Applied Hope: Building Resilient Communities
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Ana Sophia always knew she wanted to work at a mission-driven organization that had an outlook as positive and hopeful as hers is--particularly when it came to developing technical solutions to fight climate change that also lifted up communities economically. After college, she began working at the Rocky Mountain Institute, where she was introduced to the concept of Applied Hope—a mantra that she had unwittingly been living, and aspiring toward, all her life. According to Amory Lovins, RMI's cofounder, "Applied hope is not about some vague, far-off future, but is expressed and created moment by moment through our choices." In 2017, after Hurricane Maria ravaged Puerto Rico, Ana Sophia helped install microgrids in 10 public schools – giving more than 4,000 students and faculty access to clean, resilient power. "I can't tell you what it was like when the students could see firsthand what is possible. This is what Applied Hope fosters, in its purest form."

Values: Optimistic Creative Socially Mindfulness Innovative Environmentalist

Lessons Learned

- When faced with the opportunity to see the world from a different point of view, embrace it. You will learn about different cultures—and yourself.
- Go outside! Enjoy and appreciate the world around you. Learn to appreciate nature, and use your talents to protect it.
- When looking for inspiration, focus on what is possible, not what is popular.

Language Arts

- What is microgrid technology? Write a research essay on the science of microgrids, their applications, and the environmental benefits they offer.
- Ana Sophia talks about how important Applied Hope was in helping the people in Puerto Rico recover from the trauma of Hurricane Maria. Based on Ana Sophia's experiences, how can we apply this concept to facing the climate crisis in the world? Create a series of Tik Tok videos designed to bring positive messages that motivate people to get involved in finding solutions. Your videos should address a wide variety of age groups, from preteens to adults.

- Create a presentation on differences in the lifestyle of people in Central America versus South Florida. What environmental, social, and economic challenges do these regions face? Do they share any challenges? Are there ways they could they help each other? Next, write a reflection paper in which you explain the most surprising fact you learned in your research.

STEM Activities

- As the world shifts to renewable energy sources, electricity has become one of the main focuses of attention. When assessing the energy powering a home, microgrids and solar panels are two of the innovations that are used. What is the difference between microgrids and solar panels? What innovation would you like to include in your house, and why?
- In addition to technological innovations, Ana Sophia's goals for youth are to go outside and spend more time in nature. Students today can be overly reliant on technology and lack the interaction with nature like other generations. What are three benefits of being outside in nature, why are they important to our future? Potential options:
    - Vitamin D3/Sunlight
    - Understanding the factors affecting air quality
    - Learning about farming/agriculture

- In response to Hurricane Maria's damages to Puerto Rico, Ana Sophia helped install microgrids in schools to keep them operating during rolling blackouts. Schools with resilient energy are invaluable to communities, and can serve as a safe haven in times of crisis. In this activity, students learn about resilient energy systems and explore the impact of loss of power in two different cities, one with a centralized energy system, and the other with decentralized energy systems. Activity link.
- Ana Sophia currently works at RMI (Rocky Mountain Institute), where her goal is to get businesses and homes to eliminate combustion in their buildings. Combustion is a reaction where a substance reacts with oxygen gas to produce energy in the form of light and heat. Have students use this online guide to learn about hydrocarbons, the primary component of fossil fuels, and compare the products of combustion of different hydrocarbons. Using the results, students will explain how combustion produces and releases greenhouse gases such as carbon dioxide, contributing to climate change.

Sustainability Innovations

- As the world strives to collaborate on addressing global sustainability issues, conferences and conventions continue to expand and develop. The Microgrid Innovation Convention highlights advancements in technologies and real-world case studies of uses and developments.
- Collaboration is often required in order to make systemic changes to improve sustainability. Resilient Power Puerto Rico is a 501(c)3 organization that focuses on increasing resources and knowledge to improve the innovation and distribution of renewable energy across the region.
- Ana Sophia's work has been amplified by her work as an associate with RMI (the Rocky Mountain Institute). RMI has become a leader in transforming the mindset of "Whole of Government" to a "Whole of Society" National Climate Strategy. What are these two different approaches? Why is this transition so important?

Sustainable Career Pathways

- ***Renewable Energy Engineer.*** Improving the design of batteries, solar panels, and wind turbines will be essential in the transition to a sustainable future; and that will require renewable energy engineers. Want to learn more? Start here.
- ***Microgrid Design Engineer.*** Perhaps like Ana Sophia, you want to help build microgrids, increasing community energy independence and resilience. Start by understanding what a microgrid is. Then, if this is for you, learn more about the industry and job opportunities here.
- ***Renewable Energy Advocate.*** Renewable energy is a rapidly growing field and will make up an ever-larger percentage of the world's energy mix in decades to come. Becoming part of a renewable energy company--as a manager, salesperson, or support staff--is a way you can help with this transition. Or, by joining one of the many nonprofit organizations researching, promoting, or lobbying for the transition to renewable energy, you can help draw attention and investments to renewable energy.

Call to Action: Learn more about green infrastructure, remote electrification, green community education, and RMI (The Rocky Mountain Institute) - https://rmi.org.

