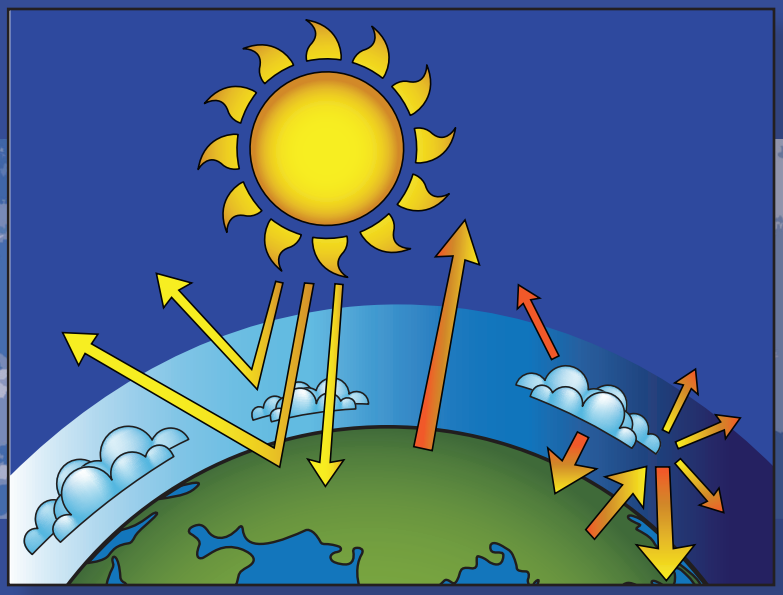
December 2010

Contributions in Education and Outreach

No. 4b



Climate Change Handbook: A Citizen's Guide to Thoughtful Action

Forest Research Laboratory
College of Forestry
Oregon State University
Corvallis, Oregon

Oregon State
UNIVERSITY

The Authors

Mark Apel is the Community Resource Development Area Associate Agent at the University of Arizona Cooperative Extension. Lauren McDonell is the Canary Initiative Project Coordinator for the City of Aspen, Colorado. Jay Moynihan is the Extension Community Development Educator in Shawano County for the University of Wisconsin Cooperative Extension. Darien Simon is a Lecturer in Sustainability at Regent's Business School, Regent's College (London). Viviane Simon-Brown is an Extension Sustainable Living Specialist in the College of Forestry at Oregon State University.

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The Project Team: Jay Moynihan, team leader; Viviane Simon-Brown, project coordinator; Mark Apel, University of Arizona Cooperative Extension; Allison Morrill Chatrchyan, Cornell University Cooperative Extension; Mike Crimmins, University of Arizona Cooperative Extension; Greg Crosby, USDA NIFA program leader for sustainable development; Catherine Elliott, University of Maine Cooperative Extension; Lauren McDonell, City of Aspen, Colorado; Nathan Myer, University of Minnesota Extension; Patt Opdyke, Oregon State University Extension (retired); William Sheftall, University of Florida/IFAS Extension; Darien Simon, Regent's College, London; Luis Tupas, USDA NIFA program leader for climate change.

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This guide is a National Network for Sustainable Living Education project. NNSLE improves quality of life and reduces environmental degradation by fostering new consumption patterns and sustainable lifestyles through Cooperative Extension Service programs at land-grant institutions.

Abstract

Apel, Mark, Lauren McDonell, Jay Moynihan, Darien Simon, and Viviane Simon-Brown. December 2010. Climate Change Handbook: A Citizen's Guide to Thoughtful Action. Contributions in Education and Outreach 4b, Forest Research Laboratory, Oregon State University, Corvallis.

Climate change is real. Average American households are a significant source of GHG emissions, as well as the ultimate end-users of most energy production. Therefore citizens have the potential to make a difference now and for future generations. This handbook provides climate science basics, including the historical changes in GHG releases, the roles that lifestyle and population play in the climate scenario, the significance of carbon footprints, and an overview of the current climate situation. A detailed carbon counter is attached to the guide.

The guide then illustrates the difference between adaptation (taking steps to live with the changes) and mitigation (taking steps to slow the rate of change.) Adaptation examples include food, water, shelter, transportation, recreation, and careers. Mitigation focuses on effectively engaging with local government, through serving on advisory boards, communicating with public officials, and leading community climate change actions. One useful way to mitigate climate change is through citizen science efforts. Citizen scientists help professional scientists better understand the impact of the rate of change on plants and animals, which is crucial for preserving species; and for assessing potential insect and disease outbreaks in agriculture, natural resources and public health.

Taking personal action is a key element of this handbook. Citizens are challenged to consume 20% fewer resources, to bring American consumption levels down to Western European levels. Readers are given 10 practical steps to take to make the changes, including a Jumpstart list to complete in a single weekend. The Resources section provides additional information, and readers are encouraged to contact the authors for further questions.

Keywords: climate change, adaptation, mitigation, citizen science, carbon counter, local government climate action, lifestyle changes

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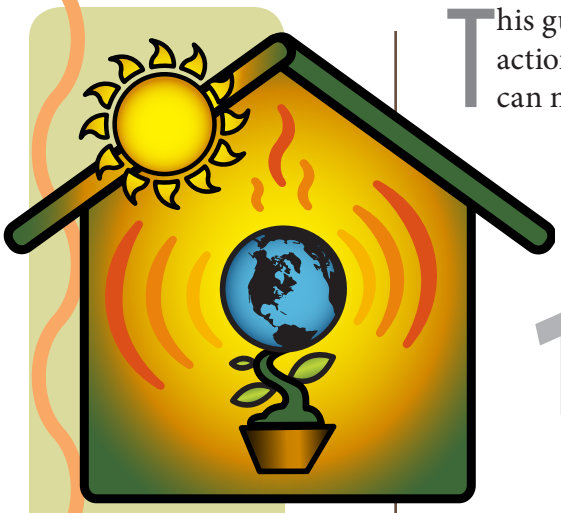


This guide is meant to inspire you, as a citizen of Planet Earth, to take action to offset the impacts we are already experiencing. Together we can make a difference now and for our children and grandchildren.

