

# Educators' Needs

## Assessment Survey of Climate Change Education In and Out of the Classroom



A review of the literature in the area of climate change education shows a number of surveys (Buhr, 2011, Johnson, 2011) looking at the needs of K-12 classroom teachers, as well as their knowledge as it relates to climate change. Additionally, several national surveys have been conducted (Yale Project on Climate Change Communication 2009, 2010, 2011, 2012, 2013) that gauge the attitudes and knowledge of Americans on climate change. Recognizing that the needs of informal and environmental educators may be different than formal K-12 educators as it relates to climate change education, we developed a needs assessment survey for distribution to the North American Association for Environmental Education (NAAEE) members and other educators who may integrate climate change in their educational settings. The results of this survey were meant to inform and support the creation of a product developed by NAAEE's Climate Change Education Professional Learning Community, supported by EECapacity.

## Survey Instrument Development

Objectives of the survey included determining:

- What do formal and informal educators know about climate change?
- What do formal and informal educators do with what they know about climate change (this includes action/service learning applications)?
- What do formal and informal educators need to integrate climate change into their educational settings?
- What climate change education resources are formal and informal educators using?
- What audiences do formal and informal educators work with and engage regarding climate change?

The survey questions were developed through an iterative process that involved:

- Collection of previous surveys that had been conducted related to climate change, environmental, and science education (see end of this section for references used)

- Identification of questions from previous surveys that align with the survey objectives
- Refining questions for survey consistency
- Narrowing down questions to accommodate for survey length
- Sharing survey with EECapacity climate change education community for comments
- Finalizing survey and entering into Survey Monkey for distribution

The final survey included 31 questions, both multiple choice and open responses.

## Survey Sample

Our main goal in gathering information through this needs assessment was not to have a closed survey, but to get as much input as rapidly as possible given the time constraints of the project. Respondents were solicited via email; in some cases directly, in some cases via an announcement in e-newsletters put out by parent organizations and in one case a Facebook post. Details of listservs utilized are found below (Table 1). The emails included objectives of the survey and gave a deadline for responding. The survey opened August 6, 2013 and closed September 13, 2013, with the intent of catching formal and informal educators while they were in teaching mode.

**Table 1: Listservs Reached**

Email Listserv or Organization	Number of Subscribers (to listserv or newsletter)	Number of Emails Sent
North American Association for Environmental Education	1600	3
National Science Teacher's Association	60,000 members- posted to website and sent to listservs once	1
Louisiana Association for Environmental Education	900	1
Social Studies and Science Teachers in NE Ohio	495	1
Climate Literacy Network	407	2
National Council of Social Studies Environmental and Sustainability Education Online Community	84	1

The US Partnership for Education for Sustainable Development K-12 NANS listserv Sustain12	429	1
Environmental and Sustainability Education Facebook Group	58	1
National Center for Geography Education	5000	2
Minnesota Association for Environmental Education	300	1
Rhode Island Environmental Education Association	228	1
New England Environmental Education Alliance	280	1

## Results

### Survey Demographics

A total of 316 individuals attempted the survey. However, only 225 (71.2%) completed the entire survey. Thus, the sample size for the latter half of the survey was less than 316.

Drs. Pat Stephens Williams and Ray Darville of Stephen F. Austin State University, Nacogdoches, TX, completed the Results Analysis.

Respondents were asked to identify their membership in related organizations in a check-all-that-apply type of question (see Table 2). They indicated that they were members of 337 organizations, or about one membership per respondent. Table 9 shows the results of the number of responses, percent of responses, and percent of cases. For organizational memberships, the National Science Teacher's Association (NSTA) was the most frequently identified (43.0% of responses and 56.9% of cases) while the North American Association for Environmental Education (NAAEE) was second most frequently identified (35.9% of responses and 47.5% of cases). Combined these two organizations represent about 80% of all individuals participating in the survey.

**Table 2. Membership Types**

Organizational Membership	Responses		Percent of Cases
	N	Percent	
NAAEE Member	121	35.9%	47.5%
NSTA Member	145	43.0%	56.9%
NAI <sup>1</sup> Member	24	7.1%	9.4%
NCSS <sup>2</sup> Member	16	4.7%	6.3%
NCGE <sup>3</sup> Member	12	3.6%	4.7%
AZA <sup>4</sup> Member	12	3.6%	4.7%
ASTC <sup>5</sup> Member	7	2.1%	2.7%
Total	337	100%	132.2%

<sup>1</sup>National Association for Interpretation

<sup>2</sup>National Council for Social Studies

<sup>3</sup>National Council for Geographic Education

<sup>4</sup>Association for Zoos and Aquariums

<sup>5</sup>Association of Science Technology Centers

Respondents were asked to self-identify the type of educator they were (Table 3). Most were formal educators (43.0%) followed by informal educators (29.1%). Some (25.9%) indicated that they saw themselves as both a formal and informal educator, while a handful self-identified as neither.

