

ACE 2011 Assembly Script

August 16, 2011

I. INTRO

What's up [ACE High]?! How is everyone doing today? Let me get a sense of who's here. How many freshmen do we have? (Wait for the cheer.) Where are the sophomores? Juniors? How about seniors? Great!

My name is [name] and I work with ACE, the Alliance for Climate Education. We have Educators around the country going to high schools and talking to students about climate change and ways to get involved. In fact, ACE has presented to almost a million students in just over two years!

How many of you have heard about global warming and climate change? Well you may sense that this is a serious issue, but the last thing you want is another person talking about the world's problems. I mean, what's that going to do anyway?

But here's the deal – the world's leading scientists say we don't have much time to start fixing the planet's climate (Rosenthal 2007).^[1] And if it's going to happen, you're the generation that's going to make it happen.

So, I'm going to break it down for you in a way you've never heard before. We are going to talk about the science and the consequences of climate change. But we're also going to talk about solutions and the positive future you all can create. People are always talking about our future like it's something that's just going to happen to us. Truth is, WE have the power to shape the future we want.

So let's take a look at where the world is today and what we're going to do to change it.

II. SITUATION

A while back, scientists discovered that the Earth has a sort of giant thermostat that controls the temperature of the planet (Arrhenius 1896, 237). And these days that thermostat is being jacked up – WAY UP. Why? Well, it's all about greenhouse gases and fossil fuels (Forster et al. 2007, 135). But when you really get down to it, it's about you and the choices you make.

In 2011/12, you've inherited a country that's all about living large.^[2]

No, not like that!

Most people are living large and don't even know it. What I mean is, we're each taking up a ton of space (Hails et al. 2008, 36). But that isn't easy to see because we each cover just a little bit of ground.

Your room and your stuff cover a little more. Count your home and, well, yeah, you take up some space.

But then there is all that space you're using that you never see. Like the space in Iowa it takes to grow your food, or in Brazil and China to get the materials to make all your stuff, or in the Middle East to get fuel to drive around. And then there's the space around the world it takes to dump your stuff when it turns into garbage. You see, everything you buy, use, and eventually throw away has to go somewhere. And you take up that space too.

Whether you live in a mansion or a little apartment, whether your family is loaded or broke, if you're in the US right now, you're in a country that is living pretty large.

Can you believe that the average US teenager uses about 21 football fields[\[3\]](#) worth of Earth's resources to live (Hails et al. 2008, 26)?

I mean, you didn't choose to live this way. You were born into a world made by previous generations, so you kind of got stuck living large.

Add that to the fact that everyday since you were like 1 year old, advertisers have been telling you that you could be cooler by having more, MORE, MORE – making you want to live as large as you can.

So whether you like it or not, you're using up 21 football fields. What's that like? Line them up end-to-end, and you'd run for over a mile down your football fields before you were done.[\[4\]](#) Now multiply that by all the students at your school. You'd have to go from [\[California to Colorado\]](#)[\[5\]](#) - just to cover the space this one school uses!

There are thousands of schools in America, and colleges, and offices and apartment buildings. There are over 300 million of us (U.S. and World Population...[updated 2009]), each with our 21 football fields.

Now there's only so much space on Earth and we in the US aren't the only ones using it up. Some countries are living almost as large as we are (Hails et al. 2008, 14).

It's true that in most countries, people are living a lot smaller (Hails et al. 2008, 14).

But in most places, the population is growing (U.S. and World Population...[updated 2009]), and almost everyone is racing to live as large as they can. That's because many have been convinced that living well means living like us – SUPERSIZED!

If everyone in the world used 21 football fields, we'd need about five planet Earths (Hails et al. 2008, 14)![\[6\]](#) As it is, we're using up more and more of the planet's resources, while at the same time taking away what the Earth needs to clean and regenerate itself. We're grabbing habitat from thousands of species that are on the brink of extinction (Seabloom et al. 2002). We're even crowding in on each other's need for space.

But using all these resources is creating a more immediate and invisible problem (Le Truet et al. 2007, 105). What most of us don't see is that living so large is pushing that giant planetary thermostat quickly toward WAY TOO HOT!

Why? Because it takes a lot of energy to live so large. To move ourselves around, all of our stuff around, to heat and cool our homes and buildings and to create electricity, we burn fuel. A LOT of fuel (International Energy...[updated 2009]).

