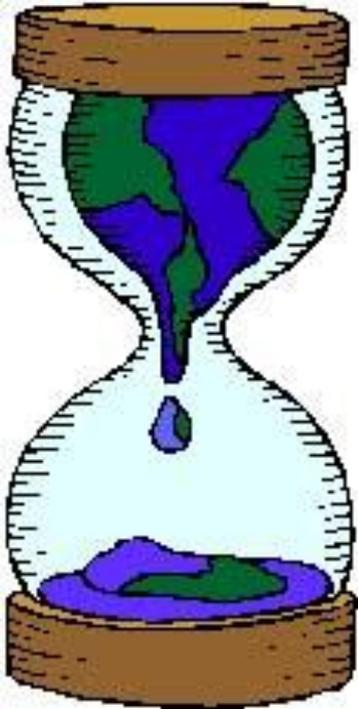


Welcome to

GC 170A1 INTRODUCTION TO GLOBAL CHANGE



**Your should have obtained two (2)
handouts when you came in today.**

**Please fill out the short one
and turn it in to a TA before
you leave today.**

Your Professor:

Dr. Katie Hirschboeck *

**Associate Professor of Climatology
Laboratory of Tree-Ring Research**

*** (pronounced: "hersh-beck")
but you may call me "Dr H"**

Objectives for today's class:

- 1 – Introduction to your Teaching Team
(and how you can be a part of it)
- 2 – Overview of the course and how
you will benefit from it
- 3 – Explanation of the course logistics
- 4 – What to do for your First Assignment!!!

This is a General Education / Teaching Team Course



Your Teaching Team:

Professor: Dr. Katie Hirschboeck

(Laboratory of Tree-Ring Research, LTRR)

Office: 208 West Stadium (yes, the football stadium!)

Graduate Teaching Assistants (GTA's)



Your Graduate Teaching Assistants (GTA's)

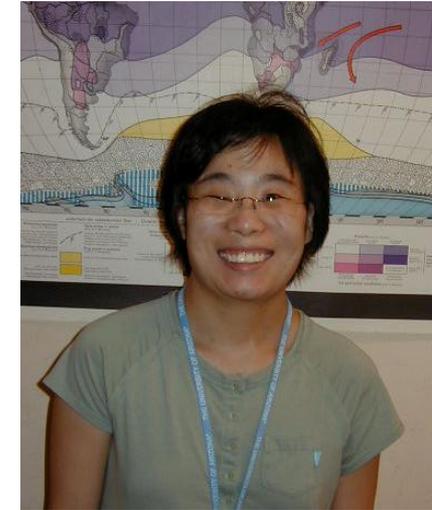


Adriana Zuniga
Arid Lands

“Resource TA”
Elizabeth May
Anthropology



Laura Marshall
Natural Resources



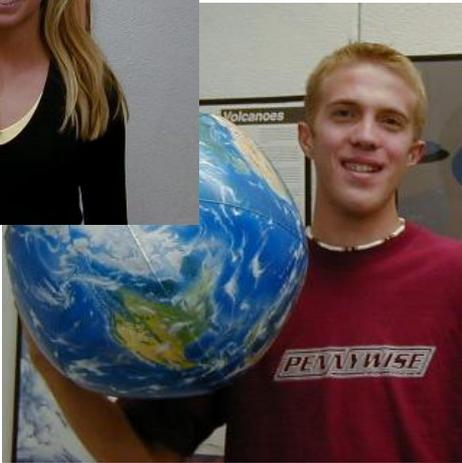
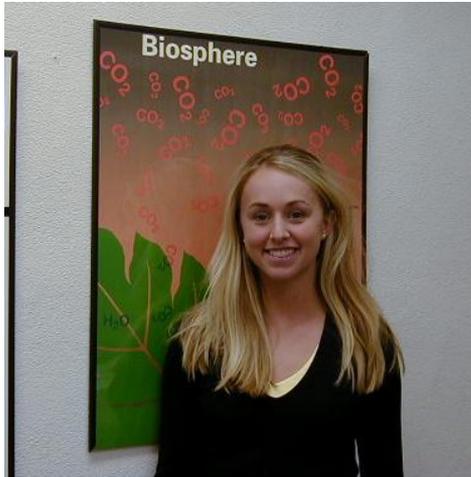
Saeahm (“Sam”) Kim
Hydrology & Water Resources



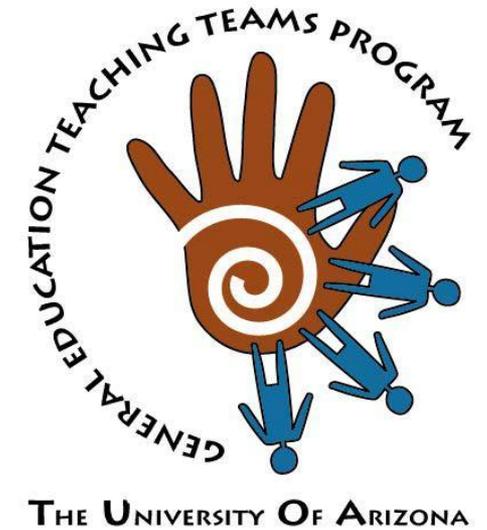
**GTA Office Hours
will begin next week**

and Undergraduate Preceptors

THIS COULD BE YOU!!



Come in for an interview and learn more!



**WHAT IS THIS COURSE
ALL ABOUT?**

**SCIENCE
& PHYSICAL SCIENCE CONCEPTS**

THE EARTH

**HOW & WHY
GLOBAL CHANGES OCCUR**

**YOUR ROLE AS
A CITIZEN OF OUR PLANET**

Why study the Earth System & Global Change?

Massive Chunk of Greenland Glacier



A massive chunk of Greenland's Jakobshavn Isbrae glacier broke off the sea earlier this month, startling scientists who detected the event thanks to satellite images.

Even More Hot Times



The sweet baked...

'Weird' Weather Is the New Normal



Dramatic swings between very wet, very dry and catastrophically stormy weather are likely to be the norm from now on, according to scientists who point to an overall warmer global climate as the source of the new meteorological reality.

