

Math 5490
Topics in Applied Mathematics
Introduction to the Mathematics of Climate

Fall 2023
1:25 - 3:20 Tuesdays and Thursdays
Amundson Hall 162

Richard McGehee, Instructor
 458 Vincent Hall
 mcgehee@umn.edu
 www-users.cse.umn.edu/~mcgehee/

course website
 www-users.cse.umn.edu/~mcgehee/teaching/Math5490/

Math 5490 9/21/2023

Math 5490
Greenhouse Effect


Brief History

1827: Fourier notices that the Earth is hotter than theory predicts
 1856: Arrhenius fingers CO₂
 1858: Keeling Curve starts
 1988: IPCC (Intergovernment Panel on Climate Change) formed
 1991: FAR (First Assessment Report) from IPCC
 1995: SAR (Second Assessment Report) from IPCC
 2001: TAR (Third Assessment Report) from IPCC
 2004: *The Day After Tomorrow* released.
 2006: FAR (Fourth Assessment Report) from IPCC
 2006: *An Inconvenient Truth* released.
 2007: Nobel Peace Prize awarded to IPCC and Al Gore
 2013: AR5 (Fourth Assessment Report) from IPCC
 2021 AR6 (Sixth Assessment Report) from IPCC

Math 5490 9/21/2023

Math 5490
Greenhouse Effect

2007 Nobel Peace Prize

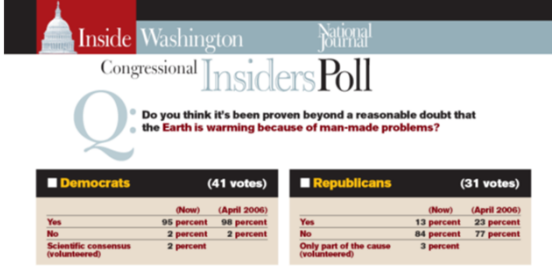


http://nobelprize.org/nobel_prizes/peace/laureates/2007/

Math 5490 9/21/2023

Math 5490
Greenhouse Effect

2007



National Journal, Feb 3, 2007
http://syndication.nationaljournal.com/images/203Insiderspoll_WJlogo.pdf

Math 5490 9/21/2023

Math 5490
Greenhouse Effect

2009

How much is Antarctica warming? Officials get firsthand look,
 Star Tribune, February 23, 2009

Online Comments: 2 favorable, 6 unfavorable

“Global [w]arming [c]annot be proved to be caused by humans. It can't. The earths climate has been constantly changing for billions of years. You global warming believers are nothing more than useful idiots to a bunch of politicians who want more control over our lives.” Posted by toddoruno on Feb. 24, 2009.

Star Tribune, Feb 23, 2009
http://comments.startribune.com/comments.php?id=asset_comments&asset_id=40181592§ion=world

Math 5490 9/21/2023

Math 5490
Greenhouse Effect

2010

Opinions About Global Warming: 2006-2010

	July 2006	Jan 2007	April 2008	Oct 2009	Oct 2010
Is there solid evidence the earth is warming?	%	%	%	%	%
Yes	79	77	71	57	59
Because of human activity	50	47	47	36	34
Because of natural patterns	23	20	18	16	18
Don't know	6	10	6	6	6
No	17	16	21	33	32
Mixed/Don't know	4	7	8	10	9
	100	100	100	100	100

The Pew Research Center for People and the Press, October 27, 2010
<http://people-press.org/2010/10/27/little-change-in-opinions-about-global-warming/>

Math 5490 9/21/2023

Math 5490
Greenhouse Effect


2010

Wide Partisan Differences in Views About Global Warming

Is the solid evidence the earth is warming?	Rep %	Dem %	Ind %
Yes	38	79	56
Because of human activity	16	53	32
Because of natural patterns	18	18	17
Don't know (Vol.)	3	8	7
No	53	14	31
Mixed/Don't know (Vol.)	9	6	12

Do scientists agree the earth is getting warmer because of human activity?	Rep %	Dem %	Ind %
Yes	30	59	41
No	58	32	45

The Pew Research Center for People and the Press, October 27, 2010
<http://people-press.org/2010/10/27/little-change-in-opinions-about-global-warming/>


 Math 5490 9/21/2023

Math 5490
Greenhouse Effect

2010

Do scientists agree the earth is getting warmer because of human activity?	July 2006 %	Jan 2007 %	April 2008 %	Oct 2009 %	Oct 2010 %
Yes	59	--	--	--	44
No	29	--	--	--	44
Don't know	12	--	--	--	12
	100	--	--	--	100

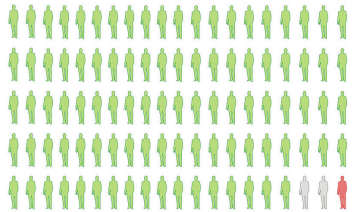
The Pew Research Center for People and the Press, October 27, 2010
<http://people-press.org/2010/10/27/little-change-in-opinions-about-global-warming/>

 Math 5490 9/21/2023


Math 5490
Greenhouse Effect

2011

97 out of 100 climate experts think humans are causing global warming



John Cook, *Skeptical Science*, 11 May 2011
<http://www.skepticalscience.com/news.php?n=734>

 Math 5490 9/21/2023

Math 5490
Greenhouse Effect

Today


View *An Inconvenient Truth*.

Tuesday, Sept 26

View *The Day After tomorrow*.

Thursday, Sept 28

Guest lecture: Professor K. Meyer, Carleton College, will present a mathematical theory of resilience.

 Math 5490 9/21/2023

Math 5490
Greenhouse Effect


Tuesday, Oct 3

Come prepared to discuss the two films.

What did the films get right scientifically?

What did they get wrong?

What did you think about the portrayal of politics?

 Math 5490 9/21/2023