And you know what today's fuel of choice is, right? Yep – fossil fuels – coal, oil, and natural gas (International Energy...[updated 2009]). These fuels are made when living things die and decompose over millions of years! Now fossil fuels have been pretty important. They powered the industrial revolution, and have led to countless innovations that have improved our quality of life. But over the years, we've learned there are some downsides to fossil fuels. They're underground and people go to great lengths to get them, like blowing up mountaintops, polluting waterways and sometimes even fighting to get their hands on them. And another problem is they'll eventually run out.[\[7\]](#)

But the biggest problem is that when we burn fossil fuels in our cars and trucks, to produce electricity and make our stuff, we're turning up that thermostat in a major way. How come? Well, now we have to understand how that planetary thermostat works.

In simple terms, our Earth's thermostat can be turned up or down by changing the balance of gases in the air around us – in our atmosphere. Less than 1% of the atmosphere is made of special gases called “greenhouse gases,” which keep the planet warm. As the Earth gets warmed by the sun and puts off heat, these gases trap it, holding heat near the surface that otherwise would have escaped into space (Houghton 2009, 21).

Gotta love those greenhouse gases. Without them this place would be really cold.

When we have just the right mix of greenhouse gases in our atmosphere, our planet's temperature stays just right for life as we know it.[\[8\]](#) Just right means the ice caps stay frozen, keeping sea level from rising and preserving homes for polar bears. Just right means ocean currents continue to flow the way they have for thousands of years. Just right means salmon can live in their cold-water homes, and gorillas can live in their warm misty forests. It means Italians can grow olives, Americans can grow corn, and Brazilians can grow coffee. It means the seasons we've come to count on come every year just as they have throughout human history. Just right means that climate stays stable enough for plants, animals and people to live where they live and do what they do. It's something we've all come to count on, with our lives.

Make a sudden change in climate, and plants, animals and even cultures can get driven to extinction. But climate doesn't change too quickly as long as greenhouse gases in our atmosphere don't change too quickly.[\[9\]](#)

Now the most important greenhouse gas for controlling the giant thermostat is carbon dioxide, or CO₂.

Scientists measure the amount of CO₂ in the atmosphere in parts per million, or ppm. One ppm may sound small, but small changes in CO₂ can make a huge difference – as we'll see by taking a closer look at that planetary thermostat.

Looking back in time, scientists have shown that when CO₂ levels are lower, around 180 ppm, temperatures are cold, like 20,000 years ago when the planet was in an ice age. And when CO₂ levels are around 280 ppm, the world is pretty comfortable, not too different from what humans are used to (Petit et al. 1999).

So guess what we make a ton of when we burn all those fossil fuels? Yep – carbon dioxide.

When we burn fossil fuels in our cars and trucks, to produce electricity and make our stuff, we spew literally tons of carbon dioxide into the air, which is trapping in all that extra heat, and jacking up the dial on that thermostat.

Now, the Earth has a very cool mechanism for dealing with carbon dioxide. While certain things release CO₂, like burning fossil fuels, other things capture it and take it out of our atmosphere like plants and trees, the oceans and the soil. These are called carbon sinks (Henson 2008, 34).

But just like the Earth can only give each person so many football fields, it can only deal with so much carbon dioxide from each person. Because we're using so much energy from burning fossil fuels, we're spewing out tons of CO₂.[\[10\]](#) So much that the trees, oceans and other carbon sinks just can't keep up! Add to that the fact that we're quickly losing our carbon sinks by cutting down the forests and warming the oceans. The Earth has never seen anything like this before (Denman et al. 2007). It's like we're conducting a giant lab experiment - on ourselves!

And while there is some uncertainty about exactly where this is headed, from studying ice cores, we do know where we've been. CO₂ and temperature have always gone together and for the past 800,000 years, they have gone up and down naturally, due mainly to changes in the earth's orbit. But until we started burning fossil fuels to power the industrial revolution, CO₂ hadn't gone above 300 ppm (Lüthi et al. 2008). And where is CO₂ today? Whoa – 390, headed quickly toward 450, and projected to go even higher (Denman et al. 2007)!

Check this out: Compared to this entire time period (gesture toward screen), we're currently increasing CO₂ levels 100 times faster than ever measured before! (Monnin et al. 2001)

One hundred times! That is a direct result of human behavior, and a really big deal. Scientists expect that CO₂ and temperature will continue to change together, as they have throughout history, and that means we're in for some serious changes to our climate. (Meehl et al. 2007)

In fact scientists think they understand the connection between CO₂ and temperature only to a point. Jack up CO₂ too high, too fast, and climate might change suddenly and unpredictably (Hansen et al. 2008, 225).