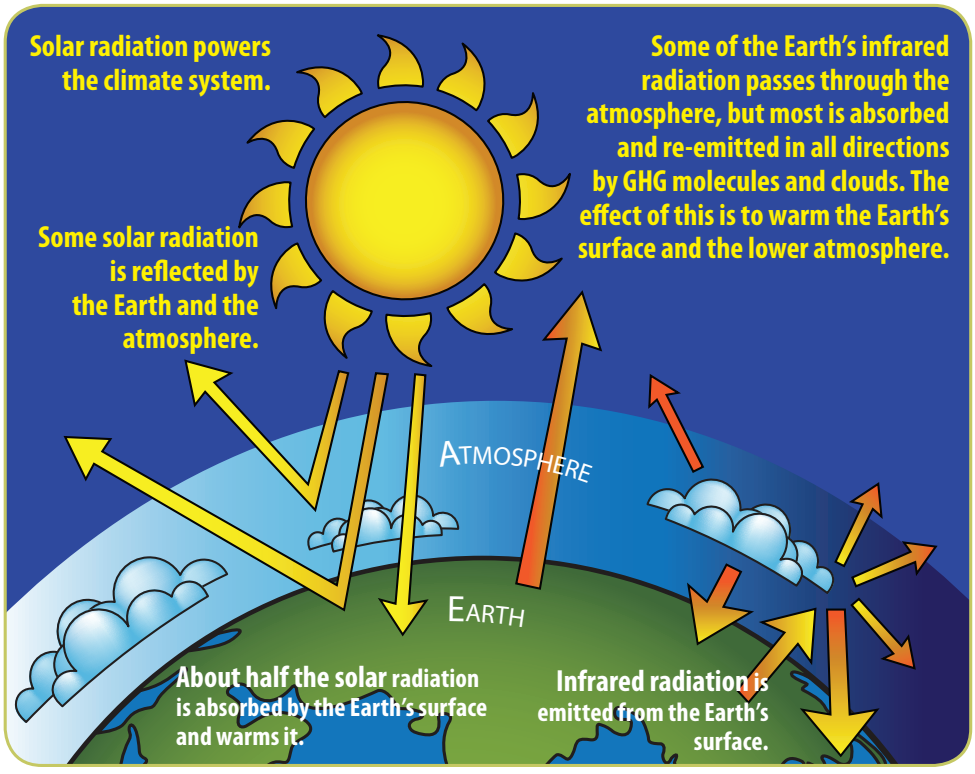
1 Basics of Climate Science

1.1 Greenhouse gases

Our earth is habitable thanks in part to gases in the atmosphere that trap a portion of the sun's energy. These "greenhouse gases" or GHG absorb heat—like the windshield that traps and retains heat inside a car or truck. GHG include carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), and others.

Without greenhouse gases, our planet would be too cold to inhabit. But too much GHG in our atmosphere can destabilize our climate—bringing potentially severe consequences.

The Greenhouse Effect



Greenhouse gases (GHG) in the atmosphere absorb and radiate heat back into our atmosphere.

1.2 Historical change

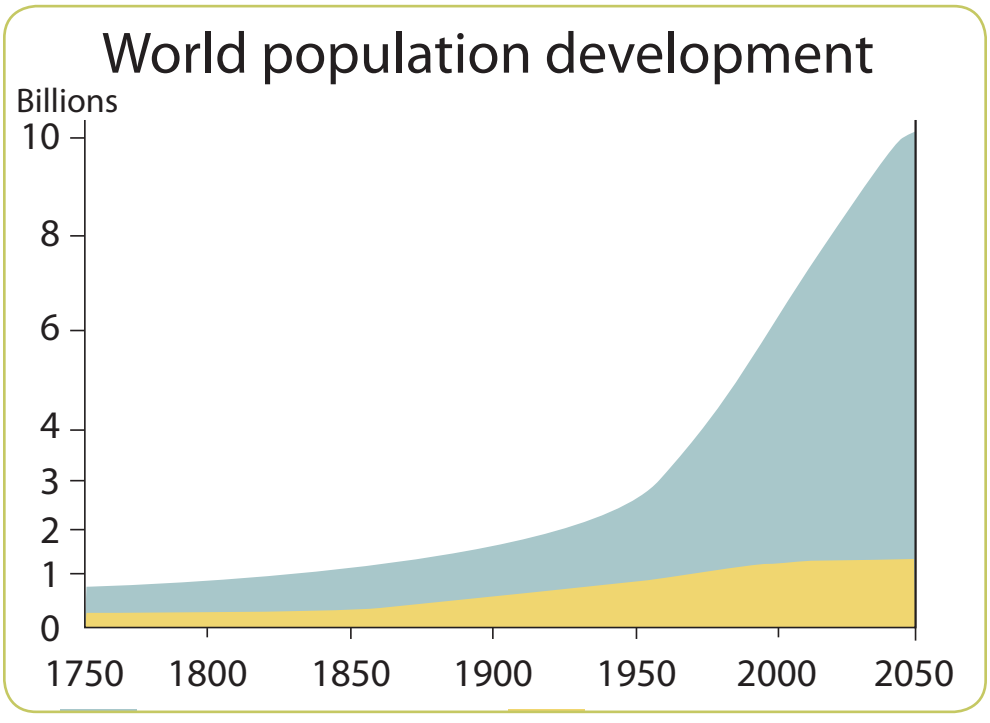
Since 1750 and the beginning of the industrial revolution, humans have been adding increasing amounts of GHG to the air through the burning of fossil fuels, deforestation, agriculture (raising animals and using certain fertilizers), natural gas distribution, and landfills. By examining ice cores, scientists have discovered that concentrations of 3 of these GHG in our atmosphere are now much greater than they have been in thousands of years. Carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4) have increased by approximately 36%, 18%, and 148%, respectively.

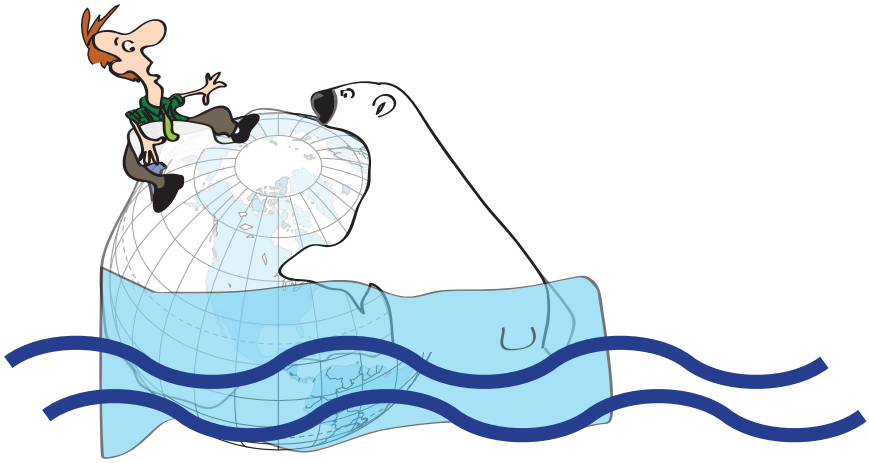
The atmospheric concentration of CO_2, the most important greenhouse gas released by human activity, now by far exceeds the natural range over the last 650,000 years. The natural range is 180–300 parts per million (ppm). By 2010, CO_2 levels reached 388 ppm.

1.3 Population and lifestyle

Part of this CO_2 increase is due to population growth. In 1750, 700 million people lived in the world. Now, our population is 6.9 billion, almost 1000% more. And part of the increase is due to the greater use of resources to build and maintain our technologically centered lifestyle.

People in developed countries use more resources than people in developing countries do. Americans use the most: for example, we use 3 times the amount of energy as the average German and 14 times as much as the average Chinese. These combined increases don't add together like 2+2=4. Instead, they multiply, leading to exponential changes.



