Solid Waste Incineration

Your topic is Solid Waste Incineration

Your committee will present sixth. Please read through the steps carefully.

Remember your ultimate goal is to reduce waste.

Product: A PowerPoint Presentation

- **Each committee will present their findings using PowerPoint and YouTube video(s). If you need more than one video to tell your stories, insert a new slide and add the video to the new slide.**
- **The PowerPoint slides have been prepared for you. You need to fill in the information. Everything in *italics* is to be replaced by your committee.**
- **You need to know the information on the slides. Use an index card so you face the Summit audience, not the screen.**
- **You will include bullet points on a few of the slides; bullet points should be a few words about your topic. (Insert a new slide if you need more room).**
- **The Solid Waste Incineration presentation will be no longer than 20 minutes and no less than 10 minutes.**

1. Elect a Chairman of your committee. Your Chairman will be in charge of the group's presentation to the rest of the class. This will include delegating parts of the presentation.

Successful Chairing for a Successful Committee

Chairs must be good listeners, good communicators, and good organizers.

Successful Chairs:

✔ Successful group discussions require planning and participation by all:

•The Chair asks questions and gets help from their committee.

✔ The Chair's job is to keep all committee members involved by making sure each member:

• has a country/topic

• has filled in all of his or her slides

• listens to the other members' findings

• joins in on the final committee opinions and solutions (Remember, the 6th grade is focusing on how to reduce, or create less, trash)

✔ Praise members' good work in writing and verbally

✔ Maintain a sense of humor

✔ Communicate often. Few people respond to a general invitation; a personal request usually brings faster results.

✔ Check in with members until tasks are accomplished; then praise committee member(s) (privately and publicly) for a job well done.

✔Document all your sources as required by your teacher.

2. Target learning standard: How do biases interfere with critical thinking? Be aware assumptions shape people's thinking.

Understanding the problem on a global scale requires an understanding of differences in cultures around the globe. You must understand community values before you can suggest community solutions.

Be aware that assumptions shape people's thinking. Look at your research as facts and try not to develop a conclusion until you are finished researching. How do biases (assumptions) interfere with critical thinking?

PowerPoint directions

Slide #1 – Title Slide

This slide introduces the committee members and chairperson. The directions are on the slide. Type in the information needed, and then erase the *italic* directions.

Slide #2 – What is Solid Waste Incineration?

This slide answers the question "What is Solid Waste Incineration?" Describe what solid waste incineration is and how it works. Find and insert an image of solid waste incineration into the slide. Add an extra slide if you need more room.

So What Exactly is Solid Waste Incineration?

Incineration (also known as thermal treatment) is a waste disposal method used as an alternative to landfilling. In this method, solid wastes are combusted (burned) to produce heat, steam, ash residue and gaseous products. Incineration can be used on a small scale to burn household waste, on a medium scale for hazardous and medical waste, and on a large scale for municipal (city) solid waste and residue from waste water treatment.

Because combustion reduces the volume of waste to less than 20% of the original volume, it is the preferred method of disposal in many countries that have limited land space, such as European countries and Japan. In fact, Denmark leads the world in incineration on a per capita

(per person) basis. They consider it a clean alternative to unsightly, smelly, and unhealthy landfill practices.

Most modern incineration facilities burn waste in a furnace or boiler. This produces heat or steam, which can be piped to the surrounding community to offset some of their heating needs. The steam produced can also be used to generate electricity. These facilities are often referred to as waste-to-energy (WTE) or energy-from-waste (EFW) systems. In this way, incineration not only reduces the volume of waste, but can also reduce a country's reliance on fossil fuels such as coal and natural gas. For this reason, and because there will likely always be a steady stream of solid waste, many people consider incineration a form of renewable energy.

Readings:

Waste Incineration – Thermal Systems:
http://me1065.wikidot.com/waste-incineration

Incineration positive/negative effects, comparison of countries:
http://www.wasteincineration.net/waste-incineration-effects.html

Europe finds clean energy in trash, but U.S. lags (N.Y. Times article):
http://www.nytimes.com/2010/04/13/science/earth/13trash.html?pagewanted=all

Slide #3 - Potential Benefits

Insert bullet points and brief explanations into this slide regarding the potential benefits of incineration.

Because incineration reduces the volume of waste by up to 95%, many countries with limited land space find this method of waste management desirable or even essential. These smaller countries and communities may otherwise have to ship their waste long distances in order to dispose of it.