"It's a new normal, and I really do think that global weirding is the best way to describe what we're seeing," Texas Tech University climate scientist Katharine Hayhoe told reporters.

While it's impossible to point to climate change as the cause of any single event, such as the devastating Joplin, Mo., tornado on May 22, Hayhoe says the pervasive background of a warmer global climate now has an impact on every storm, heat wave and wintry chill.

She and other scientists joined business leaders in a teleconference held by the Union of Concerned Scientists to highlight the mounting toll from manmade climate change.

The increasing ferocity of storms is putting a financial strain on the global risk industry, prompting some insurers to now advocate a more rapid shift to renewable energy and away from climate altering carbon-based fuels.

Photo: FEMA

increase in heat across the eastern United States in 2003. Thousands of fatalities." — Noah Diffenbaugh

Warmer-Weather Species Invade Arctic as Climate Warms

July 16, 2010



Inuit residents of Nunavut are being surrounded by plants and animals they have never seen before as a warmer climate allows the species to expand northward into Arctic Canada.

"There's 15 species that have been identified as exotic, meaning species that weren't historically in Nunavut," Environment Department spokesman Steve Pinksen told the CBC.

He said that the exotic plants could have been introduced through bird droppings or from traces of soil left on someone's footwear.

Some insects could have been brought north in cargo aboard ships and planes, Pinksen told the broadcaster.

Scientists in Canada have recorded what they call a "substantial warming signal" across the country from 1936 to 2006, with a 9.5-degree Fahrenheit rise in mean February temperatures and a 2.7-degree rise for May.

University of Alberta researchers report this warming has brought on earlier bloom times for trees and wildflowers in the central parklands of the province.

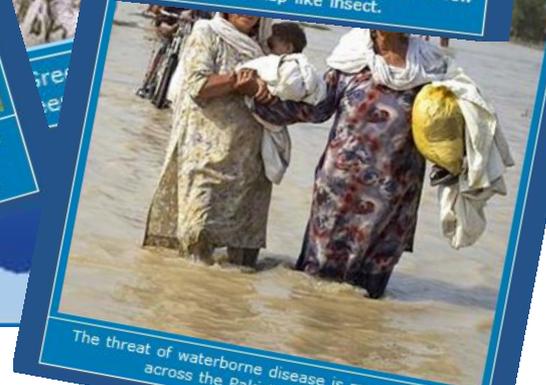
Writing in the journal Bioscience, they write that a flower



Life forms that are not native to Nunavut's Arctic environment have started showing up over the past few years, including a wasp-like insect.



The average annual losses from natural disasters have skyrocketed from \$25 billion in the 1980s to around \$130 billion in the first decade of the 21st century.



The threat of waterborne disease is mounting daily across the Pakistan flood zone.

<http://www.earthweek.com/>

2012 (so far!) . . .

Recent Severe Heat and Drought Linked to Climate Change

August 10, 2012

NASA scientists announced that the recent spate of scorching summers is almost certainly due to human-induced climate change.

2011



Tropical Plankton Found Living in the Arctic

A team of international scientists says that for the first time, tropical and subtropical species of marine microorganisms have been found in high in the Arctic Ocean.

Researchers from... that white... Greenland Ice Melt Startles Scientists

Arctic Poised For Greatest Ice Loss Ever This Summer

July 20, 2012

The recent unprecedented warmth across much of North America has been accompanied by the Arctic sea ice pack melting to its second-lowest June extent since satellite observations began in 1979.

The U.S. National Snow and Ice Data Center (NSIDC) says that during June, the Arctic lost a record total of about 1.1 million square miles of ice and was running just below the 2007.

The expanse of ice on June 30 was what would normally be expected on July 21, based on the 1979-2000 average. This was a full three weeks ahead of schedule. Scientists say it is still too early to tell if weather patterns will allow for September.

The NSIDC said the only part of the Arctic with above average sea ice at the end of June was along the coast of eastern Greenland.



July 20, 2012

America's Worst Drought Since 1956 Parches Half of Country

Crops across a vast stretch of the United States withered as the most expansive...

Thousands ordered to flee wildfire in N. California

UV Radiation



hole, according to an international team of researchers.

While suspected for some time, their findings are the first to actually measure the steep increase in deaths among ocean life caused by the increase in ultraviolet B radiation over the past several decades of stratospheric ozone depletion.

Writing in the journal *Global Ecology and Biogeography*, the team says the marine life most affected are algae, coral, crustaceans and fish larvae and eggs.

This means their losses are affecting marine ecosystems from the bottom to the top of the food web. "We know that damaging UVB radiation can penetrate to considerable depths in clear ocean waters," said Carlos Duarte, co-author and director of the University of Western Australia's Oceans Institute.

While international agreements have prevented manmade chemicals from inflicting further damage to the protective ozone level, it will take decades for the ozone hole to significantly recover.

Photo: File



"We know that damaging UVB radiation can penetrate to considerable depths in clear ocean waters." Carlos

Univ... in the southwestern district of Fangshan. Flood waters trapped motorists in their cars, students in their schools and bus passengers on roadways around the capital.

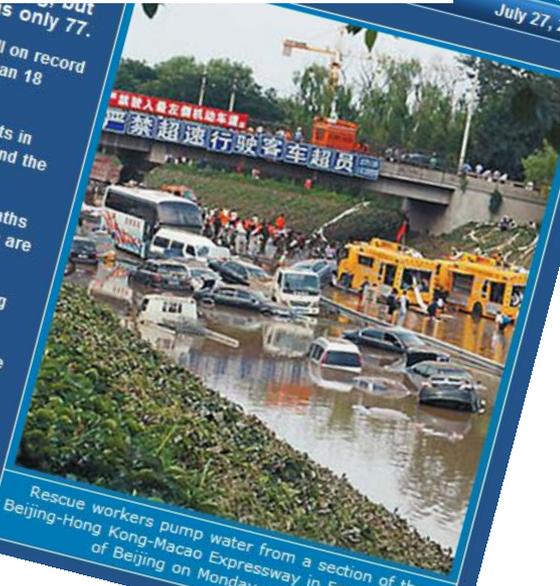
China suffers flooding and numerous storm-related deaths each summer during its rainy season, but such deluges are rare in Beijing's normally dry climate.