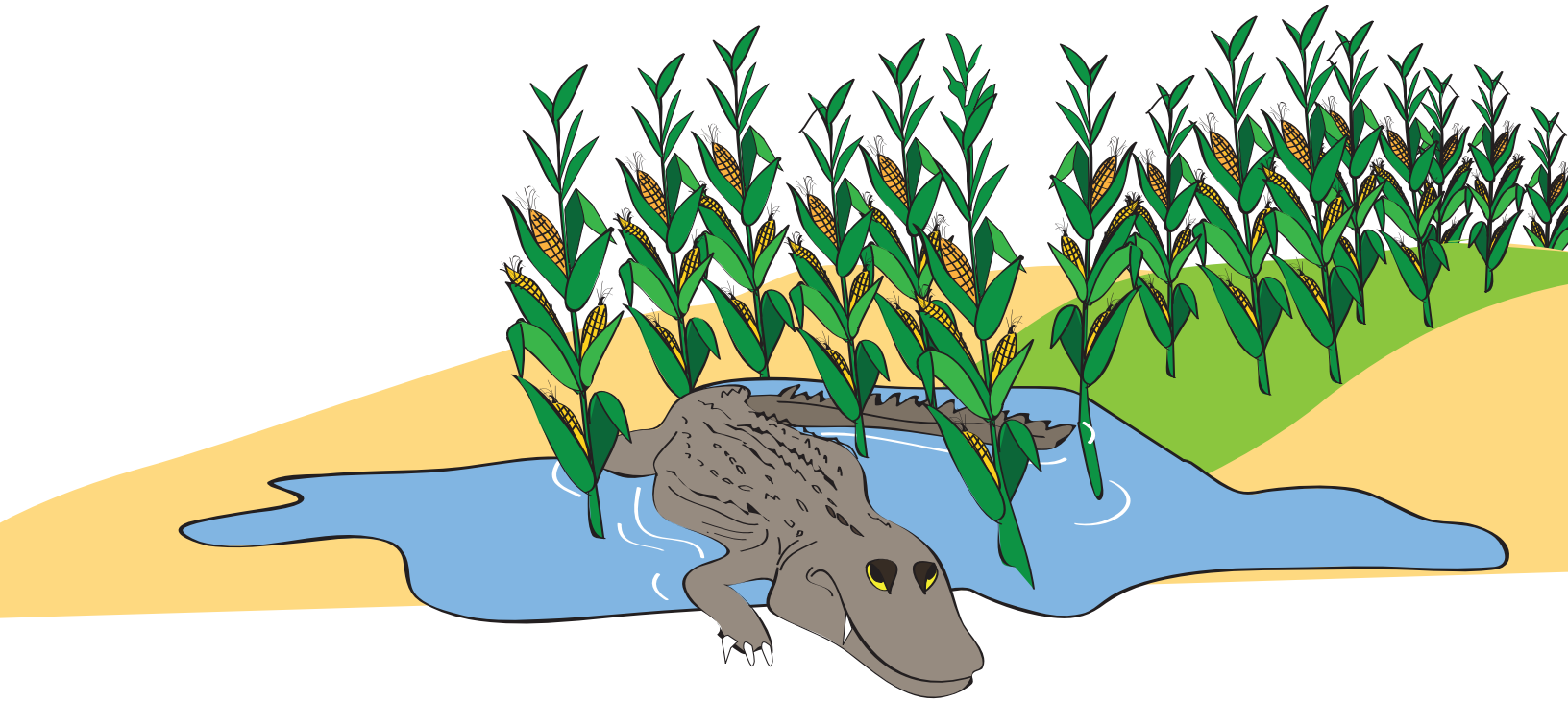


1.4 Current situation

We are already seeing some results of warming—such as regional flooding, drought, extreme temperatures, escalating wildfires, and more violent storms. On a larger scale, polar ice caps and glaciers are melting at alarming rates. Extinction rates have increased to 50,000 – 55,000 plant and animal species each year, according to a United Nations Environment Programme report.

1.5 Regional projections

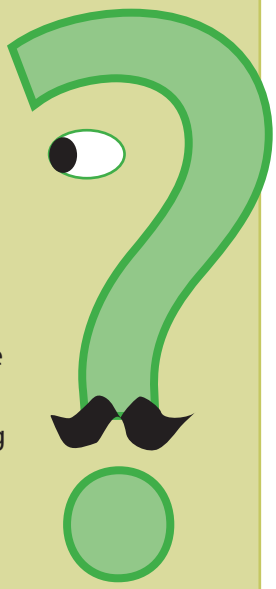
Climate change is not just about the "warming." It also means increased variability in weather—some places may get more or less of the type of weather they are used to. Projections differ by region. In the upper Midwest, the weather after 2050 is projected to be like Louisiana now (minus the hurricanes). Dry climates, like in the Southwest, will probably get a lot drier as time passes. Northern areas will become wetter with increased precipitation. The destructive intensity of hurricanes is likely to increase.



1.6 What will these changes mean for you and your family?

All of us must learn how to adapt to climate changes and to minimize our impacts on our planet right now. The choices we make today affect our children and our children's children. For this reason, we are compelled to take action or put the prosperity and safety of future generations at risk.

Is Climate Change Real? Where's the Proof?



Science does not employ the concept of "proof." Proof is a mathematical term. Science uses a "balance of evidence" approach to determine the likelihood of an event.

Fully 97% of the climate scientists who regularly publish on climate change agree with the statement, "human activity is a significant contributing factor in changing mean global temperatures" (EOS, January 2009). Perhaps the most important outcomes of the 2007 Intergovernmental Panel on Climate Change (IPCC) Report 4 are the declarations that the evidence is now "unequivocal" that the Earth's atmosphere and oceans are warming, and that it is "very likely" (greater than 90% likelihood) that most of the increase in global-average temperatures since 1950 can be attributed to human-caused emissions of heat-trapping gases.

2 What's my "Carbon Footprint"?

Everything we do—or buy—has a carbon footprint. A carbon footprint measures the amount of carbon dioxide produced during an activity or through the creation of a product.

The footprint is usually described in terms of "equivalent tons" of CO_2—meaning the number of tons of CO_2 or other GHG that are generated by an activity over a particular time. Each of the main greenhouse gases has a different climate-change impact level. Each GHG also lasts for a different amount of time in the atmosphere. To make the footprint calculation as simple as possible, each gas amount is converted into its CO_2 equivalent, both in terms of amount and duration in the atmosphere.

Calculating our individual CO_2 footprint means looking at our direct and indirect contributions. Direct and indirect refer to the level of control we have over the contribution to our footprint.

As individuals, our direct contributions of CO_2 come from

- heating or cooling our homes and workplaces
- travel for work, errands, and vacations
- power for lighting, heating, cooling, appliances, tools, and electronics

Our indirect contributions may include CO_2 emitted

- during the manufacture, production, or transportation of major purchases, like
  - housing and automobiles
  - smaller consumer goods such as food, drink, clothing, and personal items
- through recreation and leisure activities that require travel, equipment purchases, or large facilities, such as:
  - camp gear, skis and boots, boats and ATVs
  - movie theaters or gym memberships
- by financial, personal, and public services, such as banks, hairdressers, and schools

We have less choice about electricity usage because most of us don't control the type of fuel burned to provide the power. Some electricity providers do offer fuel option programs ("green energy"); check with your local utility company.

