Activity 2: Clearing the Air
Exploring Solutions: Teacher Notes

Slide	Notes
1	In this presentation, we will explore potential solutions related to climate change mitigation and adaptation.
2	Solutions can be implemented through different methods and at different scales. Most solutions for addressing climate change can be classified as either adaptation or mitigation. Mitigation includes actions that reduce sources of greenhouse gas emissions or increase the amount of carbon dioxide that is removed from the atmosphere. Limiting emissions will eventually decrease levels of carbon dioxide in the atmosphere and some of the effects of climate change. Adaptation to climate change includes actions humans can take to avoid, benefit from, or deal with actual or expected climate change impacts. Actions to address climate change can (and should) take place at multiple levels (for example, international, national, state, or local) and involve diverse sectors of society (government, private businesses, and individuals).
3	The first step toward selecting solutions involves looking closely at the projected impacts of climate change. Understanding the risks associated with each projected scenario will help when evaluating potential strategies. We must fully explore the risks, benefits, and costs of potential policies. There are different values and opinions about what actions to take, and this creates a challenge when making policies concerning climate change.
4	The actions presented here can be taken at the individual level to help address climate change. These are just some examples of strategies available at one level of action.
5	One approach to mitigation is to increase efficiency in systems. Many people consider this to be the cheapest way to limit the amount of carbon in the atmosphere. By making systems more efficient, less energy is wasted and therefore more net energy is available. This will decrease our reliance on energy inputs.
6	Driving less, eating less meat, and using less electricity all act to decrease emissions of carbon dioxide and other greenhouse gases.
7	Renewable energy is a clean alternative to nonrenewable energy resources that emit carbon dioxide into the atmosphere. These energy resources are being researched and developed with the goal of making them affordable in the future. As the costs decrease, more people will be able to use renewable energy resources in the private and public sectors as replacements for

	nonrenewable fossil fuels. Communities must consider several factors when making energy decisions, including cost, feasibility, environmental and social impacts, and community acceptance. The student page that accompanies the role play exercise provides students with an opportunity to rate different actions with these type of criteria.
8	Carbon sinks are areas in which carbon is stored. If these sinks are managed efficiently, more carbon can be stored on the surface of the Earth instead of in the atmosphere as greenhouse gases. Deforestation decreases carbon sequestration, causing more carbon to be stored in the atmosphere rather than in trees. Carbon capture is a new technology in which carbon emissions are taken from power plants, transported, and then inserted into the ground as carbon storage. Instead of letting these emissions escape to the atmosphere, engineers and scientists have developed ways to take this carbon and store it in the ground instead. This method is currently expensive and many people think that it is dangerous.
9	We can also think about broader ways to mitigate climate change, such as carbon taxes, international agreements, and a shift in cultural values that helps us reevaluate what a sustainable level of consumption may be.
10	The following slides explore these strategies and describe examples of communities working to address climate change and the programs they have implemented.
11	In 2007, the Food and Agriculture Organization of the United Nations (FAO) proposed a framework to facilitate adequate adaptation to climate change. The framework suggests specific domains in particular need of adaptation, such as coastal zones, water resources, agriculture, and areas affected by drought and desertification, as well as floods. This list contains some of the strategies that need to be considered. Adaptation can take place in advance (by planning before an expected impact occurs) or in response to changes that are already occurring.
12	Kansas City Power and Light is pioneering efforts to reduce the environmental impact of electric generation. By using renewable resources, like wind, they are producing power with fewer greenhouse gases. The Spearville Wind Generation Facility provides 100.5 megawatts of renewable energy. It serves 33,000 homes and will provide renewable energy to 100,000 homes when it is fully developed. “We pledge to participate in – and contribute to – efforts that recognize and promote responsible environmental stewardship; to continually seek to understand and address concerns about the environment; and to strive to improve, protect and conserve beyond the law’s requirements.” - Bill Downey, KCP&L President and CEO
13	The City of Aspen’s Canary Initiative was created in 2005 to address the climate challenge and provide leadership in reducing greenhouse gas emissions locally. The Canary Initiative is helping Aspen transform from a carbon-intensive community to one that is sustainable and environmentally responsible with the following programs:

	• Policy, research, and education to ensure that individual, government, and business decisions seek to reduce greenhouse gas emissions • Energy efficiency programs for existing buildings and new construction • Reduction of greenhouse gas emission through changes to ground and air transportation • Generation of a portion of the community's electricity from renewable resources • Increased recycling efforts and decreased generation of the amount of solid waste • Options to offset greenhouse gas emissions More Information: http://aspenpitkin.com/Living-in-the-Valley/Green-Initiatives/Canary-Initiative
14	The McNeil Biomass facility uses woody biomass to generate renewable energy for Burlington, Vermont. The biomass comes from low-quality trees, logging waste, logging residues, and recycled wood. All the wood is harvested from sustainably managed forests. The facility has been operating since 1984. More Information: https://www.burlingtonelectric.com/page.php?pid=75&name=mcneil84
15	The 10% Challenge is a voluntary program to help households and businesses reduce greenhouse gas emissions by at least ten percent. The 10% Challenge provides the tools and the information necessary to conserve energy at home and at work with the following three easy steps: sign up to be a participant, calculate your current annual greenhouse gas emissions, and then pledge to take some actions to reduce your emissions by at least ten percent. More Information: http://www.10percentchallenge.org/
16	The California Climate and Agriculture Network conducted an assessment of the adequacy and availability of resources for California agriculture to address climate change. They have three main program areas. 1) Farmer Education & Outreach: Provides resources for farmers and ranchers on the impacts of climate policy on California agriculture and the science of climate benefits that result from organic and sustainable practices. 2) Network Building: Expands the network of farmers, scientists, government agency staff, and advocates to cultivate communication and understanding of the role agriculture can play in climate protection. 3) Policy Initiatives: Advances policies that support and encourage farming and ranching practices that have climate benefits and other environment co-benefits. More Information: http://www.calclimateag.org/wp-content/uploads/2011/03/Ready-Or-Not-Exec-Summary.pdf
17	Melbourne, Australia, is taking action to prepare for climate change. The city's Climate Change Adaptation Strategy assessed the risks of projected impacts. Two key adaptation actions were identified to address multiple risks. 1) Harvest storm water across the municipality: This addresses the insufficient water supply, provides irrigation for parks and street trees, prevents floods, builds water system resilience, and protects biodiversity.

	2) Increase the city's passive cooling efficiency to reduce urban heat island effect: The urban environment in Melbourne increases the temperature, which makes people more vulnerable to heat stress. Design and infrastructure changes are being planned to reduce the city's temperature both inside buildings and at street level. More Information: http://www.melbourne.vic.gov.au/AboutCouncil/PlansandPublications/strategies/Documents/climate_change_adaptation_strategy.PDF

References Cited:

Food and Agriculture Organization of the United Nations (FAO). (2007). Adaptation to climate change in agriculture, forestry and fisheries: Perspective, framework and priorities. Retrieved from ftp://ftp.fao.org/docrep/fao/009/j9271e/j9271e.pdf