The city's drainage system was mostly constructed during the 1950s, based on a Soviet design.

It has not been updated to keep pace with China's explosive development in recent decades.

Construction has also covered many of Beijing's canals and other waterways, leaving runoff nowhere to go except into the overwhelmed sewers.

Photo: China Daily



Rescue workers pump water from a section of the Beijing-Hong Kong-Macao Expressway in Fengtai district of Beijing on Monday afternoon.

July 27, 2012

Questions GLOBAL CHANGE SCIENTISTS are asking and studying:

- **How and why are these changes occurring?**
- **What are the impacts? Who will be most vulnerable? Where will impacts be greatest?**
- **Can human beings do anything to stop or mitigate these changes?**
- **. . . or are they part of “natural variability” that will happen no matter what we do?**
- **How can humanity adapt to global changes?**

THESE ISSUES ARE NOT WITHOUT CONTROVERSY!! We'll address this too!



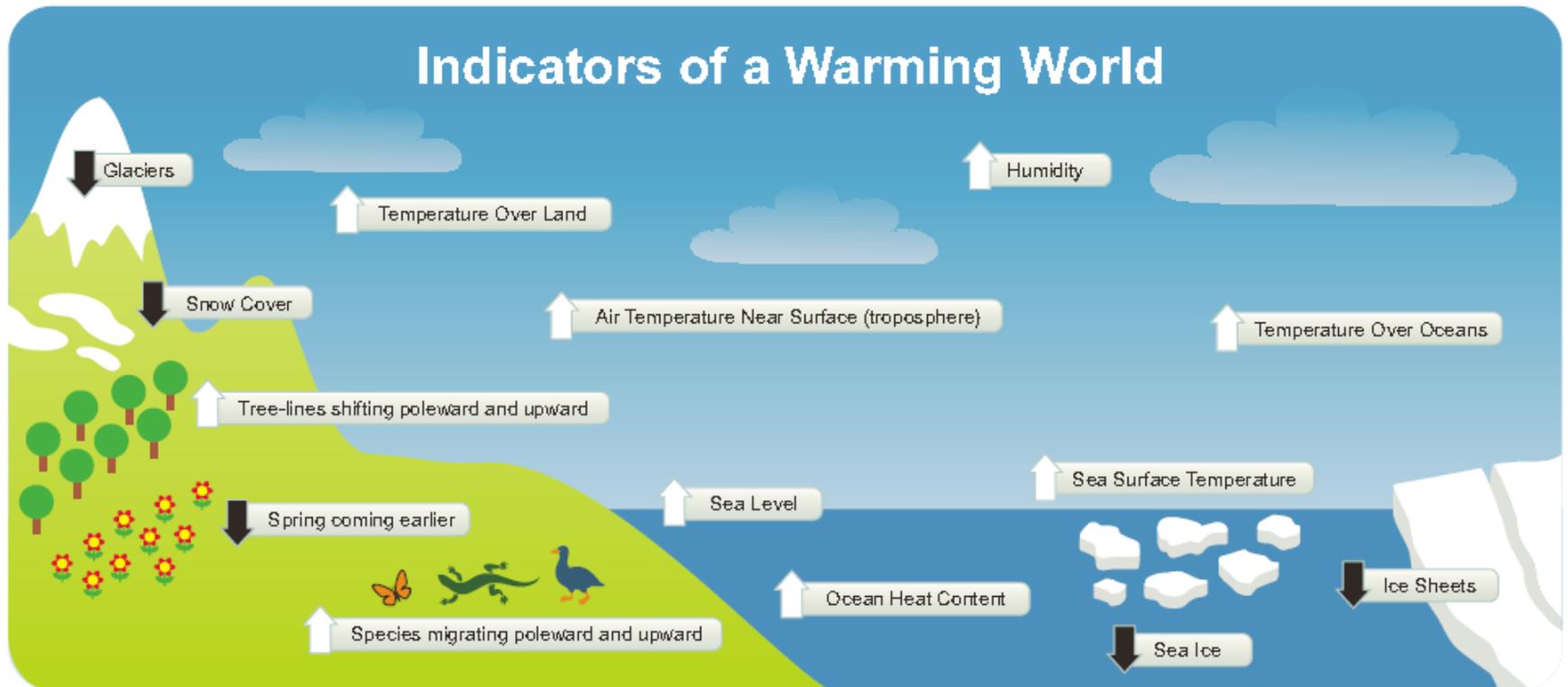
SHOULD THE UNITED STATES ADOPT A TAX ON CARBON?

Should the United States adopt a tax on carbon? Yes: It would spur growth, innovation

SHOULD THE UNITED STATES ADOPT A TAX ON CARBON?

Should the United States adopt a tax on carbon? No: It would hobble economic recovery

GOAL #1: By the end of the semester, you will be able to explain how and why each of these indicators are changing and what it means for the planet – and you!