We also have only indirect control over the impacts from our product choices. But there are still ways to reduce our indirect contributions of CO_2. We can

- reduce our overall consumption by asking ourselves if we really need a product before we buy it
- buy local products to reduce transportation impacts
- learn to make things for ourselves—it can be fun! Grow veggies. Can or preserve produce.

The most important thing to remember about carbon footprints is that they should be as small as possible. According to the World Resources Institute, the maximum sustainable living footprint per person per year worldwide is less than 2000 kg CO_2 (2 tons). In 2002, the American footprint per person was 20 tons of CO_2.

That's fully TEN TIMES sustainable levels!

2.1 Make a difference by Thinking Smart and Acting Cool

Action	CO_2 reduction (lb/yr)
Use a push mower instead of a power mower	80
Clean or replace air-conditioning filters as advised	175
Run your dishwasher only when it's full and use the energy-saving setting	200
Buy products packaged in reusable or recyclable containers	230
Install low-flow shower heads in order to use less hot water	300
Replace your current washing machine with a low-energy, low-water-use machine	440
Keep your water-heater thermostat no higher than 120° F	500
Don't overheat or overcool rooms. Turn thermostat up when it's hot and down when it's cold	500
Replace standard light bulbs with energy-efficient fluorescent bulbs	500
Wash laundry in warm or cold water, not hot	500
Install a solar thermal system to provide hot water	720
Recycle all of your home's waste newsprint, cardboard, glass, and metal	850
If your water heater is more than 5 years old, wrap it in an insulating jacket	1,000
Caulk and add weatherstripping around doors and windows to plug leaks	1,000
Reduce your garbage by 25%	1,000
Leave your car at home two days a week (walk, bike, take public transit or carpool)	1,590
Insulate walls and ceilings	2,000
Get rid of old, energy-inefficient appliances and replace with newer energy-efficient models	3,000
Plant trees around your home; paint the roof a light color in a hot climate, and a dark color in a cold climate	5,000
Replace the car you use most often with a fuel-efficient car (rated at 32 mpg or more)	5,600
When replacing windows, install energy-saving models	10,000

Use the Sopris Carbon Counter to determine your baseline carbon footprint.

3 Adaptation and Mitigation

Responses to global climate change usually fall into two broad categories: adaptation and mitigation. Adaptation is taking steps to ***live*** with the changes that are underway. Mitigation is taking steps, most often at the government level, to ***slow*** the rate of change.

Adaptation is Local

Learn the basic science and examine your life and community.

3.1 Adaptation

Adaptation is necessary because mitigation (slowing global climate change) is rather like slowing a really big ship—it's going to take awhile! CO_2 hangs around in the air for about 100 years—that means the warming we are experiencing ***now*** is not even from our own CO_2 emissions, but from CO_2 emitted in our grandparents' time. And the CO_2 we are putting into the air *now* will greatly affect our children's and grandchildren's lives. Other greenhouse gases last longer, so their effects will endure for several generations.

As you learn about basic climate science and the projected changes for where you live, think about how these changes could affect you, your children, grandchildren, and great grandchildren. All humans require food, water, and shelter to survive. Here are some points to ponder.

Food, water, shelter

Where does your drinking water come from? Is it from glacier or snowpack runoff? Their mass is decreasing. Consider locating alternative sources of water that don't rely on mountain runoff. In extreme instances, you may want to think about moving to an area where obtaining water isn't such a challenge.

Water and temperature play big roles in food production. How available will reasonably priced, locally produced food be in your area? Growing seasons and plant zones are changing, meaning that growing conditions for particular plants may become better or worse. Keep as many food options open as you can by staying aware of water availability and climate patterns in your area.

Make sure your dwelling conserves heat in winter or coolness in summer. In the short term, the cost of energy will rise as new fuels and power sources go commercial. The biggest savings is always in conserving energy in the first place.

Transportation and recreation

Transitioning to new energy sources will probably increase the cost of transportation. Therefore, it is in your interest to reduce the distance you have to travel for work, school, and shopping, or find alternative ways to accomplish those tasks. If your health permits, walking and cycling may benefit your personal well-being as well as reducing your carbon footprint.

Rapid climate change may also affect your recreation choices. For example, if you live in an area that is expected to get less snow in the future, will you still be able to ski and snowmobile? What other activities might you consider? What are their carbon footprints likely to be?

Future careers

Science and math skills will be more important than ever for future jobs. Both adaptation and mitigation will create whole new product and service areas, and enhance existing ones. Some jobs will benefit from rapid climate change. But some will become obsolete.

Since around 2000, some countries have been making massive investments of public funds into "green" technology and manufacturing. Unfortunately the United States is not one of them. For example, China now produces about half of all photovoltaic cells and solar panels in the world market; they likely will soon dominate production in that industry. So when looking at employment now and in the future, keep an eye on where jobs may be available, or start your own entrepreneurial business using green technology and green skills.

3.2 Mitigation

As mentioned before, adaptation involves living with rapid change. Mitigation is about slowing the rate of change. This is primarily an arena for government and corporations, but you also can make a difference by engaging with your local government. There are some ideas for mitigation at the personal level in the Take Action section later in this guide.

"Cool" Winners: Companies and Sectors

- Nuclear power
- Renewable energy
- Bio-fuels
- Green builders
- New technology vehicles
- Agriculture (depending where)
- ATVs (assuming they develop new power schemes)
- Battery and energy storage companies
- Biotechnology
- Genetics
- Biomemetics
- Nanotechnology
- Information industry
- Eco-industrial manufacture
- Bio-plastics
- Pyrolisis reactors
- "Local" supply (for retail)
- "Organic"
- Services, such as life-cycle analysis and other "sustainability" disciplines

4 How to Engage with Your Local Government

Getting involved with local government may seem daunting at first. It can even feel as though there's an invisible wall between us and our elected or public officials. But in the United States, our state and federal constitutions require transparency and access to our government.

Climate change should be taken seriously by all—citizens and public officials alike. How can we, as citizens, petition, influence, and support our local government in taking action? What avenues are available that will help us sway elected and public officials, especially between election cycles?

Planning now for future changes will save tax money in the long run.

4.1 Serve on a citizen advisory board

Communities typically have citizen commissions or committees appointed by elected officials to oversee specific issues, such as planning and zoning, utility rates, environmental concerns, or architectural design. Generally, these groups serve in an advisory capacity. They make recommendations to the governing body, which then makes the final decisions.

4.2 Find out when, where, and how often your local government meets

Why is this important? Because meetings present opportunities for ordinary citizens to share their opinions or ideas. Local governments generally must follow open meeting or "sunshine" laws. This concept means that citizens have access to

- public notices of meetings
- posted agendas
- minutes of meetings
- accommodations for those with disabilities
- opportunities to speak before the governing body

This type of information is publicized in various ways, such as online, in the newspaper, or on television.