**Table 3. Type of Educator**

	Frequency	Percent	Valid Percent	Cumulative Percent
Formal educator	136	43.0	43.0	43.0
Informal educator	92	29.1	29.1	72.2
Both formal and informal educator	82	25.9	25.9	98.1
Neither formal or informal educator	6	1.9	1.9	100.0
Total	316	100.0	100.0	

Educator type and memberships were cross tabulated to present a more detailed picture of respondents (Table 11). Formal educators were most likely to be NSTA members (72.6% of cases) while informal educators were most likely to be NAAEE members (77.8%).

The majority of all respondents teach climate change to grade 9-12 students, adults, or university/preservice/in-service students. A large percentage also taught to formal and grades 6-8. The top four types of courses taught by classroom teachers represented environmental science, life science, earth science and physical science, with environmental and earth science being the areas where climate change is most often included.

## Survey Respondents and Climate Change Education

Overall, educators self-reported being fairly or very well-informed about climate change, though there was a significant difference between how well-informed formal and informal educators felt they were on “how the climate system works” and “ways to communicate about climate change to students,” with formal educators feeling more informed than informal. While 77% of respondents felt climate change was relevant to their subject area, 94% felt it was extremely or very important to teach their audience about climate change.

When asked the focus of their lessons on climate change, 5 of the 10 foci offered were selected by more than 50% of the respondents (see Table 4). Educators focused least often on civic engagement (19.7%), adaptation (29.7%), social, political and economic ramifications of climate change (31.9%), and climate solutions (38.1%).

**Table 4: Focus of climate change lessons, highest to lowest**

Focus	Percent
The greenhouse effect, human activity	85.0%
Impacts of climate change on wildlife and plant life	77.9%
Impacts of climate change on people and property, not in your area	63.7%
Mitigation– things people can do to lessen their impact on climate forces	59.3%
Impacts of climate change on people and property in your area	57.5%
Climate solutions-hands on action taking initiatives and the skills to perform them	38.1%

When compared, formal educators were more likely than informal educators to focus on: adaptation, causes of climate change, local impacts, social, political and economic ramifications, and civic engagement while informal educators were more likely to focus on mitigation, impacts not in local area, impacts on people and property in area, impacts on wildlife and plant life, and climate solutions.

When asked about what Climate Literacy Principles their course covered, respondents identified, “Human activities are impacting the climate system”,

“Climate change will have consequences for Earth system and human lives,” and “Humans can take action to reduce climate change,” as the top three. Educators identified where they usually found their educational resources on climate change from a list of 13 different sources. Course textbooks were most often selected followed by the internet.

## Educator Needs

Overall, 53.1% of all educators said they were either extremely confident or very confident teaching climate change. Yet comparing formal and informal educators, 58.9% of formal educators saw themselves as either very confident or extremely confident, while only 37.7% of informal educators saw themselves this way. In addition, over 10% of informal educators were either not very or not at all confident, whereas only 4% of formal educators saw themselves this way.

The greatest barriers identified to teaching climate change were time to develop and search for curriculum resources and the budget to develop new resources.

When asked what resources were needed to effectively teach about climate change two items tied (n = 165) for the highest counts:

- Content information that links climate change impacts to your local/regional wildlife
- Information about up-to-date regional/global climate science

Financial resources had a rank of three (n = 144). Only 17 respondents indicated that they had no need for resources.

Educators were asked three questions (question 19) about whether they had adequate resources for teaching climate change. Responses provided were "disagree", "agree", and "strongly disagree". Some 34.4% of respondents (n=78) indicated that they disagreed or did not have adequate resources to teach the science of climate change while 65.6% either agreed or agreed strongly, indicating that they did have adequate resources. Opinion toward adequate resources for integrating climate solutions had a larger percentage disagreeing. About 45.5% of respondents (n = 95) said they disagreed — they believed that they did not have sufficient resources. Just over half of the respondents (54.5%) agreed or strongly agreed that they had adequate resources. Finally, we asked respondents whether they had adequate resources for teaching the ramifications of climate change. This particular item had the largest percentage of disagreement with 59.1% (n = 130) indicating that they did not have adequate resources. Only 40.9% said they



We will continue to analyze the results of this survey and develop a lengthier literature review and discussion. Long-term goals involve developing a more controlled survey that includes a knowledge assessment for educators.

