

1 February 15, 2007

2 submitted to

3 *Teaching for High Potential, National Association for Gifted Children*

4
5
6
7
8
9 **Global Climate Change - Motivated High School Students Gain their Voice**

10 Paul Bierman – contact author (pbierman@uvm.edu; 802 863 3609)

11 Peter Gould

12 Jasmine Lamb

13 Christine Massey

14 Simon Norton

15 Jean Olson

16 Luke Reusser

17 John Ungerleider

18
19
20
21
22 With the snow-less winter of 2007 drawing to a close over much of the United
23 States only two years after Hurricane Katrina slammed into New Orleans, human-induced
24 climate change is on everyone's mind. Release of the authoritative United Nations-
25 sponsored *Intergovernmental Panel on Climate Change* report in February 2007
26 confirmed for policy makers what most scientists have known for years; humans are
27 changing the world's climate by running the biggest uncontrolled global experiment in
28 history. Burning fossil fuels and slashing tropical forests, we have increased atmospheric
29 levels of CO₂ by > 30% since the dawn of the industrial revolution and unless something
30 changes quickly, CO₂ levels will have doubled or tripled by century's end. Climate
31 models suggest the world will by then be 2 to 10 degrees F warmer on average,
32 permanent sea ice will have vanished, and the great ice sheets of Greenland and
33 Antarctica may be in irreversible decline.

34 How does an exceptional young person deal with such a dire forecast without
35 losing hope, and how does he or she avoid becoming mired in a cycle of inaction and
36 helplessness? To address these issues, faculty of the *Governor's Institutes of Vermont*, a
37 seven-program group of summer residential Institutes that caters to high-potential
38 learners, developed a weekend climate change program. The program brought together
39 70 of Vermont's most motivated high school students, nearly a dozen staff, and 18
40 visiting specialists for a Winter Weekend of learning and action. The overarching theme
41 of the weekend was to understand global climate change from a variety of perspectives,
42 get a sense of the science, as well as a sense of the politics involved. After learning the
43 basics, the students worked with faculty and outside specialists to learn about solutions--
44 personal, local, and global. Throughout the weekend, we stressed the importance of not
45 giving up hope, of taking action, and of finding one's own voice to speak about this
46 compelling issue.

47 *Our Approach*

48

49 We explicitly designed the *Focus on Global Climate Change Weekend* to cross
50 what are typically considered disciplinary boundaries and to build on previous
51 programmatic knowledge. We had seven objectives for the weekend:

52

- 53 1. increase student awareness of human-induced climate change,
- 54 2. increase student knowledge about the science underlying changes in climate,
- 55 3. catalyze student reflection on new information and ideas to which they are
56 exposed,
- 57 4. provide skills, knowledge, and support to allow students to make changes in their
58 lives and their families lives that minimize human impact on climate,
- 59 5. catalyze action by students to provide positive societal change,
- 60 6. model ways of learning outside the classroom setting, and
- 61 7. support students as they accept and acknowledge the problems posed by human-
62 induced climate change.

63

64 Over the past decade, the *Governor's Institutes of Vermont* residential Winter
65 Weekends have always had students and faculty working in separate, topically-focused
66 groups. The integrated approach we took this year was the result of both faculty and
67 student interest in approaching the pressing problem of climate change through an
68 interdisciplinary lens. Crossing disciplines allowed us to attract a variety of students and
69 appeal to a variety of learning styles. Recruiting was done on a first come/first served
70 basis through high school guidance counselors. The demand for the program greatly
71 outstripped the number of available spots with registration closing weeks ahead and
72 numerous students and teachers turned away.

73

74 The planning process for staff required several group meetings and conference
75 calls to create cohesion among the faculty, discuss curricular goals, create a working
76 schedule, and discuss reading materials for the students. We created a pre-weekend
77 packet of activities for all students and staff to complete before arriving that included: 1)
78 a short reading packet with science, newspaper, and popular book excerpts, 2) a graphic
79 "footprint" collage of household energy use on 11x17 paper, and 3) a calculation of
80 household carbon emissions. Staff also created a carpool list for students and visiting
81 speakers to encourage the reduction of carbon emissions. All of these materials are
82 available at the Winter Weekend website (<http://uvm.edu/giv/givwinter2007>).