4.3 Communicate with local officials

You can engage with elected officials and municipal staff on an individual level or in a public forum.

Meeting one-on-one, emailing, or calling to provide ideas is a great place to start. By picking one or several easy ideas for your local government to implement, you can help build momentum for change. For example, you may convince your local officials to require energy-efficient compact fluorescent (CFL) or light-emitting diode (LED) lightbulbs in government buildings to save money and reduce carbon footprints. This can begin to set bigger ideas in motion. Sometimes, a personal chat with the mayor, city manager, or public works director is all it takes to make a difference.

Other times, using a public forum to air an idea—and where the media are present—may be more effective. The opportunity to speak before a board, commission, or committee during a public meeting usually comes in two forms: either a call to the public or a public hearing.

Call to the public

This is when a member of the public may speak on any topic that is not on the agenda for that particular meeting. It's generally inappropriate (and sometimes illegal) for a member of the body to respond during the call to the public. However, moderators will take note of topics for follow-up at future meetings.

Public hearing

This is when the public may provide input on agenda topics. Such input is required by state law or local ordinance. Planning and zoning issues or ordinance changes commonly require public hearings because the decisions made by the governing body will likely directly affect all or part of the community.

In a public hearing, you may comment as an individual or on behalf of a like-minded group. You also can petition to demonstrate group support for a particular grievance or present a new idea at this time.

Strategies for sharing ideas

Here are some suggestions for how to present your ideas in a public meeting or hearing:

- inquire ahead of time if you plan to share photos, slides, or other media
- think carefully about and write down what you plan to say
- make your comments clear and concise, and stay within the time allotted
- avoid being overly critical or berating past actions
- focus on current situations and possible solutions
- don't repeat what others have already said

When you share your thoughts about climate change in public meetings and forums, you demonstrate to decision-makers that the issue is important to their constituents. Here is where citizens can suggest policy changes for a more stringent review of land-use decisions or procurement practices as they relate to CO_2 emissions.

4.4 Local government climate action

The Mayors Climate Protection Agreement asks communities to implement reduction goals greater than those specified in the Kyoto Protocol, reduce greenhouse gas emissions by at least 7% below 1990 levels by 2012, and support federal emission reduction legislation.

Cities and communities across the country are already rising to the challenge with innovative, ambitious, and far-reaching initiatives and efforts. Become familiar with what is already being done so that you can suggest positive, well-reasoned policy changes to your public officials. Help your community join in!

You can start by focusing on areas where governing bodies directly affect policy, regulations, land use, taxation, and public works, or have public outreach programs. These areas may include land use and mobility, consumption and solid waste, urban forestry, and food and agriculture.

Local governments can also

- create education and green certification programs for residents, businesses, homes, schools, or special events
- invest in efficient technology and renewable energy for municipal utilities
- encourage policies that address climate change at state and federal levels
- network with other communities through organizations like Local Governments for Sustainability (www.iclei.org)

Where a local government is not yet addressing climate change, citizens can serve as the catalyst for action. You don't have to be a scientist or expert to have valuable ideas and voice your concerns about climate change.

Remember: a government cannot represent people it does not hear. Speak up and share your thoughts!

Leading the Action around the USA

- Aspen, Colorado was the first city nationwide to create the Canary Tags program, a carbon offset or carbon reduction investment program. Canary Tags represent investments in local energy conservation and renewable energy projects and can be purchased by visitors, residents, businesses, and events. www.aspenzgreen.com/offsets
- Multnomah County and the City of Portland, Oregon have jointly committed to reducing their carbon emissions by 40% by 2030. www.portlandonline.com/portlandplan/
- New York City has conducted greenhouse gas inventories, identified the sources and concentrations of emissions, and created baselines against which to measure future inventories. www.nyc.gov/html/plannyc2030/html/emissions/emissions.shtml
- The City of Chicago has created climate action plans to guide local policy, research, education, and other efforts to achieve emission reductions goals. www.chicagoclimateaction.org

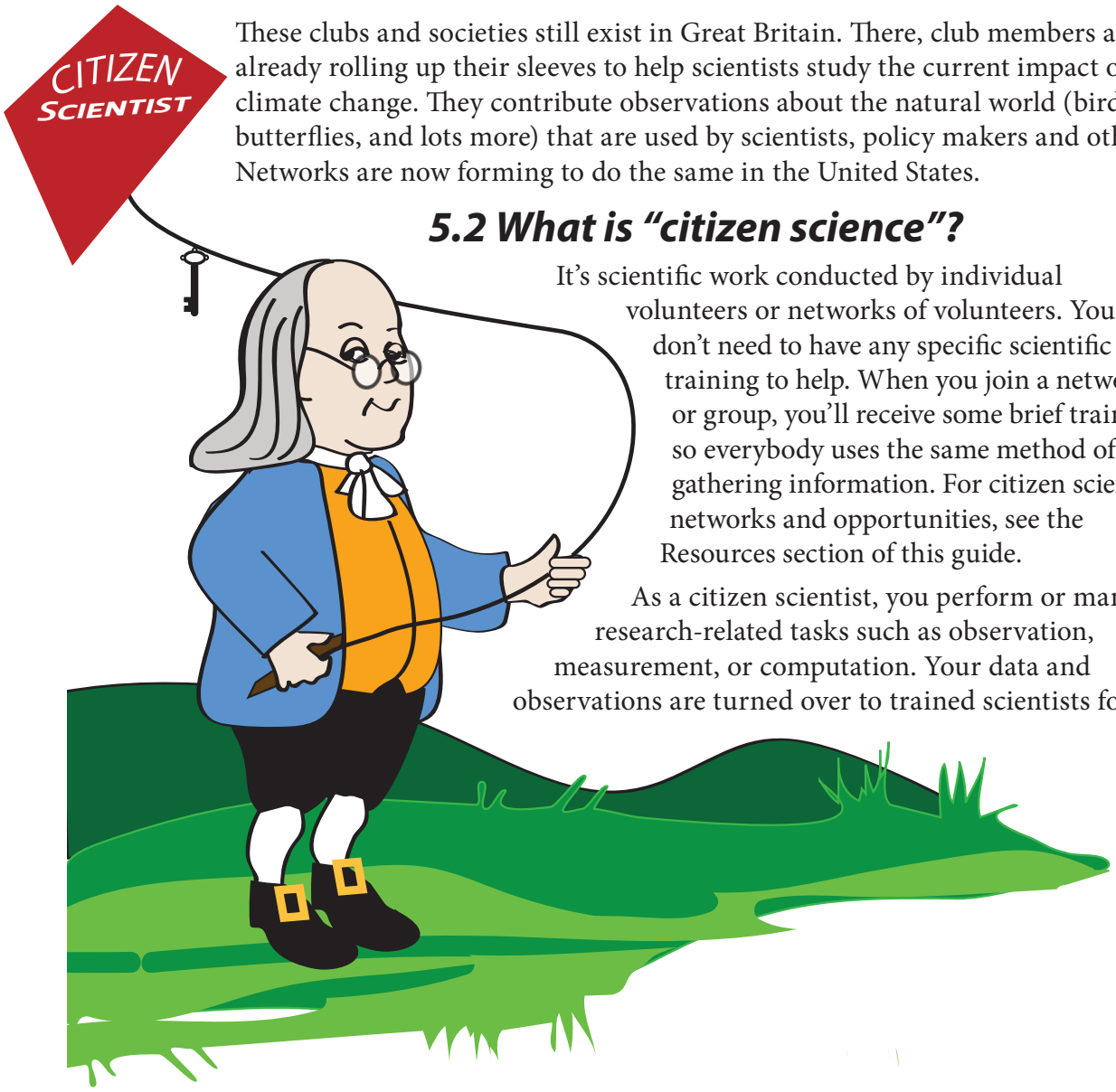
5 Citizen Science, Phenology, and Climate Change