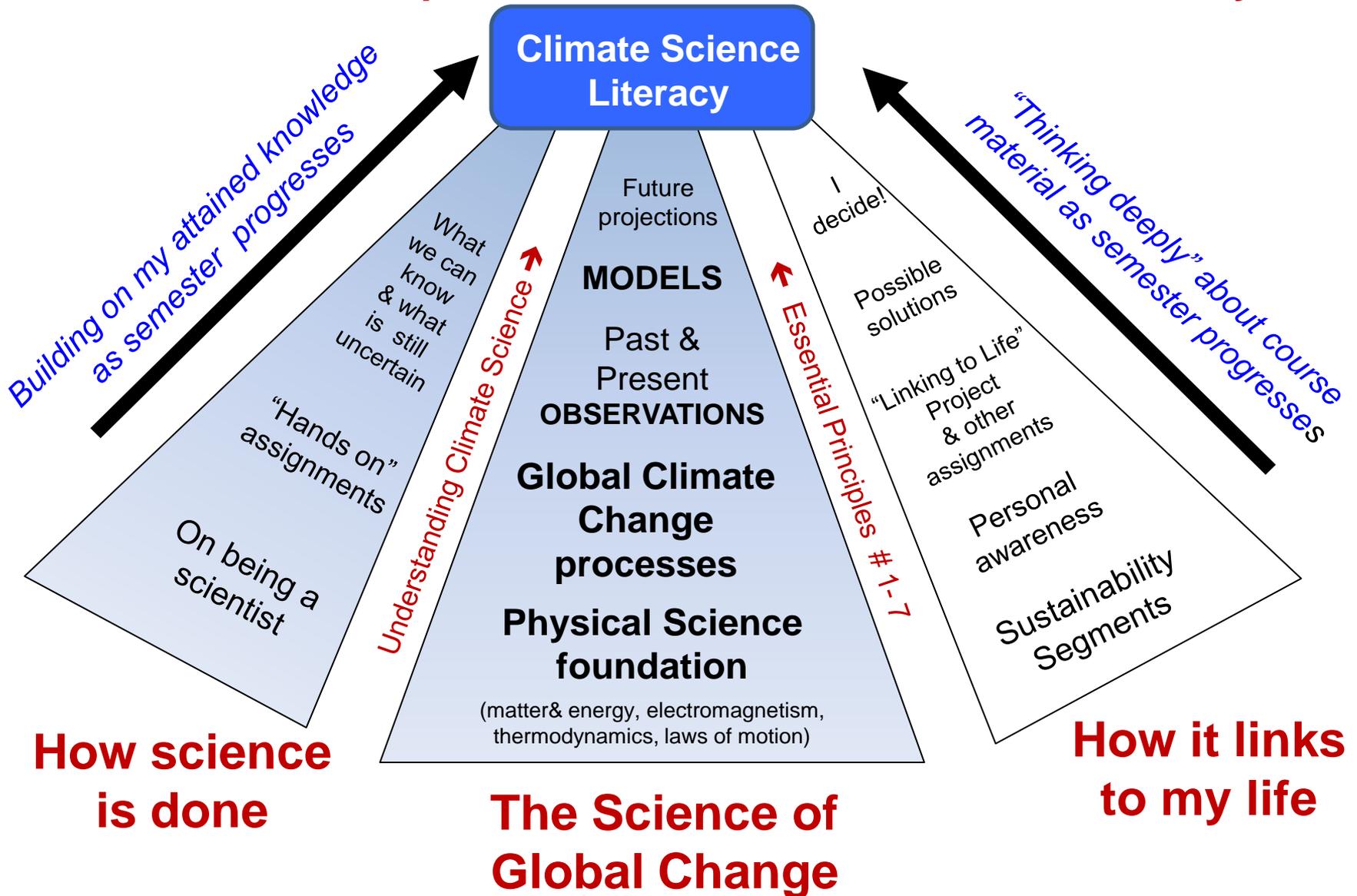


GOAL #2: By the end of the semester, you will be able to critically evaluate and knowledgeably discuss these indicators, which point to a “human” fingerprint in what’s driving climate change .



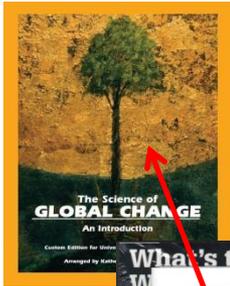
... and then make some informed decisions on what can be done about it!

OVERALL GOAL: Enhanced Understanding Of Global Change Science, How It Operates, & What It Means To Me Personally

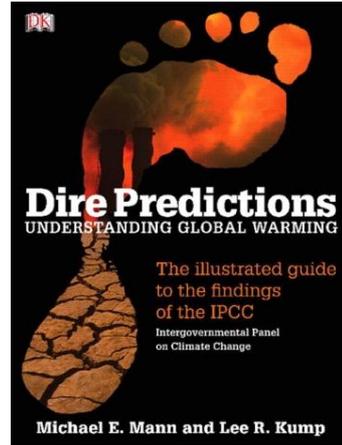


COURSE LOGISTICS

COURSE LOGISTICS



E-text



Required:
2 TEXTBOOKS
1 e-book (online)
+ one paperback

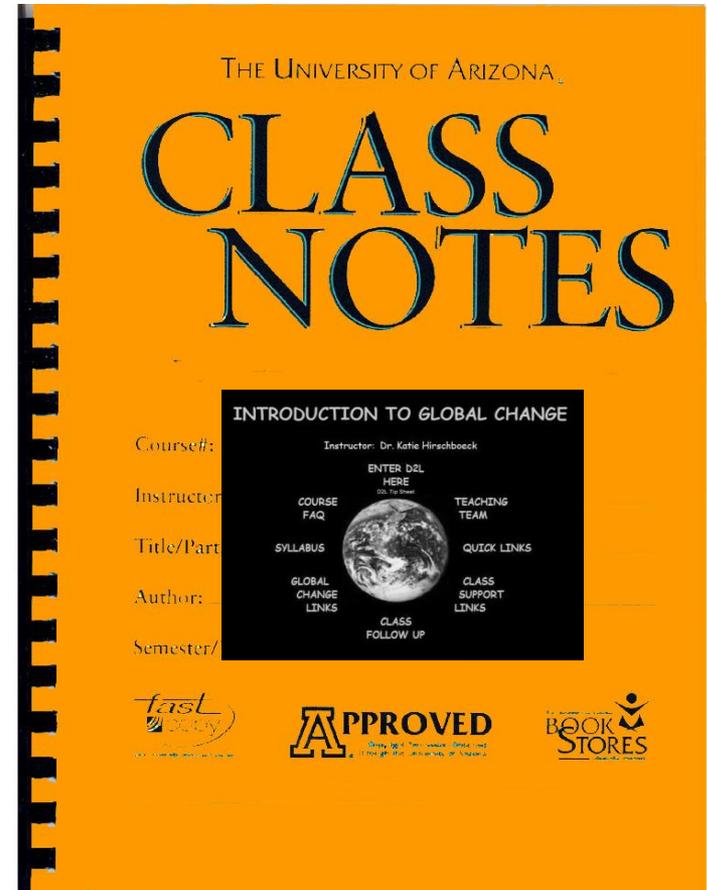
Begin reading Chapter 1 now in e-text. . .