Incineration may also be safer for the environment than landfilling. Even modern landfills can eventually leak fluid (leachate), which can contaminate soil and groundwater. They also produce landfill gas, which contains methane and other toxic chemicals. If that gas is not captured, cleaned and burned, it poses a risk to air quality, and it smells. Most modern incinerators burn waste at high enough temperatures to destroy most toxins, and use scrubbers to remove the majority of toxins left in flue gases. Any trash left uncovered in a landfill is also available to scavengers, especially birds, which poses a risk of poisoning to wildlife. For these reasons, many people believe incineration is a cleaner alternative to landfills in dealing with waste.

In waste-to-energy systems, incinerators can provide heat and electricity that would otherwise be unavailable in landfilling. Steam produced in a boiler can be piped to nearby communities to

supplement their heating needs or can be used to turn a turbine, generating electricity for the power grid. In both these ways incinerators can reduce the amount of fossil fuels, such as coal and natural gas, needed in a community.

Slide #4 - Incinerator Disadvantages

While the pros of waste incineration may outweigh the cons, especially for smaller countries, there are a significant number of disadvantages that must be considered. One of the most compelling is incineration reduces the incentive for reducing and recycling material before it ever enters the waste stream. Incinerators typically run 24 hours a day and require a large, steady stream of waste material to feed their hungry appetites. A comprehensive recycling program would reduce the volume of waste and make it harder to keep these systems running at full capacity.

Read the following two articles for perspectives on the negative aspects of incinerators. Please remember to consider the biases and points of view of the authors or subjects.

India's Waste-To-Energy Plan Could Mean Bad News For Trash Pickers:
http://www.huffingtonpost.com/2012/09/21/india-garbage-energy-plan_n_1902433.html

Incinerators: Myths vs Facts:
http://www.no-burn.org/downloads/Incinerator_Myths_vs_Facts%20Feb2012.pdf

Slide #5 - Waste Incinerator Practices

For this slide you will insert YouTube video(s). Your intent here is to provide a thorough, yet concise video describing the process of Solid Waste Incineration. Remember, you have a time limit of approximately 6 min. If you know how to use parts of a video, do so, if not choose the best one(s) that fits your message. The videos can be found below. Remember, the authors of these videos have a bias - they are promoting their product or their opinion. If you need more room, insert a new slide.

***** How a waste-to-energy plant works 5:00
http://www.youtube.com/watch?v=lmtOuAed5nM&feature=related

***** Waste-to-Energy in North Carolina 4:12
http://www.youtube.com/watch?v=oo0WPanijNE&feature=related

***** Waste incineration (looks at Denmark's Incineration) 6:10
http://www.youtube.com/watch?v=Bb-RoAWv3ro&feature=related

***** Onondaga County: Waste-to-Energy: How it works, an animated video by Covanta Energy 1:31
http://www.youtube.com/watch?v=D3WWjmDICn8&feature=related

Slide #6 - Committee Opinions

Use this slide to summarize your committee's opinions about incinerators. Please consider all previous readings before drawing your conclusion(s). Are there negative consequences to burning waste and turning it into energy? Do the risks outweigh the benefits? Remember your learning objectives**: how do biases interfere with critical thinking? And be aware that assumptions shape peoples thinking.** Do the authors of the articles have an agenda that influences their stance?

Slide #7 - Solutions

Today - For this slide, first consider the alternative solutions for dealing with the massive amounts of waste we as a society produce now. Are they better or worse than incineration? Why might other countries feel differently?

Tomorrow - The amount of waste that ends up in landfills or incinerators represents only a small portion of the resources needed to produce that waste in the first place. For every ton of municipal waste, more than 70 tons of resources in the form of manufacturing, mining, oil and gas exploration, agricultural, coal combustion, and other discards are produced.

Strategies for lowering waste production start with the three R's + COMPOST. Though waste-to-energy systems can be an effective method of waste management, REDUCING the amount of waste in the first place can have a much greater impact. REUSING is the second most effective way of eliminating material that would otherwise go into our waste stream. RECYCLING materials such as paper, plastics, metals and glass can eliminate as much as 75% of the remaining volume of trash. Lastly, COMPOSTING any organic (living or once living) waste reduces trash volume and converts it to an environmentally friendly form, which can be used to fertilize crops and gardens, enriching the earth rather than polluting it.

Vocabulary

- Boiler – An enclosed vessel in which water is heated and circulated, either as hot water or as steam, for heating or power
- Combustion - The process of burning; a chemical reaction that occurs between a fuel and an oxidizing agent (oxygen) that produces energy, usually in the form of heat and light
- Furnace - An enclosed chamber or structure in which heat is produced by burning fuel, usually producing hot air
- Incineration - The process of burning material so that only ashes remain
- Landfill - A system of trash and garbage disposal in which the waste is buried between layers of earth to build up low-lying land

- Municipal - Of or pertaining to a town or city or its local government
- Organic – Of, relating to, or derived from living organisms
- Per Capita - Per unit of population (per individual person)