To be effective, adaptation and mitigation actions must be science-based. However, the climate is changing so rapidly that professional scientists cannot gather the on-the-ground data fast enough to use in climate projections. But citizen scientists can. Benjamin Franklin was one. So was Thomas Jefferson. Now you can be one too.

5.1 History

The practice of citizen science is experiencing a revival in the United States. Back in the 19th century, many counties and K-12 schools had "natural history" societies wherein ordinary folks got outside and studied the natural world, i.e., "did science."

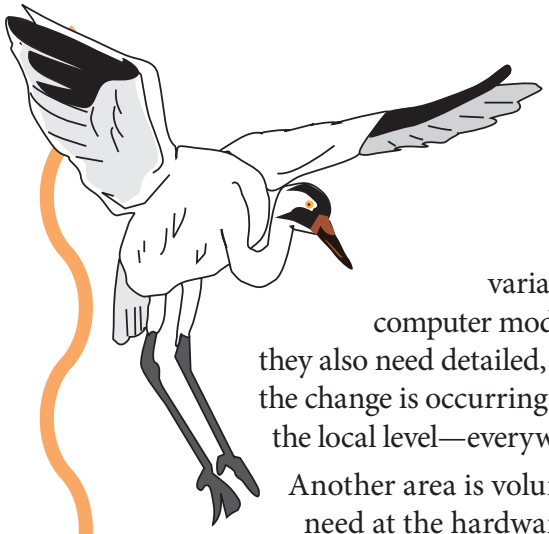
These clubs and societies still exist in Great Britain. There, club members are already rolling up their sleeves to help scientists study the current impact of climate change. They contribute observations about the natural world (birds, butterflies, and lots more) that are used by scientists, policy makers and others. Networks are now forming to do the same in the United States.



5.2 What is "citizen science"?

It's scientific work conducted by individual volunteers or networks of volunteers. You don't need to have any specific scientific training to help. When you join a network or group, you'll receive some brief training so everybody uses the same method of gathering information. For citizen science networks and opportunities, see the Resources section of this guide.

As a citizen scientist, you perform or manage research-related tasks such as observation, measurement, or computation. Your data and observations are turned over to trained scientists for use



in their research. By using citizen-science networks, research can be done much faster. This is a vital advantage in a period of rapid climate change.

Phenology is one area where citizen scientists can be extremely helpful. Phenology is the study of plant and animal life-cycle events and how these are influenced by variation in the seasons and climate. Although scientists have computer models, satellites, and other complex instruments to use, they also need detailed, ground-level data. Most important are data on how fast the change is occurring and its impact on the life cycles of plants and animals at the local level—everywhere.

Another area is volunteer weather monitoring. You can get the tools you need at the hardware store. Scientists need data on weather changes over time where you live.

What difference could I make?

You, the citizen, working cooperatively with your neighbors, can help research scientists. Getting the data is important. But it's also a good, healthy opportunity for personal exercise and learning. Schools, clubs, church groups, hunting and fishing clubs and many other groups can get involved. The whole family can do it together, while spending time outside.

What we are trying to find out

"Climate change" alone is not the problem. The problem is the rate—the speed of the current change. We need to know the weather conditions on the same date at the same place from year to year. Finding out the impact of the rate of change on plants and animals is crucial for preserving species. It's also crucial to assess potential threats such as insect and disease outbreaks in agriculture, natural resources and public health.

Audubon Counts

Every year citizens across the country collect information about the birds in their areas. This is vital data for gauging changes in populations and ranges.

Climate change and change on the living land

All living things tend to "migrate" over space, through time. Citizen scientists may observe what plant and animal species are doing to handle rapid climate change. For example,

- some species will attempt to migrate in latitude
- some species will attempt to migrate in altitude
- some species will attempt to migrate in depth
- some parasites, hyper-parasites, and pathogens will either expand or contract their ranges
- some parasites, hyper-parasites, and pathogens will lose their hosts; conditions may favor adapting to new hosts

The general longer-term effects of a warming climate are:

- species typically found at lower elevations will be found higher
- species found closer to the equator will be closer to the pole
- species that cannot "move" fast enough will become extinct

Climate change and water

Rapid climate change will affect fresh water, a substance crucial to the survival of all living things. How our water changes will vary widely, depending on location. Citizen scientists may observe

- some water bodies will change pH
- some water bodies will become warmer
- less water will be available from seasonal melt of snow and glaciers
- some areas will be dryer
- some areas will be wetter
- some areas will experience more variability
    - ¤ shorter and more intense precipitation
    - ¤ swings in weather conditions over shorter periods
    - ¤ more icing vs. snow
- lower water levels
- flow changes
- degradation in quality of a water body
- a slowing of groundwater recharge rate

6 Take Action

Climate change is a HUGE problem. It requires BIG solutions. Taking small steps to reduce your carbon footprint is a good start. Getting involved in local government is beneficial. Becoming a citizen scientist is useful. But to really make a difference, even BIGGER life changes are required.

Get ready to plunge into the BIGGEST challenge of your life! You are a contestant on the most real of the reality shows on TV:

6.1 Extreme lifestyle change—the 20% Challenge!

Consuming 20% fewer resources WILL make an impact on slowing climate change. Does that percentage seem like a lot? Are you visualizing a diminished, constrained existence that doesn't look like fun at all? Consider this …

Western Europeans consume 20% less in goods and services than Americans do. They use more public transit, cycle or walk to work and shopping, live in smaller houses, hang their laundry out to air dry, and in general, buy fewer things. Statistics show that western Europeans are happier (yes, there is a happiness index), healthier, work less (the usual amount of paid holiday time is 5 weeks), save more, spend more time with family and friends, and enjoy a better quality of life overall than U.S. citizens do. That sounds appealing, doesn't it? You can do it too!

6.2 Practical steps for starting the 20% challenge

1. Figure out what's really important to you and your family

Use our companion guide, *Living Sustainably: It's Your Choice*, to help you identify what you value most. Create a decision-making template based on your family values. We each have different values depending on how, when, and where we grew up, and what we've experienced in life. But no matter what lifestyle we prefer, we can make better choices (i.e., keep our carbon footprint small). Weed out what's not important to you, and you'll reach that 20%.