## References Used

### **Assessments:**

Pike, C., & Herr, M. (2011). *American climate attitudes*. (1st ed. ed.). The Resource Innovation Group (TRIG).

Buhr, S. M. (2011). *Navigating climate science in the classroom*. Boulder, CO: University of Colorado, Boulder.

Johnson, R. (2011). *Climate change education in k-12: Teacher preparation, understanding, needs and concerns*. Slingerlands, NY: National Earth Science Teachers Association.

Leiserowitz, A., Smith, N. & Marlon, J.R. (2011) *American Teens' Knowledge of Climate Change*. Yale University. New Haven, CT: Yale Project on Climate Change Communication.

<http://environment.yale.edu/uploads/american-teens-knowledge-of-climate-change.pdf>

Luebke, J.F., Clayton, S., Saunders, C.D., Matiasek, J., Kelly, L.-A. D., & Grajal, A. (2012).

*Global climate change as seen by zoo and aquarium visitors*. Brookfield, IL: Chicago Zoological Society.

Meehan, C. R. (2012). *Global warming in schools: An inquiry about the competing conceptions of high school social studies and science curricula and teachers*. Madison, WI: University of Wisconsin-Madison.

Cite as: Leiserowitz, A. & Smith, N. (2011) *Knowledge of Climate Change Among Visitors to Science & Technology Museums*. Yale University. New Haven, CT: Yale Project on Climate Change Communication. <http://environment.yale.edu/climate/files/MuseumReport.pdf>

Leiserowitz, A., Maibach, E., Roser-Renouf, C. & Hmielowski, J. (2012) *Global Warming's Six Americas, March 2012 & Nov. 2011*. Yale University and George Mason University. New Haven, CT: Yale Project on Climate Change Communication.

Maibach, E., Wilson, K & Witte, J. (2010) *A National Survey of Television Meteorologists about Climate Change: Preliminary Findings*. George Mason University. Fairfax, VA: Center for Climate Change Communication. [http://www.climatechangecommunication.org/resources\\_reports.cfm](http://www.climatechangecommunication.org/resources_reports.cfm)

## Rationale:

Simmons, B. (2011). *Climate change education in the formal k-12 setting: lessons learned from environmental education*. Eugene, OR: The National Academies Board on Science Education Committee on Human Dimensions of Global Change Division of Earth and Life Studies.

Marcinkowski, T., Noh, K., Sagy, G., & Erdogan, M. (2011). *Glimpses of the status of climate literacy, k-12, from national assessments of environmental literacy*. Florida Institute of Technology.

Hollweg, K. S., Taylor, J. R., Bybee, R. W., Marcinkowski, T. J., McBeth, W. C., & Zoido, P. (2011). *Developing a framework for assessing environmental literacy*. Washington, DC: North American Association for Environmental Education. Available at <http://www.naaee.net/framework>.

Simmons, B., Archie, M., & Hollweg, K. (2010). *Excellence in environmental education: Guidelines for learning(k-12)*. (3rd ed.). Washington DC: North American Association for Environmental Education.

Marcinkowski, T. (2010). *Contemporary challenges and opportunities in environmental education: Where are we headed and what deserves our attention?*. Melbourne, FL: Florida Institute of Technology.

(2010). *Guidelines for k12 global climate change education*. Washington DC: North American Association for Environmental Education.

Fleming, M. L. (2010). *Practitioner's needs: Professional development priorities of informal and nonformal environmental educators*. Washington DC: Environmental Education and Training Partnership.

Fleming, M. L. (2010). *Teachers' needs: Professional development priorities of formal pre-k-20 environmental educators*. Washington DC: Environmental Education and Training Partnership.

## Questions in Surveys developed from:

*National Survey of Zoo and Aquarium Visitors, CLiZEN questionnaire.*

Source: Alejandro Grajal, PI Climate Literacy Zoo Education Network, Brookfield Zoo

*2013 NOAA Climate Stewards Pre-Assessment*

*2013 NOAA Climate Stewards Education Project Needs Assessment*

*2013 NOAA Climate Stewards Needs Assessment*

Source: Peg Steffen, Education Coordinator NOAA

*Parks Climate Change Survey*

Source: Carol Lavoie, Project Manager, Applied Research Northwest

*Understanding Global Change questionnaire*

Source: Mark S. McCaffrey, Programs and Policy Director, National Center for Science Education

## Other Material:

(2009). *Climate literacy: the essential principles of climate sciences* . (2nd ed.). Washington DC: US Global Change Research Project.