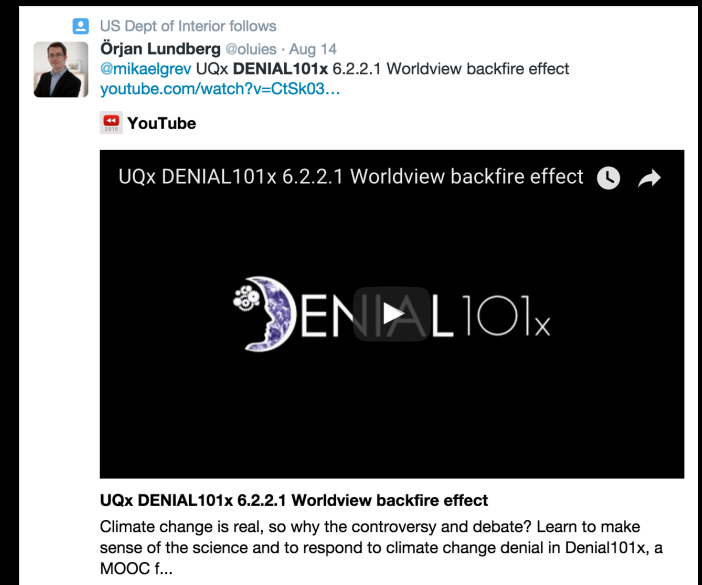
- Climate change comes up in courses across campus, often taught by non-experts (of climate). These videos could be a resource for professors from departments across campus from the humanities to the hard sciences.
 - Professors can use the videos as a personal resource to efficiently check their understanding on how to confront a difficult myth
 - Professors can use the videos in the course as a direct, live response to student questions

Using videos on Social Media

- We also are seeing these videos being used as responses to myths that pop up on social media



kschuene@msudenver.edu



Finding the proper video quickly

- The most efficient way to find the relevant video is to go to skepticalscience.com and look for the myth.



kschuene@msudenver.edu

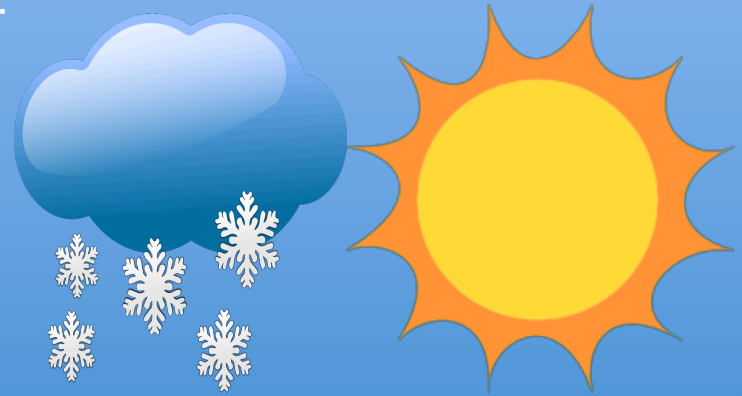
Course Feedback

From a teacher on a small island off of the Caribbean coast of Central America:

“We’ve been able to apply these new tools to our marine education program that I run at the local school. The greater majority of adults here have barely finished grade school and for them, any new idea is a challenge to their way of doing things. Instead of encouraging their children to learn, they are telling them their teachers are lying! By using the new tools, we have been able to better prepare the older students to recognize and understand why some adults can feel threatened by all this new information, but it still does not change the facts. The end result is that we have started to see a very slight increase in the number of students that participate in our discussions. Thank you Denial101!”



From a meteorologist: 32 years as a weather forecaster has not been enough to persuade me on climate change. When it was referred to me, I always denied it. Now, taking part in this course and watching the videos, I come back and say, "Sorry, I was wrong."





**Thank
you!**

Contact:
kschuene@msudenver.edu
Twitter: @keah88
DrKeah.blogspot.com

**Full list of videos: [http://
www.skepticalscience.com/denial101x-
videos-and-references.html](http://www.skepticalscience.com/denial101x-videos-and-references.html)**

**Dana Nuccitelli will be speaking about
the successes of our MOOC Wednesday
11:20 in Moscone West 3003**

kschuene@msudenver.edu