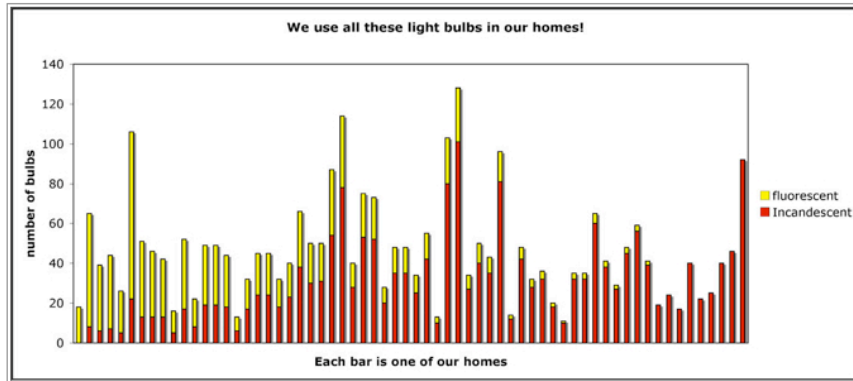
82

83 The overall structure of the weekend moved students intellectually from learning
84 facts toward reflection and then taking action. Students arrived on Friday afternoon and
85 were immediately immersed in the issues and the science. We opened the weekend with
86 a local champion of climate change action, the President Pro Tempore of the Vermont
87 State Senate. The senator was followed by a local expert, a geologist who studies
88 regional climate change and climate history. We used the carbon footprinting exercise as
89 an icebreaker for the students and closed the evening with *Too Hot Not to Handle*, a
90 movie that moved beyond statistics to action and solutions. By the end of the first
91 evening the problem was clear, the importance of taking action had been well articulated,
92 and the students were starting down the pathway from learning facts to taking the steps
93 necessary to make change.

93

94 The footprinting exercise provided information we used immediately. For
example, from the footprints, we calculated the number of lights contained in all the

95 student and faculty homes (see the graph below). Of the nearly 3000 installed bulbs, over
 96 2/3 were still incandescent. A simple calculation showed the students that just by
 97 swapping out these incandescent bulbs and replacing them with energy efficient compact
 98 fluorescents, we could save ~ 40,000 kilowatt hours of electricity each year, representing
 99 the typical electrical use of 6 Vermont households, which use on average 7000 kilowatt
 100 hours per year! If we use the estimate that 2 pounds of CO₂ are released per kilowatt
 101 hour of electricity used, then changing these 2000 light bulbs could reduce our collective
 102 emissions by 80,000 pounds per year. That's the equivalent of between one and two
 103 household's average yearly carbon emissions – a big change, simply done.
 104



We use
2950
 light bulbs in our homes:
974 fluorescent
1976 incandescent

105
 106

A very important aspect of the interdisciplinary Winter Weekend, not only pedagogically, but in terms of empowering students to respond to critical global issues in their own lives, was providing them with intensive exposure to different perspectives that would allow them inroads for learning about the reality of global climate change and finding ways to appropriately take action in their own lives and communities.

107 On Saturday morning, students worked closely with faculty in disciplinary groups
 108 considering the *Science of Climate Change*, gaining a voice in *Performing Arts*,
 109 understanding themselves in the eco-psychology of the *Body-Earth* relationship, and
 110 learning about policies in *Current Issues and Youth Activism*. These four strands provided
 111 students with the scientific foundation to understand potential policy advocacy and social
 112 action responses at a political level. The strands also allowed them to explore the
 113 reactions and emotions that can create denial or paralysis in the face of an overwhelming
 114 environmental threat. Students experimented with artistic expression as a holistic and
 115 inspiring medium for raising consciousness and mobilizing local action to this global
 116 threat. During the afternoon, the students rotated between disciplines so they all met and
 117 worked with faculty having different expertise.

118 In *Performing Arts*, theatre skills helped young people confront this daunting
 119 problem by helping them acquire a clear, persuasive voice and project a positive, open
 120 attitude even to the last row of the audience. Students learned specific techniques to
 121 access our own emotional experiences, as a way to identify and work with feelings that a
 122 global problem of such immensity brings up in us. They tapped into energy that will help
 123 them be leaders in the coming social changes that global warming requires.