NOTE: assigned readings will be listed in the weekly
D2L Checklist &
on the **Reading Assignments Schedule.**

COURSE LOGISTICS

. . . Plus a **CLASS NOTES PACKET** which will be available in the ASUA Bookstore tomorrow (Tuesday) after 3:00 pm or so . . . (go to the *Books Customer Service Kiosk* downstairs)

We'll be using it in class on Wednesday so please purchase it as soon as possible if you can.



COURSE LOGISTICS

. . . Plus a
Turning Tech “CLICKER”

Also available in the ASUA
Bookstore.

You'll need it starting NEXT WEEK!

NOTE: You cannot return these if
opened, but you will be able to sell it
back at end of semester . . . it's
becoming the new “standard” clicker
on campus & you should be able to
use it in other classes.



*Turning Technologies
Response Card*

How this class will operate:

**Class is divided
into ~ 20
collaborative
learning groups**



**Most of you are
first-year
students & non-
science majors**

WHAT KIND OF BACKGROUND DO I HAVE TO HAVE?

- **CRITICAL READING SKILLS**
- **WRITING SKILLS**
- **BASIC MATH & QUANTITATIVE REASONING SKILLS**
- **HIGH SCHOOL SCIENCE**
- **TEAM WORK SKILLS**

**Important: regular computer access is
REQUIRED for this class!**

*(Please fill out the background form turn it in
before you leave today)*

COURSE LOGISTICS

GC 170A Website (external & in D2L)

<http://fp.arizona.edu/kkh/nats101gc/>

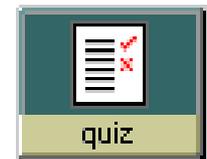


COURSE TOOLS WE'LL USE in D2L:

D2L = "Desire To Learn"

**OUR D2L SITE
MAY LOOK
DIFFERENT THAN
D2L IN SOME OF
YOUR OTHER
COURSES . . .**

**THE CHECKLIST
WILL GUIDE YOU!!**



Inside D2L

The screenshot shows a D2L course page for GC170A1. At the top, there are navigation links: My Home, D2L Email, Locker, Logout, D2L Help Pages, and Library Tools. The course title "GC170A1 Intro to Global Change" is prominently displayed next to the University of Arizona logo. Below the title is a navigation bar with links for Course Home, Classlist, Chat, Videos, Discussions, RQ Quizzes, Checklist, GRADES, SEMESTER-ON-A-PAGE, and READING & RQ SCHEDULE. The main content area is divided into several sections: Events (with a calendar icon and a callout "click for Calendar"), News, COURSE TOOLS (containing a grid of icons for various resources like class website, FAQ, checklist, follow-up, movie, dropbox, assignment, self-test, quiz, and study guides), and News & Announcements (with a callout "LATEST NEWS & ANNOUNCEMENTS"). Callouts from external boxes point to these sections: "D2L Help" and "UA Libraries" point to the top navigation; "Gradebook" points to the GRADES link; "Semester-on-a-Page" points to the SEMESTER-ON-A-PAGE link; "Reading & Online Quiz Schedule" points to the READING & RQ SCHEDULE link; "Events (due dates etc.)" points to the Events section; "News & Announcements" points to the News & Announcements section; "Main GC 170A Course Tools here" points to the COURSE TOOLS section.

My Home | [D2L Email](#) | Locker | Logout | [D2L Help Pages](#) | [Library Tools](#)

GC170A1 Intro to Global Change [Gradebook](#)

[Course Home](#) | [Classlist](#) | [Chat](#) | [Videos](#) | [Discussions](#) | [RQ Quizzes](#) | [Checklist](#) | [GRADES](#) | [SEMESTER-ON-A-PAGE](#) | [READING & RQ SCHEDULE](#)

Events [click for Calendar](#)

Today
No events

Upcoming

- [Prepare for "Pop" Quiz on the Syllabus & FAQ - Due](#) Aug 22, 2012 (12:00 PM)
- [Read Essay "On Scientific Method" by Robert Pirsiq - Due](#) Aug 22, 2012 (12:00 PM)

News

COURSE TOOLS

GC 170A "INTRODUCTION TO GLOBAL CHANGE"
Lecture 01 & 02 MWF 12:00 - 12:50 pm - Fall Semester 2012
For a guide to the GC 170A D2L Site Layout [CLICK HERE](#)

INTRODUCTION TO GLOBAL CHANGE	class website GC 170A webpage	FAQ Course FAQ	checklist Checklist Tool	Follow Up Class Follow-Up	
movie Videos	dropbox Dropbox	assignment Assignments	self-test Self Tests	quiz RQ's	study guides Study Guides

News & Announcements

LATEST NEWS & ANNOUNCEMENTS

Welcome to GC 170A1
INTRODUCTION TO GLOBAL CHANGE

The latest course news and announcements will always be posted right here.

Events (due dates etc.)

News & Announcements

Gradebook

Semester-on-a-Page

Reading & Online Quiz Schedule

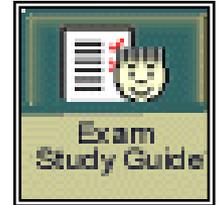
Main GC 170A Course Tools here

D2L Help

UA Libraries

Multi-Tiered Testing Approach:

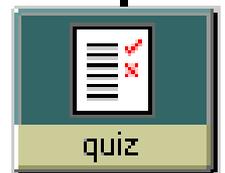
Midterm & Final
Individual Exams



In-class Individual &
Group Tests



Online Readiness
Quizzes



Ungraded
Self-Tests



**HIGH
STAKES
TESTING**



**LOW
STAKES
TESTING**

Example: **Short in-class test procedure:**

10-questions!

You'll take the test as an individual first . . .