Jacking up the thermostat toward this point should be freaking people out. But it's happening quietly. See, it takes the CO₂ we release several decades to warm the planet, and it can last in the atmosphere for more than 100 years (Albritton et al. 2001, 38).[\[11\]](#) So right now, we're only feeling the CO₂ from the 1950s (Hansen 2005). And we didn't stop there. We added more CO₂ in the '60s, some more in the '70s, the '80s and '90s. It's like a carbon party! And that's nothing compared to what we're doing today. Crazy, right? But CO₂ isn't the only greenhouse gas; there are a handful of others.

We can't forget about those farting cows. No, I'm serious! When cows fart and burp, which they do A LOT, they put out a super greenhouse gas called methane (Steinfeld et al. 2006), which is about 20 times as powerful as carbon dioxide at trapping heat (Environmental Protection Agency 2009).[\[12\]](#)

In fact, over 20% of all methane we emit comes from livestock farting and burping (Where does methane...[updated 2009]).[\[13\]](#)

All these greenhouse gasses are jacking up that planetary thermostat. In fact, since you were born, we've had the Earth's 10 hottest years – in recorded history (Global Land...[updated 2009])! And this is melting ice caps and glaciers, affecting natural weather patterns, and starting to change life on Earth for billions of people (Lovgren 2005).

So here you are, just being a normal teenager. Driving around, charging your phone, maybe eating hamburgers made from farting cows. And suddenly – wham – you're in the middle of a planetary emergency. You didn't start it. You don't want it. But it's you who has to make the decision to stop it.

Stopping it isn't going to be easy, but you now have the one thing you need to get started: knowledge, a clear understanding of what is happening. You are the first generation that is ready to face the fact that living large means lots of energy. Lots of energy from fossil fuels means lots of CO₂. And lots of CO₂ means climate change that could get out of control.

III. Consequences – Voice-over from Peter Coyote

Presenter: Look, 98% of the world's climate scientists tell us that people are responsible for global warming (Anderegg et al. 2010) and every international science academy agrees. And the longer we wait to act, the worse the consequences are going to be (Hansen et al. 2008, 217). Even so, there are some folks, even a *very* few scientists, who say they aren't convinced. They say all this extra CO₂ being dumped into our atmosphere

won't lead to problems; or, that we should just sit back, chill and do nothing until everyone's 100% sure. Well, we could listen to those few folks and take the chance that nearly every climate scientist is wrong. You might take that risk in a cartoon world where nobody ever really gets hurt. But this is the real world we're talking about, the only world we've got.

So what does climate change look like in our world?

Remember I said it's changing the lives of billions of people? Scientists say a warmer world is a riskier world. There's always a chance that an extreme storm or heat wave will strike *somewhere*, but climate change is loading the dice. It will increase the odds that we'll have more extreme rainfall, flooding and heat waves that are stronger than ever (Meehl et al. 2007, 783). The world saw a lot of crazy weather in the past year....

Coyote: Extreme storms made 2010 the planet's wettest year in history (NOAA: 2010 tied... [updated 2011]). Torrential rains flooded the Mississippi River, forcing thousands to evacuate and causing billions of dollars in damages [citation]. 2010 was also the hottest year ever recorded (NOAA: 2010 tied... [updated 2011]). In Russia, a heat wave killed tens of thousands of people and led to widespread crop failure [citation]. Here in the US, Texas had its worst drought ever, sparking wildfires which burned hundreds of homes and millions of acres [citation].

Warmer weather is melting ice caps, which means rising seas. Coastal cities like Seattle, Shanghai, and Miami risk being flooded (Pfeffer et al. 2008). What's more, one billion people around the world rely on snowpack and glaciers for water, and if these melt, many will need to find new places to call home. If we don't take action, there could be up to 150 million climate refugees in the next 40 years (Myers 2001).

Why is all this happening? Well, human activity has already raised average temperature by a degree and a half Fahrenheit (Trenberth et al. 2007, 237). A degree and a half seems small, but the Earth's health is very sensitive – a lot like your body. If your temperature went up a degree and a half to 100 degrees, you'd be home from school. Raise it another degree and a half, you'd probably be headed for the doctor. Raise it a few degrees more and you'd be in serious trouble.

Back in the last ice age, it was only about 8 degrees colder than it is now (Jansen et al. 2007, 435). [18] That put a mile of ice over much of North America (Dyke and Prest 1987). A degree and a half can make a huge difference. And scientists say if we do nothing, we're likely to raise global temperature 3 to 7 degrees in this century (Meehl et al. 2007, 762).