124 In the *Science of Climate Change*, students investigated the global carbon cycle,
 125 current and future fuels (their characteristics and carbon-intensity), and the greenhouse
 126 effect. They worked in small groups and created large posters in order to do peer
 127
 128
 129
 130
 131
 132

133 teaching. A subgroup of students used portable watt meters to measure the electrical
134 power use of common household and campus appliances – assuming the persona of
135 guerrilla energy efficiency experts as they monitored soda dispensers and microwaves.
136 These meters allowed a graphic demonstration of the efficiency of compact fluorescent
137 lighting.

138 Through the strand *BodyEarth*, students connected climate change to their own
139 lives, to who they are, and to how they interact and experience the environment around
140 them. Through engaging all their senses, the students experienced the reality that we are
141 living organisms in relationship to and part of the planet, that reducing our carbon
142 footprint is not an action to fix some big problem beyond us, but to address our own
143 health and well being and the health and well being of everything we hold dear.
144 Activities included movement, discussion, and quiet reflection, being in the woods, and
145 possibly the silliest and most fun activity, eating cake to connect and appreciate how our
146 bodies rely continuously on what the earth provides. This strand helped bring balance and
147 integration to the students by providing them a place to express and experience their
148 feelings amidst a packed schedule of electives and presentations on global climate
149 change.

150 In *Current Issues and Youth Activism*, students assessed how they could take
151 effective political and social action locally to respond to this global threat. They
152 practiced being able to speak knowledgeably and convincingly about the scientific
153 evidence to skeptics or to the uninformed, and role-played strong verbal arguments for
154 policy changes. In Socratic discussion, they explored the disconnect between the
155 overwhelming scientific evidence for global warming and the apparent inaction, denial,
156 and/or paralysis of politicians who are not addressing the threat. They deepened this
157 understanding by analyzing the perspectives, interests, and motivations of various
158 stakeholders in the debate by role-playing. In small groups, they researched the efforts of
159 those who have been taking political action. Students made recommendations for action
160 at the national and state policy level and by designing peer-education programs.

161 Outside specialists were an important part of the curriculum and brought new and
162 different ideas to the Institute. We recruited local specialists who could speak with the
163 students in small groups regarding “solutions” to the problem of climate change.
164 Students were able to choose and spend 35 minutes each in six of the 22 workshop
165 offerings. These workshops touched on diverse aspects of politics, policy, science, conflict
166 resolution, communications, outreach, media, alternative energy, conservation, transportation,
167 sustainability, local farming, and the arts (<http://uvm.edu/giv/givwinter2007> has a complete
168 list of speakers and their topics). The goal of these rotations was to expose students to a
169 wide range of ideas and people while showing that many people were already taking
170 meaningful actions to address climate change.

171 We ended the activities with *Five Steps Forward*, an exercise where the students
172 developed personal action plans detailing what positive steps they would take personally
173 and in their communities to affect change. We closed the weekend with a ceremony and
174 celebration where students presented to their peers using a variety of means including
175 puppetry, murals, and performance. The ceremony concluded with the students and
176 faculty standing up to declare their commitments for change followed by a graduation
177 where each student received their diploma, an energy-efficient compact fluorescent light.
178 Students left with the feeling that they were on their way to developing enough self-
179 confidence to be effective public speakers for this issue they feel so passionately about.