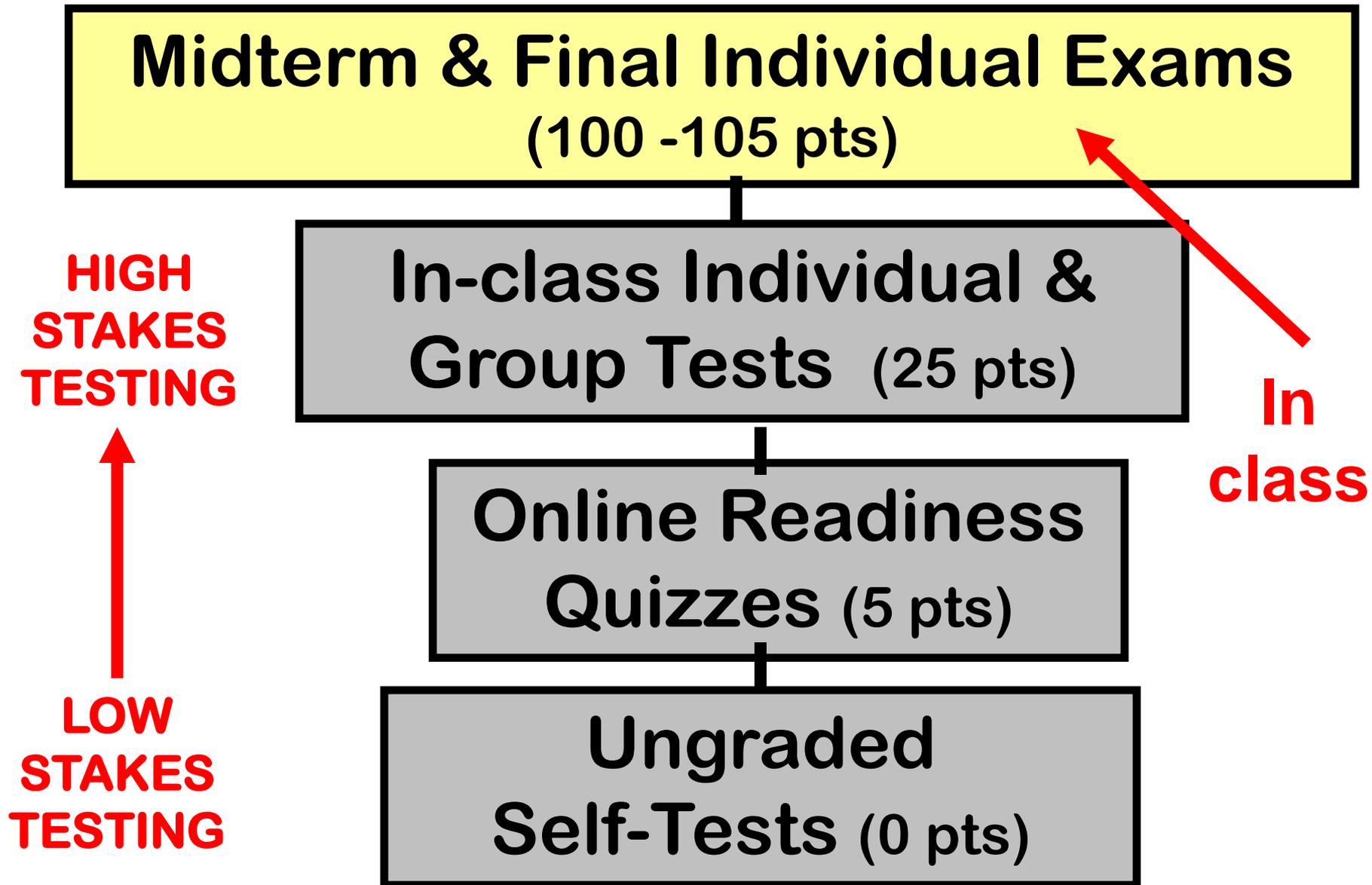
After individual tests are completed . . .

you'll get into your group & take the same test together as a group!



You'll find out your Group Test score right after you take it . . .

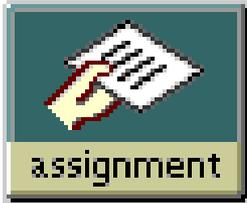
Multi-Tiered Testing Approach:



Group

ASSIGNMENTS

Individual



In Class
assignments

GROUP ASSIGNMENTS *(In-Class Activities)*



**G-1 Understanding
Absorption Curves**



G-2 Energy Efficiency



**G-3 Tree-Ring Activity
Parts I & II**



**G-4 Applying the Energy
Balance Terms**



G-5 Volcanism & Climate

INDIVIDUAL ASSIGNMENTS *(Short Writing Assignments)*



I-1 Climate Science Basics
Lesson 1 CO₂ & the GH Effect



I-2 Climate Science Basics
Lesson 2 Mother Nature's Influence



I-3 Climate Science Basics
Lesson 3 Observable Changes



I-4 Climate Science Basics
Lesson 4 Intro to Climate Modeling



**I-5 Class "Climate Action Debate"
Preparation**



Short Writing
assignments

LINKING-TO-LIFE PROJECT *(Individual Term Project in 4 Parts)*



Part A Your Ecological Footprint



Part B Thinking More Deeply



Part C Film Review Discussion Posts



Part D Final Project Report

Linking-to-Life
Term Project
(parts distributed throughout
the semester)



Instructions

Use this page to view the checklists available to you. To view a checklist and check any of its items, click the checklist name.

Checklists



Checklists

[Week 01 - Tasks for Aug 19-25](#)

Items Complete: 0 out of 12

[Week 02 - Tasks for Aug 26 - Sep 1](#)

Items Complete: 0 out of 9

Categories

- [Purchase Textbooks](#)
- [Read and Study Syllabus & FAQ](#)
- [Short Readings on Science](#)
- [E-Text](#)
- [Self Tests](#)
- [Readiness Quizzes](#)

The D2L Checklist Tool



[Check off each task as you complete it to stay on track & document your progress]

Week 01 - Tasks for Aug 19-25 - Internet Explorer provided by Dell

https://d2l.arizona.edu/d2l/common/popup/popup.d2l?ou=260624&queryString=&footerMsg=&popBodySrc=/d2l/lms/checklist/view

Week 01 - Tasks for Aug 19-25

Purchase Textbooks

Purchase "The Science of Global Change" (SGC) E-Text & "Dire Predicitons" (DP) textbooks

Our two textbooks have been arranged and/or selected specifically for this class and are available at the ASUA Bookstore in a single package. A pamphlet with registration directions to access the SGC E-Text online comes shrinkwrapped in the Textbook Package. It is labeled PEARSON Online Access. The package also contains the *Dire Predicitons* paperback text.

