Learning to Fight the Climate Crisis

Susan M. Schneider, PhD
Audubon’s 2019 Fall Climate Issue won a National Magazine Award.

It’s online at: https://www.audubon.org/climate-action-guide
Your Guide to Climate Action

Feeling like you can’t make a difference? That couldn’t be further from the truth. Here’s where to begin and how to amplify your efforts to make lasting change in the world.
Climate Action Guide
Create a More Climate-Friendly Yard

America’s largest irrigated crop isn’t corn or soy—it’s grass.
Climate Action Guide

Why Towns Should Prepare for the Climate Displaced

Climate change is already causing people to relocate. As more hometowns become inhospitable, yours might be able to help.

Climate Action Guide

How to Hack Your Local Food System to Prevent Waste

Farm-to-table is the buzzword, but too often farm-to-landfill is the reality.

Climate Action Guide

Why You Should Support Green Infrastructure

By working with nature, not against it, we can mitigate climate disasters while creating vital habitat.
California Audubon Chapters

A proud history of Audubon Advocacy Day at the state capitol
The impact of human-induced warming is worse than previously feared, and only drastic coordinated action will keep the damage short of catastrophe.”

The world faces a *10-year* deadline
CO2 emissions vs Atmospheric CO2 Levels

Atmospheric CO2 levels
(Total Amount of CO2 in the atmosphere)

- CO2 Levels from Mauna Loa, Hawaii
- CO2 Levels from Law Dome ice core

Total CO2 Emissions
(Total amount of CO2 emitted by humans)

- Cumulative CO2 emissions

Year
CO2 – The Long View

For centuries, atmospheric carbon dioxide had never been above this line.

Source: NASA
The Consensus

97 out of 100 climate experts think humans are changing global temperature.

Recent survey: Only 15% of the US public knows this.
Indicators of a Warming World

- Wildfires
- Mosquito bite
- Spring coming early
- Species migrating poleward and upward
- Floods
Wildlife at Risk: The Sixth Great Extinction

Nearly half of our coral reefs are already gone.
Global Greenhouse Gas Emissions by Economic Sector

- Electricity and Heat Production: 25%
- Agriculture, Forestry and Other Land Use: 24%
- Buildings: 6%
- Transportation: 14%
- Industry: 21%
- Other Energy: 10%

Source: IPCC
Carbon Footprints

India: 2 tons CO2e per capita
China: 6 tons
Sweden: 7 tons
UK: 8 tons
Germany: 11 tons
Australia: 16 tons
Canada: 16 tons
US: 18 tons

US Department of Energy/UN/Global Carbon Project
Figure 2a. Change in California GDP, Population, and GHG Emissions Since 2000

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Explaining climate change science & rebutting global warming misinformation

Scientific skepticism is healthy. Scientists should always challenge themselves to improve their understanding. Yet this isn't what happens with climate change denial. Skeptics vigorously criticise any evidence that supports man-made global warming and yet embrace any argument, op-ed, blog or study that purports to refute global warming. This website gets skeptical about global warming skepticism. Do their arguments have any scientific basis? What does the peer reviewed scientific literature say?

Rising CO2 levels could push ‘hundreds of millions’ into malnutrition by 2050

Posted on 5 September 2018 by Guest Author
Climate Change E-Newsletters

- Yale Climate Connections
- World Resources Institute

- and Website
CoolCalifornia.arb.ca.gov for Households, Small Business, Schools, Local Government
Did you know ... with just five actions, the average California household may be able to reduce their carbon footprint by 50% or more?

Step 1. Calculate

CARBON CALCULATOR

Each household and individual in California has the power to protect the climate and keep California cool. See how you compare to similar households and find out how to make reductions.

Step 2. Take Action

1. Choose alternative modes or electrify your transportation
2. Make your home more efficient
3. Eat a lower-carbon diet
4. Reduce or offset your air travel
5. Choose electricity from renewable sources

Step 3. Find Funding

FUNDING WIZARD

Searchable database full of funding opportunities for sustainable projects
Outstanding Climate Change Books

Annoted list at www.scienceofconsequences.com

Drawdown
The Most Comprehensive Plan Ever Proposed to Reverse Global Warming
Edited by Paul Hawken

The Uninhabitable Earth
Life After Warming
David Wallace-Wells
Outstanding Climate Change Books