180

181 *Outcomes*

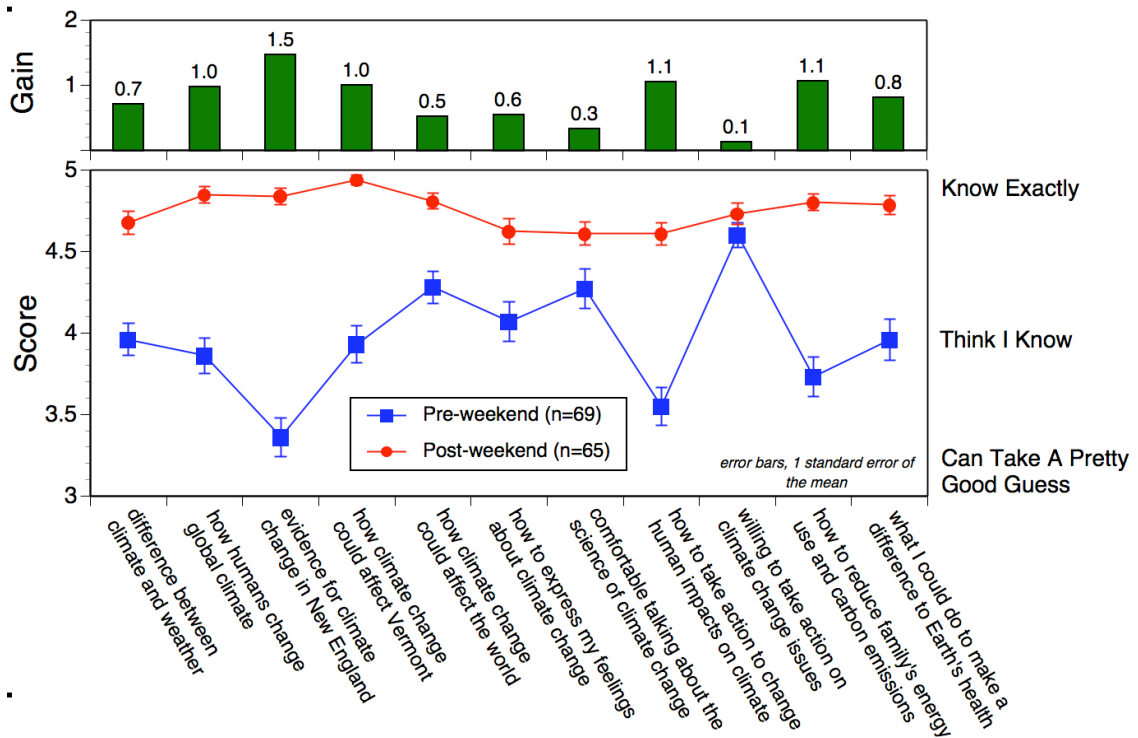
182

183 The outcomes were overwhelmingly positive and can be evaluated two ways. We
 184 did formal assessment that blended knowledge and attitude surveys administered before
 185 and after the weekend. Students were asked to self-assess their knowledge and attitudes
 186 on a 1-5 scale that ranged from *I don't have a clue* to *I know exactly* (see graph below).
 187 From these surveys, we learned that the weekend cohort was already motivated and
 188 knowledgeable. Their biggest gain (1.5 pts) was in their knowledge of evidence for
 189 climate change in New England, the topic of our keynote speaker. Students came into
 190 weekend very willing to take action (4.6 pts) and made least gains there (0.1 pts). They
 191 made large gains in their understanding of how humans change climate (the science
 192 strand), how climate change could affect Vermont (the keynote speaker), how to take
 193 action (all strands and workshops), and how to reduce emissions (specialist workshops).

194

195

196



197

198

199 Anecdotal written student responses tell the story and repeatedly mention the
 200 amount they learned, how the Winter Weekend changed them personally, and how it
 201 primed them for action.

202

203 *This weekend was the most motivating, inspiring, incredible weekend of my life.*
 204 *With the information I gathered, I will be prepared to create positive change. I*
 205 *feel enlightened.*

206

207 *This weekend gave me more faith in my generation. It was nice to be with*
 208 *people who are all working for the common good.*

209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254

It was depressing and encouraging, liberating and frustrating, hard and fun.

*That the adults had so much confidence that we could change the world.
Enjoyed learning the ways I could help personally.*

*I met incredible, passionate students and collaborated with them to make
change. Incorporating art and science was important. It's great to see it
addressed with different subjects.*

Issues for the students and some faculty included a change in approach from previous Winter Weekends as well as information overload, lack of sleep, a need for more hands-on activities, and requests for more time to openly discuss issues with their peers.

The broader community responded well to our program. The President of the Vermont Senate asked to speak to the program's young adults, taking time out of his very busy schedule to open the Winter Weekend. Our recruiting efforts for outside specialists generated much interest. The adults who presented workshops felt it was an important goal for them to reach a young, motivated audience. We provided a small honorarium and invited the specialists to meals, but the fact that most took time on a weekend to be with the students, speaks volumes. The media also responded to press releases, with at least one on-site newspaper reporter and one local television crew appearing over the weekend.