[NOTE: Contact Dr. H immediately if you discover that for some reason the bookstore has run out of copies.]

Purchase the GC 170A Class Notes packet

The **CLASS NOTES PACKET** will be available for purchase the first week of classes. You can get it at the **ASUA Bookstore** at the textbook **KIOSK** on the 1st floor (basement) of the bookstore.

PLEASE OBTAIN IT AS SOON AS ITS AVAILABILITY IS ANNOUNCED and BRING IT TO CLASS next week.

[NOTE: The bookstore typically runs out of copies of the CLASS NOTES at some point so you may need to put in a **SPECIAL ORDER** with the bookstore to get a copy run off for you personally. This usually takes at least 24 hours.]

Purchase Turning Tech Response Card ("clicker")

The logistics of how we will use "Clickers" in this class will be explained in class in more detail.

(NOTE: You should be able to use the Turning Tech clicker in several of your UA courses.)

Read and Study Syllabus & FAQ

Read Syllabus

Read & study the **Course Syllabus** so that you become familiar with the course structure and format. Prepare yourself to take a "practice" self-test and RQ quiz on the syllabus. (NOTE: your "practice" self-test and quiz results will not count toward your course grade.)

Learn the Course Policies by studying the FAQ

Read & study the **Course Policies FAQ** so that you understand the course policies, rules, and procedures. Prepare yourself to take the "practice" self-test and online quiz (RQ) on the FAQ. (NOTE: your "practice" self-test and quiz results will not count toward your course grade.)

Prepare for "Pop" Quiz on the Syllabus & FAQ

Due at 1:00 PM on Wednesday, August 22, 2012

BE PREPARED FOR A "POP QUIZ" ON THE SYLLABUS & FAQ IN WEDNESDAY'S CLASS (Aug 22)

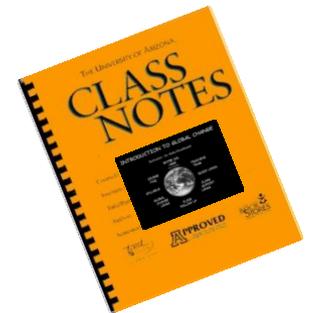
Short Readings on Science

Read Essay "On Scientific Method" by Robert Pirsig

Due at 1:00 PM on Wednesday, August 22, 2012

ASSIGNMENTS FOR WEDNESDAY:

1. On the **CLASS WEBPAGE**, read & study the **Syllabus** and the **online FAQ** (Frequently Asked Questions)
POP QUIZ in class on Wednesday about this!
(To test yourself, take the Practice Self Test)
2. **REGISTER YOUR E-TEXTBOOK & begin reading CHAPTER 1.**
3. Get your **CLASS NOTES** packet on Tues afternoon or Wed & bring to class on Wed (if possible).
4. Go to **QUICK LINKS** & read the short essay “**On Science**” by Robert Pirsig -- it will be referred to in class on Wed.



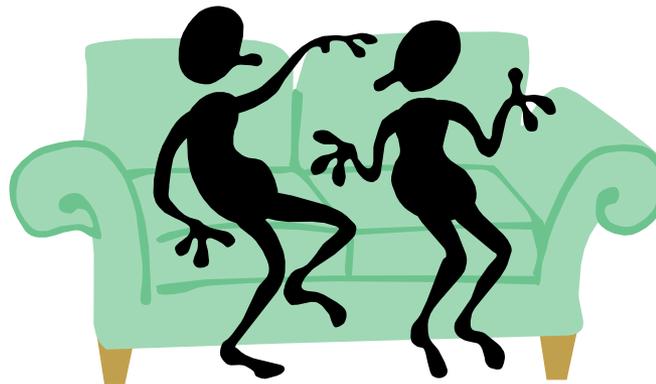
PASSWORD = nats101gc

QUESTION BREAK!



Get to know someone in class:

1. Name?
2. Where from?
3. What year & major?
4. Most interesting place on Earth visited?
5. Ever experienced an unusual environmental phenomenon? (flood, landslide, earthquake, tornado, wildfire, etc.)



“Dr. H” CLASSROOM POLICIES

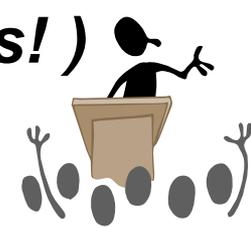
(more at online FAQ “Frequently Asked Questions”):

1. Sorry, but no questions can be answered *before* class until teaching equipment is set up.
2. Questions *after* class will be answered after the equipment has been shut down.
3. **Don't distract your fellow students!** Unless laptops are being used in class for an approved class purpose all electronic devices must be shut off throughout the class period – including PHONES, LAPTOPS & TABLETS. . . . **except your CLICKERS of course!** See FAQ #36
4. **No Texting – you could be called on at any moment!** 
5. Respect your professor and each other. **Refrain from side conversations** during lectures, presentations, videos, etc. – except when INVITED to!

WHAT KIND OF STUDENT SHOULD I BE IN ORDER TO GET MY MONEY'S WORTH OUT OF THIS COURSE?