Presenter: When temperatures rise, it's not just people who are at risk. Remember I told you that global warming is bad for animals? Well climate change could mean the end of the road for millions of species.

Coyote: Melting ice is wiping out polar bear habitat; warmer winters allow pine beetles to thrive and destroy Rocky Mountain forests; and warmer oceans are damaging coral reefs. Because the climate is changing so fast, many plants and animals simply can't adapt quickly enough. If we stay on this course, climate change could cause 30% of the world's species to be threatened with extinction, within your lifetime (Thomas et al. 2004).[\[17\]](#) And extinction means forever.

Presenter: People are at risk. Animals and plants are at risk and so is our way of life. Climate change poses a major threat to our economy, national security and health.

Coyote: Health experts say that climate change poses a serious threat to human health [\[citation\]](#).

Climate change increases the spread of diseases such as avian flu, west nile virus and malaria [\[citation\]](#). Burning fossil fuels contaminates air and water with toxic lead, mercury and arsenic [\[citation\]](#). It also creates pollution that causes more allergies, asthma and respiratory disease [\[citation\]](#).

Economists predict that climate change will cost our world trillions of dollars each year in damages (Stern 2006) and threaten food and water supplies in communities around the world. Military experts warn these crises could increase threats in volatile regions like the Middle East [\[citation\]](#).

«We will pay for this one way or another... We will pay to reduce greenhouse gas emissions today... or we will pay the price later... And that will involve human lives.»
-General Anthony C. Zinni, former head of US Central Command [\[citation\]](#)

The more CO₂ we release, the more dangerous these impacts will become. And because CO₂ stays in the air for hundreds of years, what we do now will shape our world for generations to come. If we fail to act soon, we will commit ourselves to more heat waves, droughts, storms and floods that would make climate change the new normal (Solomon et al. 2009).

Presenter: Climate change affects the whole world, and it's also starting to affect you right now right here in [California] (insert regional impacts slides and script).

Presenter: I know this is heavy stuff. It's true that some of these things are already happening around the world. And scientists expect we'll see much worse if we sit back and do nothing.

But the future isn't written yet. Today, we're at a crossroads – and the good news is we have a choice.

You *can* change this, and avoid the worst of these problems. But it will take innovation and imagination.

You see, the human imagination is the most powerful tool we have. Imagination got us to the moon. Imagination created the amazing technology that used to be science fiction.

OPTION 1: NO REUNION

So what are you gonna do with your imagination? Something like this?

[Jump to Tribute]

OPTION 2: REUNION

All right, it's time to bust out that imagination. I'm going to step off stage, and when I come back we're going to be at your 40th-year high school reunion. Now, y'all will be old and gray at that point, but you'll be able to celebrate the world you created because you didn't just sit back and DO NOTHING. So, take a journey with me to the future. All right, I'll see you in 40 years.

Transition

What's up [ACE High]! How you doin'?! Wow, its crazy to be here with you guys. You're the generation that stopped climate change. It's wild. I'm just so privileged to be here with you today – this is like a dream for me ... OH MY GOSH – is that [Matt]? Man, [Matt], thanks for inventing that new SOLAR technology that finally made renewable energy affordable for everyone! This is such an honor for me! [Blakely], is that really you? When [Blakely] was 23, she became the youngest person ever to win the Nobel Peace Prize for convincing the world to limit their carbon emissions!

So, listen, it's your 40th-year reunion. The worst of all that climate change stuff is behind us. All because you stepped up and took action. What you did was heroic and it wasn't easy. So to thank you, I put together a tribute showing what you guys did, starting from when you were back in high school, when it was far from certain what the consequences of climate change would be. Can I show it to you? What? I didn't hear you [ACE High]!

All right – here it is.

(REUNION break ends here.)

IV. TRIBUTE – (Voiced-over and music dubbed.)

Transition

Now, nobody knows if that will be our future, but it could be. All the technology you saw? That's real and ready to go right now. And the students, they're real too. ACE helps tens of thousands of students around the country take on carbon-cutting projects—and students right here in [REGION] are doing amazing things.

**[CUSTOMIZE SCRIPT PER REGION – TWO STORIES/PICTURES PER REGION.
Ideally show picture of school where you’re presenting.]**

That’s pretty awesome, right? But students like you can go even bigger. Check it out:

V. SHOW SHREYA/DANIELA TRANSITION

VI. ASKS

So how are YOU gonna change the world? For Shreya and Daniela it started right here at an ACE presentation. They got started by doing two things. And that's what I’m asking you to do right now: Pick a DOT, join an Action Team.