2. Investigate the possibilities

There are 2 parts to this investigation. The first is to get information. Look at the websites, read the reports, check out books and articles from the library, peruse "10 things you can do for the environment" lists. Explore the One Less

Car Challenge, or the Eat Local Challenge, Plan C Solutions, or the 2000 Watt Society. (Didn't catch those the first time? Google 'em!) What about zero-waste living, or eco-villages, or the carbon-conscious consumer? Check those out, too.

The second part is to figure out your baseline data. If you aim to reduce electrical usage 20% in the coming year, how much do you currently use? For those of you who love charts and graphs, this is the fun stuff. Pull out your utility statements, weigh your garbage, scan your credit card bills.

3. Identify 1st, 2nd and 3rd tier actions

Identify and separate possible actions into "easier to do," "harder to do," and "most challenging." Find fun actions too—did you realize that not ironing your clothes is an energy-saver? Select actions that make substantial differences in your carbon footprint.

4. Consider the implications of your actions

Did you know that even a simple step like installing a low-flow showerhead can add up to big results? Using less water in your household means

- your community withdraws less water from its water sources, such as wells and surface water
- fewer chemicals are used to make that water safe for human consumption
- less electricity is consumed for treating and pumping the water
- less carbon is emitted into the atmosphere
- less wastewater is discharged into the municipal wastewater system—reducing the strain on the existing system or the capacity needed in a new system
- your water bill is lower!

Get Ready!
Starting today, pledge to

- reduce spending 20%
- reduce energy use 20%
- reduce petroleum product usage 20% (vehicles, power mowers, boats)
- save 20% of your earnings
- reduce water use 20%
- increase energy conservation 20%
- increase quality time with your family and friends 20%
- increase time you volunteer in your community 20%
- reduce your garbage 20% by weight
- increase the amount of local food you buy 20%
- reduce travel miles 20%
- increase outdoor activities 20%
- reduce busy work 20%
- reduce household clutter 20%
- reduce plastics usage 20%
- and you choose the rest!

5. Jumpstart yourself

Reserve this weekend to tackle the Jumpstart list.

Jumpstart
Things you can do—*this weekend!*

- change to CFL or LED lightbulbs
- install low-flow showerheads
- adjust your thermostat
- caulk and seal your windows
- turn off your TV for an hour (or more)
- switch to cold water wash for your clothes and hang your laundry out
- change the air filter on your furnace
- put a jug of tap water in the refrigerator
- sit and do absolutely nothing for 10 minutes

6. Learn more

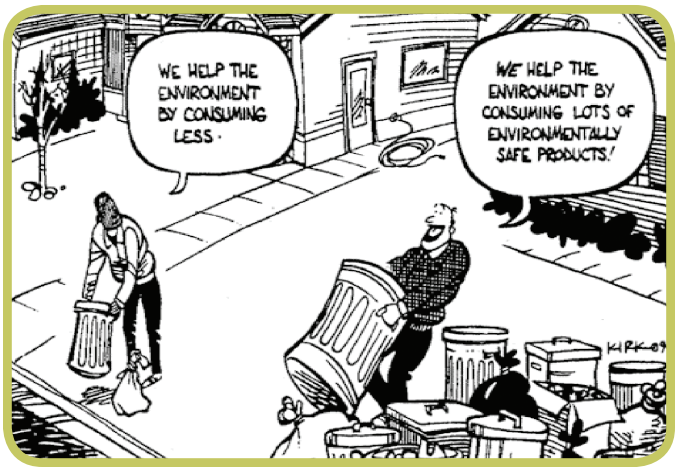
Take field trips. Visit local farms and farmers markets. Explore green spaces. Sign up for 'how to' classes. One of the friendliest activities you can do is walk your neighborhood; observe what others are doing—or not doing—to live a "lower carbon footprint" lifestyle. Watch out, you might find new friends when you do!

7. Get mad!

Or at least get passionate about something. Does the Great Plastic Gyre in the Pacific Ocean make you see red? What about oil spills? Are you appalled at inhumane working conditions in clothing sweatshops? Do you hate seeing good food being thrown away while people in your community go hungry? Is there a threat to your favorite scenic area? Are useful goods going in the landfill instead of being reused? Is it dangerous to cycle or walk in your community? Use that passion to make a difference!

8. Take a "Do I Really Need This?" stance

Adopt this mantra: "more fun, less stuff!" Use it to decide what projects to take on, what items to buy, what gifts to give. Challenge your creativity by finding new ways to do things, new ways to use things, new ways to make things for yourself—all the while reducing consumption 20%.



The next two recommendations may seem strange considering all the vigorously active changes we're encouraging you to make. However, without these philosophical foundations, follow-through will be more difficult.

9. Slow down

Making thoughtful choices takes time. Not having enough time makes it difficult to invest in lifestyle changes. This is a particularly sticky problem in the U.S. where on average, we work over 160 hours more per year than workers did in 1969. That's 20 days more!

We've also gotten into the habit of thinking we don't have time to do things when in fact, we do have time, we just choose to do other things instead. But like any habit, slowing down and learning to think about how to do things better gets easier the more often you do it.

10. Be kind

If you do nothing else from this guide, be kind—to yourself, your family, your neighbors, your community, your bioregion, the plants and animals that share your world. Be kind—to our one and only planet.

7 Resources

There's a wealth of information about climate change and what you can do to make a difference. We've selected a few to get you started. Please feel free to contact the authors if you have any questions.

Climate Science

PEW Foundation's Climate Change 101: Science and Impacts
www.pewclimate.org/docUploads/Climate101-Science-Jan09.pdf
RealClimate
An FAQ site on climate change, for beginners, run by climate scientists.
www.realclimate.org/index.php/archives/2007/05/start-here

The Intergovernmental Panel on Climate Change
THE official authority. The single most reliable source. Used by businesses and governments, the world over. This is a very comprehensive site.
www.ipcc.ch

Living with the Changes

PEW Foundation
The Pew Center on Global Climate Change has a series of documents comprising their "Climate Change 101."
www.pewclimate.org/global-warming-basics/climate_change_101

NOAA Climate Literacy
Go here to obtain the free publication Climate Literacy: The Essential Principles of Climate Science.
www.climate.noaa.gov/index.jsp?pg=/education/edu_index.jsp&edu=literacy

The Carbon-Conscious Consumer
The Center for the New American Dream.
www.newdream.org/cc/index.php

Think Smart, Act Cool
A nice personal take on fighting rapid climate change.
www.sustainable.org/information/ThinkSmart_GlobalWarming_A.pdf

EPA Climate Change Site
The EPA site is a gateway to a wide range of information and tools regarding climate change science, adaptation, mitigation, local government and business energy planning.
www.epa.gov/climatechange

Plan C. Community Solutions
www.communitysolution.org/index.html

The Sustainable Living Project at OSU
Oregon State University
www.cof.orst.edu/cof/extended/sustain/

Sustainable Communities Capacity Center
University of Wisconsin Extension
www.capacitycenter.org