Standards

California:

- **ELA**
- RI.11-12.7: Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.
- SL.11-12.2: Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.
- SL.11-12.4: Present information, findings, and supporting evidence (e.g., reflective, historical investigation, response to literature presentations), conveying a clear and distinct perspective and a logical argument, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks. Use appropriate eye contact, adequate volume, and clear pronunciation. CA a. Plan and deliver a reflective narrative that: explores the significance of a personal experience, event, or concern; uses sensory language to convey a vivid picture; includes appropriate narrative techniques (e.g., dialogue, pacing, description); and draws comparisons between the specific incident and broader themes. (11th or 12th grade) CA b. Plan and present an argument that: supports a precise claim; provides a logical sequence for claims, counterclaims, and evidence; uses rhetorical devices to support assertions (e.g., analogy, appeal to logic through reasoning, appeal to emotion or ethical belief); uses varied syntax to link major sections of the presentation to create cohesion and clarity; and provides a concluding statement that supports the argument presented. (11th or 12th grade) CA
- SL.11-12.5: Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
- W.11-12.3: Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences. a. Engage and orient the reader by setting out a problem, situation, or observation and its significance, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events. b. Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters. c. Use a variety of techniques to sequence events so that they build on one another to create a coherent whole and build toward a particular tone and outcome (e.g., a sense of mystery, suspense, growth, or resolution). d. Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters. e. Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.
- W.11-12.10: Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.
- WHST.11–12.2: Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. a. Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c. Use varied transitions and sentence structures to link the major sections of the text,

create cohesion, and clarify the relationships among complex ideas and concepts. d. Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers. e. Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).

- WHST.11–12.6: Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.
- WHST.11–12.7: Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- WHST.11–12.9: Draw evidence from informational texts to support analysis, reflection, and research.
- WHST.11–12.10: Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences

- **STEM**
- HS-ESS3-2: Evaluate competing design solutions for minimizing impacts of developing and using energy and mineral resources, and conserving and recycling those resources, based on economic, social, and environmental cost-benefit ratios. Clarification Statement: Examples include developing best practices for agricultural soil use, mining (for metals, coal, tar sands, and oil shales), and pumping (for petroleum and natural gas).
- HS-ESS3-4: Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.
- HS-PS1-2: Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.
- HS-ESS2-6: Develop a quantitative model to describe cycling of carbon through the ocean, atmosphere, soil, and biosphere.

Massachusetts:

- **ELA**
- RI.11-12.3: Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text.
- RI.11-12.7: Integrate and evaluate multiple sources of information presented in different media or formats (e.g., in charts, graphs, photographs, videos, or maps) as well as in words in order to address a question or solve a problem.
- W.11-12.1: Write arguments (e.g., essays, letters to the editor, advocacy speeches) to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
- W.11-12.1.a: Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s), counterclaims, reasons, and evidence.
- W.11-12.1.c: Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
- W.11-12.1.e: Provide a concluding statement or section that follows from and supports the argument presented.

- W.11-12.2: Write informative/explanatory texts (e.g., essays, oral reports, biographical feature articles) to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
- W.11-12.2.a: Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include text features (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
- W.11-12.2.b: Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.
- W.11-12.2.e: Establish and maintain a style appropriate to audience and purpose (e.g., formal for academic writing) while attending to the norms and conventions of the discipline in which they are writing.
- W.11-12.3: Write narratives to develop experiences or events using effective literary techniques, well-chosen details, and well-structured sequences.
- W.11-12.3.a: Engage and orient the reader by setting out a problem, situation, or observation and its significance, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create an appropriate progression of experiences or events.
- W.11-12.6: Use technology, including current web-based communication platforms, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.
- SL.11-12.2: Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.
- SL.11-12.4: Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, vocabulary, substance, and style are appropriate to purpose, audience and a range of formal and informal tasks. (See grades 11-12 Language Standards 4-6 for specific expectations regarding vocabulary.)
- SL.11-12.5: Make strategic use of digital media (e.g., audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

- **STEM**
- HS.ESS.2.6: Use a model to describe cycling of carbon through the ocean, atmosphere, soil, and biosphere and how increases in carbon dioxide concentrations due to human activity have resulted in atmospheric and climate changes.
- HS.ESS.3.2: Evaluate competing design solutions for minimizing impacts of developing and using energy and mineral resources, and conserving and recycling those resources, based on economic, social, and environmental cost-benefit ratios. Clarification Statement: Examples include developing best practices for agricultural soil use, mining (for metals, coal, tar sands, and oil shales), and pumping (for petroleum and natural gas).
- HS.CHEM.1.2: Use the periodic table model to predict and design simple reactions that result in two main classes of binary compounds, ionic and molecular. Develop an explanation based on given observational data and the electronegativity model about the relative strengths of ionic or covalent bonds. Clarification Statements: Simple reactions include synthesis (combination), decomposition, single displacement, double displacement, and combustion. Predictions of reactants and products can be represented using Lewis dot structures, chemical formulas, or physical models. Observational data include that binary ionic substances (i.e., substances that have ionic bonds), when pure, are crystalline salts at room temperature (common

examples include NaCl, KI, Fe2O3); and substances that are liquids and gases at room temperature are usually made of molecules that have covalent bonds (common examples include CO2, N2, CH4, H2O, C8H18).