What’s a DOT?

It means Do One Thing to help the environment and cool the climate. See, you don’t have to go live in a cave to lower your emissions—you can start with one simple action that’s good for the planet, and good for you.

I mean, anybody can do ONE thing, right? That’s an easy way to get started—and build green habits for life. Check out the ideas on the screen to get you get going. Best of all, when you add up all those DOTs, it’ll have a huge impact. So what’s YOUR DOT? Please share your DOT by filling out the paper forms I handed out and passing them in. You’ll also get sweet updates from us and info about contests, prizes and more.

IF TEXTING IS PERMITTED:

But why wait? You can pick a DOT right now by texting DOT to 30644. That’s right, I got special permission to text today IN SCHOOL! You have 30 seconds to text DOT to 30644. Go!

Once you text, you’ll get a response asking what your DOT is – we’ll offer some ideas. Just text us back and you're in! It costs the same as standard text messages, and we'll send you occasional fun texts about those contests and prizes. You can opt out at any time. That's DOT to 30644. DOT to 30644. Then text back with your DOT, or else it won’t count. Got it? Awesome.

END TEXTING:

OK, you’ve picked a DOT and that’s a solid first step. But some of you are probably thinking, “Great, I’m reusing my water bottle, but that’s not enough. I want to do more.

Good!

The second thing you can do is start [or ‘join’ – *if they already have an action team*] an Action Team here at school. What’s an Action Team?

An Action Team is a student club that helps fight climate change at your school- anything from starting a recycling program to reducing energy use at school. You might already have a green club in place—we'll work with what you got! [EDUCATORS SHOULD KNOW FROM BOOKING FORM AND CUSTOMIZE.]

ACE can turbocharge your work with ideas, starter grants and hands-on expertise to help you rock awesome projects fast.

Schools all around here are already getting their teams going. You can compete with them and schools across the country to win prizes for your club. You could even be featured in this presentation across the country next year—like Shreya and Daniela.

I need at least ten of you to come see me right after the presentation and I'll help you get started. Come right down here and we'll talk.

Choose a DOT. Join an Action Team. That's how you can start now.

Look, we covered a lot here from fossil fuels, to farting cows, CO₂ to carbon sinks, from living large to species extinction. We saw that using too much energy from burning fossil fuels means emitting too much CO₂ that will make a future no one wants. Beating climate change will be the greatest challenge of our lifetime—but also an incredible opportunity to innovate and reinvent how we live.

It all comes down to you and the decisions you're about to make. We all believe in you. So what will you choose?

My name is [name] and I'm here to help. Please come talk with me about how to get started, and how ACE can support your school throughout the year! Thank you.

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- [1] “If there’s no action before 2012, that’s too late. What we do in the next two to three years will determine our future. This is the defining moment.” Rajendra Pachauri, IPCC Chairman.
- [2] “Living large” refers to one’s ecological footprint.
- [3] Football field without end zones: 100 yds by 53.3 yds = 5330 yds²; 9.4 hectares = 112,424 yds² = 21.1 football fields.
- [4] Football field without end zones: 100 yds * 21 fields = 2100 yds = 6300 ft (1 mile = 5280 ft).
- [5] Depending on how many students. The distance from San Francisco to Denver is about 1,210 miles. If there are more than 1014 students in the school, then this is accurate.
- [6] Global biocapacity in 2005 was equal to 2.1 hectares. In order to provide for 9.4 hectares/person, we would need five Earths.
- [7] Fossil fuels are not renewable resources, so they will eventually run out if consumed.
- [8] This section refers to the ecological conditions that have developed over the last 10,000 years, during the current interglacial period.
- [9] Sudden events such as volcanic eruptions and asteroid impacts can also cause rapid climate change.
- [10] CO₂ levels have risen 100 ppm since pre-industrial levels, according to the IPCC 2007 report as cited throughout.
- [11] No single lifetime can be defined for CO₂ because of the different rates of uptake by different removal processes.
- [12] Methane is actually 21 times as powerful over 100-year period.
- [13] Total livestock enteric fermentation was approximately 22% of total U.S. methane emissions.
- [15] Official death toll is 1833, with several hundred still reported missing. Estimated total cost of damages from Katrina is around \$81 billion.
- [17] “We predict, on the basis of mid range climate warming scenarios for 2050, that 15-37% of species in our sample of regions and taxa will be committed to extinction.” Thomas et al. 2004.
- [18] Climate models indicate that the Last Glacial Maximum (about 21,000 years ago) was 3°C to 5°C cooler than the present.