1. *How Bad Are Bananas? The Carbon Footprint of Everything* by Mike Berners-Lee
   - "Enjoyable, fun to read and scientifically robust. A triumph of popular science writing."
   - Chris Goodall, author, *Ten Technologies to Fix Energy and Climate*

2. *The Parents' Guide to Climate Revolution* by Mary DeMocker
   - Foreword by Bill McKibben
   - 100 Ways to Build a Fossil-Free Future, Raise Empowered Kids, and Still Get a Good Night's Sleep
2019 ACEEE City Scorecard

- Buildings/Transport Progress
- Work on all, especially Local Government Ops, Community
Good News/Bad News

- Knowledge and technology
- Huge financial savings
- Big obstacles

The best science and technology doesn’t help us if we don’t use it
Behavioral Economics for Behavior Change

Nudge
Improving Decisions about Health, Wealth, and Happiness
Richard H. Thaler and Cass R. Sunstein
...with a new afterword

The Science of Consequences
How they affect genes, change the brain, and impact our world
Susan M. Schneider
Learning Principles

- A century of research
- Well-quantified
- Extensive application
- Awesome generality: hundreds of species
- Advanced neurophysiological and genetic understanding
American Psychological Association Task Force

Major Barriers

Old Habits

A Sense of Futility

Ideally: New green habits

New social norms

Natural rewards
Incentives & Sustainability

Financial incentives often work - but think outside the box

Vermont and time-of-use electricity pricing
“Hybridfest” competition to astonishing levels

- *180* mpg
Reinforcing Progress: Shaping

Meet people where they’re at!

Ramp up slowly (and be prepared to backtrack)

Meatless Mondays?
Behavior and Outcome: Variable Schedules of Reinforcement

Gambling
Stream clean-up

Lotteries and contests!
The Power of Variable Schedules
Do I Have to Wait?
“Delay Discounting” & Wiser Choices

- Establishing new habits
- Social support/new social norms
- Informal/formal commitments
- Greener alternative rewards
- Successful models to follow
- Recording progress on checklists, charts, & apps
Large Scale Gamification

Over 25 million players in US

Over 800 actives in the study/
26,000 controls

MIT Technology Review

Rewriting Life

Pokemon Go Increased U.S. Activity Levels by 144 Billion Steps in Just 30 Days

This gaming craze increases activity levels for players, regardless of their age, sex, or weight.

by Emerging Technology from the arXiv October 21, 2016

Althoff, White, & Horvitz (2016)
Large Scale Gamification

Activity up hugely – for a while
The Power of Social Media: YouTube

Help us plant 20 million trees around the globe by January 1st, 2020.

16,295,404 TRESPS PLANTED

JOIN TEAM TREES

$1 PLANTS A TREE

- 5 TREES

- 20 TREES

- 50 TREES
Energy Chickens at the Office – Success!

- Individual scoring, use collected eggs to build up farm
- 42 participants
- 288 devices, 12 weeks
- 13% decline in energy use

Global Mammalian Biomass

High Impact & Broad Impact

**Individual action**

Figure 1. A comparison of the emissions reductions from various individual actions. The height of the bar represents the mean of all studies identified in developed nations, while black lines indicate mean values for selected countries or regions (identified by ISO codes) where data were available from specific studies. We have classified actions as high (green), moderate (blue), and low (yellow) impact in terms of greenhouse gas emissions reductions. Note the break in the y-axis. See supplementary materials 5 for details.

Success: Seattle’s “In Motion” Initiative

• Reduce solo car trips/Increase public transit, carpooling, biking

• Barriers identified

• Timing

• Start small (shaping)

• Pledges/free transit card

• Public meetings

• Individual tracking charts online, weekly reinforcing emails, reminders
Seattle’s “In Motion” Initiative

Typical 20% drop in solo car trips

New habits formed
Success: A Focus on the Group - & Feedback

Minnesota school district as an Energy Star!

Inclusive 13-year program
Teams
Rival school competition
Immediate reinforcement
Public recognition

>30% savings: over $5,000,000
Some Behavior Change Strategies

• Investigate barriers to change
• Use incentives – wisely
• Include attention/social support
• Provide comparative data on greenhouse gas emissions – feedback
• Find role models
• Offer people choices
• Create goals &

celebrate progress!
What Hope Looks Like

https://350sacramento.org

ECOS Sacramento
https://www.ecosacramento.net

Other Resources: CoolCalifornia
National Audubon’s climate toolkit