Students who mesh well with Dr. H's teaching style and the format of this GC 170A lecture section:

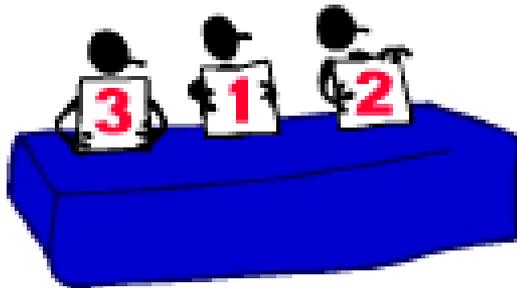
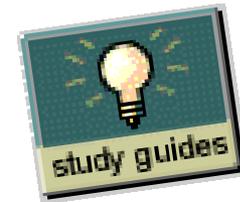
- **Like a class that is structured with lots of online support**
- **Enjoy working with fellow students in groups during part of the class period (not a loner)**
- **Have convenient access to a computer and the internet and check it frequently**
- **Are "visual" learners who like lots of graphics & videos in lectures**
- **Attend class regularly and like to keep up with the material as it is taught (tiered testing helps!)**



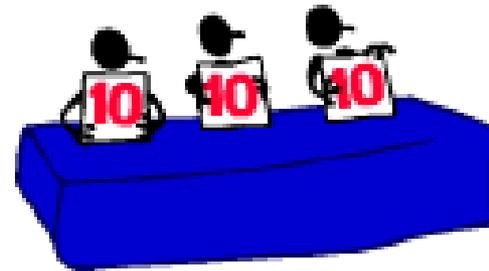
• **Have a sense of humor!**



Taking full advantage of **ALL** the learning tools and resources this course offers offer will give you the best return on your investment

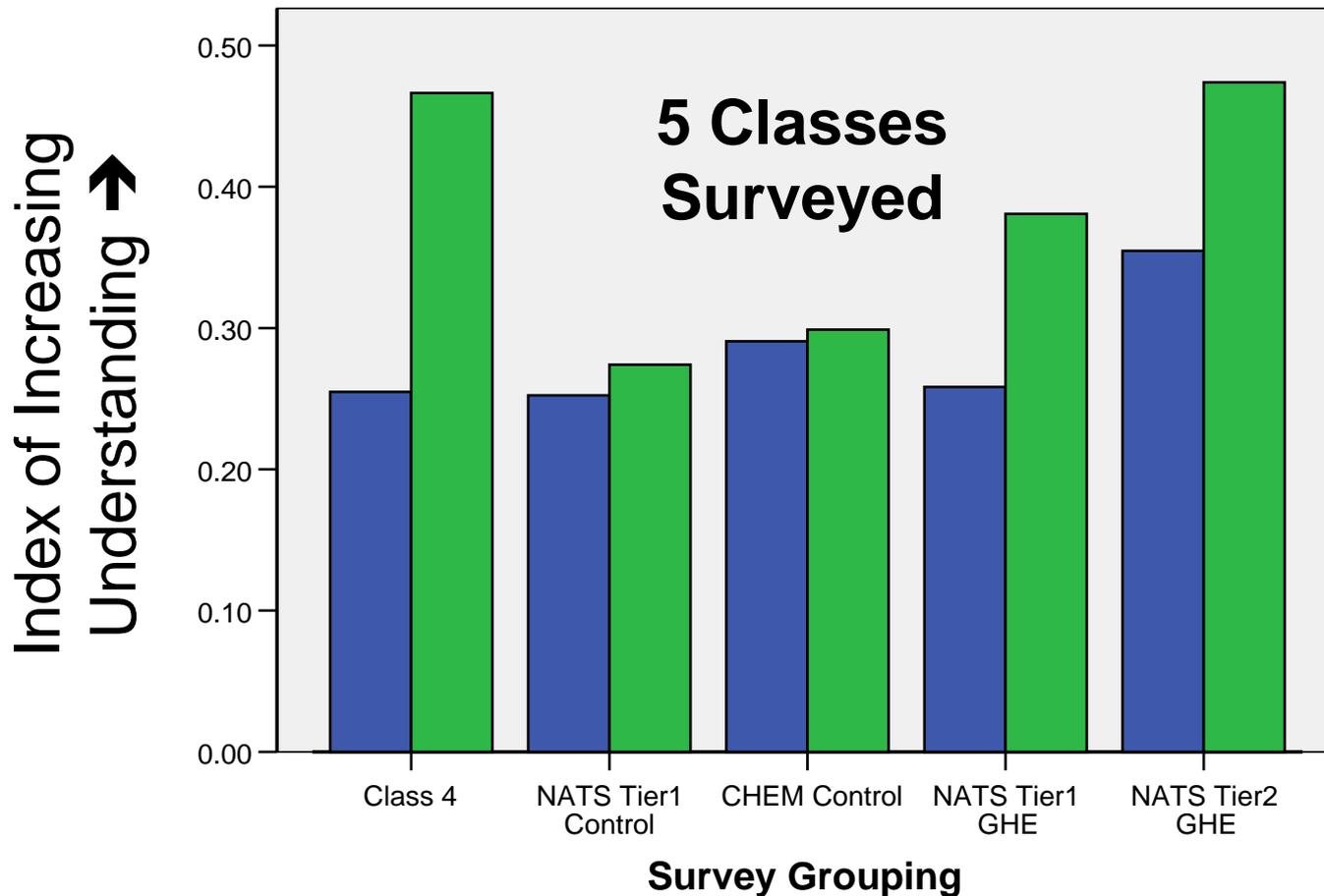


OR



How well do you understand the science underlying the GREENHOUSE EFFECT?

■ = Start of Semester Scores ■ = End of Semester Scores



How well do you understand the science underlying the GREENHOUSE EFFECT?

**Dr. H's
GC Class**

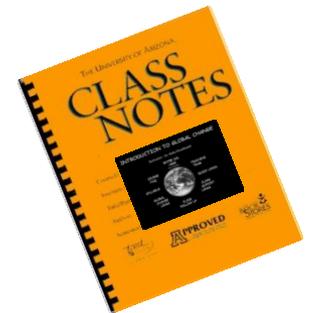
 = Start of Semester Scores

 = End of Semester Scores



Recap: ASSIGNMENTS FOR WEDNESDAY:

1. On the **CLASS WEBPAGE**, read & study the **Syllabus** and the **online FAQ** (Frequently Asked Questions)
POP QUIZ in class on Wednesday about this!
(To test yourself, take the Practice Self Test)
2. **REGISTER YOUR E-TEXTBOOK & begin reading CHAPTER 1.**
3. Get your **CLASS NOTES** packet on Tues afternoon or Wed & bring to class on Wed (if possible).
4. Go to **QUICK LINKS** & read the short essay “**On Science**” by Robert Pirsig -- it will be referred to in class on Wednesday



PASSWORD = nats101gc

**SEE YOU IN CLASS ON
WEDNESDAY!**