We encourage anyone interested in running a similar program to examine the Winter Weekend website at <http://uvm.edu/giv/givwinter2007> and to contact the authors of this paper. Putting this all together took many people, many months but the results were worth it. We are catalyzing change and empowering students to make change. Here's how one student summed up the weekend.

*[The] weekend was excellent and changed my life....I'm inspired; I want to make
people listen to me and listen to global warming. Before I came here I didn't
know a lot about global warming. We hadn't spent a lot of time talking about it
in school and I wasn't very concerned. I want to walk out of here and start to
make a difference, and I want to get started NOW.*

Important Links

The Governor's Institutes of Vermont (<http://giv.org>), a member of the National Conference of Governor's Schools (<http://ncogs.org>), has served more than 7,000 highly motivated students from virtually every high school in the state since the Institutes were established in 1982. Many gained the confidence and encouragement to be the first in their families to go on to college. All came away knowing themselves better, more clearly defining their capabilities and goals, and seeing the world in a new and brighter light. The Institutes open the world to talented Vermont students.

254 *Short author bios*

255

256 **Paul Bierman** (pbierman@uvm.edu) is a Professor of Geology and Natural Resources at the
257 University of Vermont. Now in his 13th year as a faculty member of GIV, he teaches both in the
258 summer and winter Institutes. He has a BA degree from Williams College and his Ph.D. from the
259 University of Washington.

260

261 **Peter Gould** (gould@sover.net) has a doctorate in interdisciplinary studies from Brandeis, and
262 has performed and taught politically-engaged theatre for 25 years all over the United States. He
263 teaches Spanish at Marlboro College and the School for International Training, and works with
264 young people at the New England Youth Theatre, the Governor's Institute on the Arts, and his
265 own Get Thee to the Funnery Shakespeare camps in northern Vermont.

266

267 **Jasmine Lamb** (jasmineopal@verizon.net) has worked as the Director of Student Life for the
268 Governor's Institute on the Arts for many years. She is a mediator, teacher, and writer living in
269 Montpelier, Vermont. Her growing passion is in what she calls ListeningArts, which uses
270 movement, writing, storytelling, and stillness as ways to expand our capacity to listen to
271 ourselves and others.

272

273 **Christine Massey** (christine.massey@uvm.edu) works on science education initiatives in the
274 Education and Geology Departments at the University of Vermont. She directs the high school
275 Science & Technology Governor's Institute, in both summer and winter, and directs the UVM
276 Perkins Museum Environmental Science Day Camp for elementary students. Christine holds a
277 BA from Carleton College and an MS from the University of Washington, both in Geology.

278

279 **Simon Norton** (simon.norton@sit.edu) has been the Co-Director of the Vermont Governor's
280 Institute on Current Issues for Youth Activism and the Program Director of the S.I.T. Youth
281 Peacebuilding and Leadership programs since 2001. He lives in Brattleboro, Vermont, and
282 teaches global issues, civics, leadership, peacebuilding to youth from all over the world. Simon
283 holds a B.A. in International Studies from the School for International Training and a Masters in
284 Education from the Harvard University.

285

286 **Jean Olson** (giv@sover.net) has been Executive Director of the Governor's Institutes of
287 Vermont since 1994. She is currently a doctoral student at the University of Vermont researching
288 the academic, social, and emotional needs of high-potential learners and is also the President
289 Elect of the National Conference of Governor's Schools (NCOGS).

290

291 **Luke Reusser** (lreusser@uvm.edu) is a doctoral student in the Rubenstein School of
292 Environment and Natural Resources at the University of Vermont. Through his research, he
293 investigates the impacts of human activities on natural rates of landscape change and erosion
294 along both the U.S. Pacific and Atlantic coasts, as well as the north island of New Zealand.

295

296 **John Ungerleider** (John.Ungerleider@worldlearning.org) is a Professor of Conflict
297 Transformation at the School for International Training in Brattleboro, Vermont. He directs
298 SIT's International Youth Peacebuilding Camps and the Vermont Governor's Institute on Current
299 Issues and Youth Activism. (www.sit.edu/youth) A former Fulbright senior scholar in Cyprus,
300 Professor Ungerleider founded the Child Labor Education and Action (CLEA) project for
301 Vermont teens working to fight oppressive child labor around the world.