Sustainable Communities Network
www.sustainable.org

The Psychology of Climate Change Communication

Climate Change Wildlife and Wildlands Toolkit
A toolkit for formal and informal educators. Maintained by the U.S. Global Climate Change Research Program.
www.globalchange.gov/resources/educators/toolkit

The Center for Research on Environmental Decisions
Columbia University has published *The Psychology of Climate Change Communication,* "A Guide for Scientists, Journalists, Educators, Political Aides, and the Interested Public."
www.cred.columbia.edu/guide

Transition Towns
A Transition Initiative (which could be a town, village, university or island etc.) is a community-led response to climate change pressures, fossil fuel depletion, and economic instability.
www.transitionnetwork.org/about

The Investor Network on Climate Risk
INCR is a network of institutional investors and financial institutions that promotes better understanding of the financial risks and investment opportunities posed by climate change.
www.incr.com

Climatebiz - climate business online magazine
www.greenbiz.com/climate

Citizen Science & Phenology

The USA National Phenology Network
Facilitates collection and dissemination of phenological data to support global change research. Join up!
www.usanpn.org/

A Phenology listserv:
phenolog-l@uwm.edu

Project Budburst
Collect important climate change data on the timing of leafing and flowering in your area.
www.budburst.ucar.edu/

A radio story about this project:
www.npr.org/templates/story/story.php?storyId=10086723

Citizen Science Central
www.birds.cornell.edu/citscitoolkit/projects/find

Find a Citizen Science Project!

Appalachian Mountain Club Mountain Watch (Appalachian Mountains)
www.outdoors.org/conservation/mountainwatch

Cornell Lab's Project Feeder Watch
Embrace winter, and count feeder birds for science!
www.birds.cornell.edu/pfw

Audubon Christmas Bird Count
www.audubon.org/bird/cbc

United States and Canada: North American Breeding Bird Survey
www.pwrc.usgs.gov/bbs

National Wildlife Federation: Wildlife Watch (pick by state)
www.nwf.org/WildlifeWatch

Citizen Weather Observation
The National Weather Service (NWS) Cooperative Observer Program (COOP) is the nation's weather and climate observing network of more than 11,000 volunteers. The COOP was formally created in 1890.
www.weather.gov/om/coop

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What is a carbon footprint?

Using coal, natural gas, or oil for electricity, heat or transportation releases carbon dioxide (CO_2) into the atmosphere. These daily carbon dioxide emissions make up your carbon footprint.

Why Care?

Too much CO_2 from our daily activities hurts the planet's climate. Measuring carbon emissions can be tricky. This card lists estimates of the CO_2 emitted through common activities.

Add it up:

When you want to lose weight, you count calories. When you want to save money, you count dollars. Want to improve the atmosphere? Count CO_2 emissions. Driving, flying, drinking coffee and even eating sushi all have a carbon footprint. Use this guide to count your carbon so you can live lighter!

Put this card in your wallet or on your fridge for reference!

100% Post Consumer recycled paper

THE SOPRIS FOUNDATION

www.soprisfoundation.org

303 E ABC Aspen, CO 81611

Sustainability for the Rockies

Carbon Footprint COUNTER

What's *your* total?

Home Energy Use

Lights use natural window light ..... 0 lb CO2
Cooling open a window for fresh air..... 0 lb CO2
Washing cold water, air dry ..... 0.4 lb CO2/day
Snow shovel by hand ..... 0 lb CO2/winter
Bathing hot shower, 5 minutes..... 3.5 lbs CO2/shower
Home energy efficient house ..... 3.8 lbs CO2/sf/yr

Lights four 26 Watt CFL bulbs for 12 hours ..... 1.7 lbs CO2/day
Cooling electric fan ..... 1 lb CO2/day
Washing cold water, electric dryer ..... 4.4 lb CO2/day
Snow snowplow truck removal..... 950 lbs CO2/winter
Bathing hot shower, 10 minutes ..... 7 lbs CO2/shower
Home average US household ..... 10 lbs CO2/sf/yr

Lights four 100 Watt bulbs for 12 hours ..... 6.5 lbs CO2/day
Cooling air conditioner ..... 7 lbs CO2/day
Washing hot water, electric dryer ..... 8 lbs CO2/day
Snow heated driveway ..... 6 tons CO2/winter
Bathing soaking in avg hot tub ..... 9 lbs/day
Home large size, many amenities ..... 51 lbs CO2/sf/yr

Travel | Recreation

Driving take the bus instead .....0.2 lb CO2/passenger mile
Flights long, extended trip* ..... 0.3 lb CO2/passenger mile
Recreation cross country ski..... negligible CO2
Exercise walk, hike outdoors ..... negligible CO2
Extra average car idling in traffic..... 12 lbs CO2/hour

Driving hybrid electric car, 41 mpg ..... 0.5 lb CO2/mile
Flights medium trip* ..... 0.5 lb CO2/passenger mile
Recreation lift-serviced skiing ..... 45 lbs CO2/day
Exercise gym workout ..... 21 lbs CO2/visit
Extra snowmobiling ..... 87 lbs CO2/hour

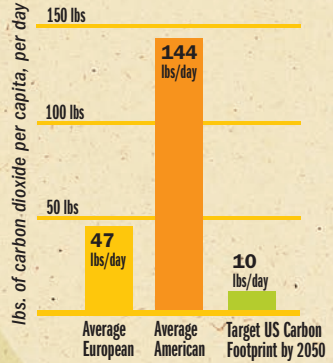
Driving average 23 mpg vehicle..... 0.9 lb CO2/mile
Flights short trip* ..... 0.9 lb CO2/passenger mile
Recreation heli-skiing..... 419 lbs CO2/day
Extra private jet..... 3.4 tons CO2/hour

Food | Drink | Work

Water tap water ..... negligible CO2
Alcohol New Belgium beer..... 1.8 lbs CO2/12-oz bottle
Food fruits & vegetables..... 1.6 lbs CO2e/lb
Food banana ..... 0.25 lbs CO2e/banana
Work laptop computer ..... 0.3 lb CO2/day
Extra coffee ..... 0.4 lb CO2/cup

Water dispenser with hot/cold ..... 3.1 lbs CO2/day
Alcohol domestic wine..... 5.5 lbs CO2/750 ml bottle
Food chicken, fish, eggs..... 6 lbs CO2e/lb
Work desktop computer ..... 2.2 lb CO2/day
Extra LCD 40" flatscreen TV ..... 0.7 lb CO2/day

Water bottled Fiji water..... 1 lb CO2/liter
Alcohol French wine ..... 6.2 lbs CO2/750 ml bottle
Food beef ..... 22 lbs CO2e/lb
Food cheeseburger..... 6.6 lbs CO2e/burger
Work send a UPS package..... 4.7 lbs CO2/package
Extra yellowtail sushi ..... 0.5 lb CO2e/piece



* In addition to other factors, more fuel is burned during takeoff & landing in a short flight than on long flights.

- The distance a product is shipped from where it was produced, or the specific model of a home appliance or personal vehicle alter the actual carbon footprint. These estimates are based on best available information.
- For a complete explanation of the calculations, refer to "Daily Carbon" at www.soprisfoundation.org