

## Lesson Plan 1 Preparation Introduction

### **Preparation Time: 30 minutes**

#### Preparation:

Please prepare all of the materials and read background.

#### Materials/Equipment:

- Small signs with the key terms & definitions to post around the room.
- “What is the Students Designing Sustainability Project?” handout
- 32-40 oz. Starburst candies
- Medium to large bowl or container
- Computer with internet connection
- Oral History Interview worksheet -1 for each student

#### Background:

“Sustainability is related to the quality of life in a community -- whether the economic, social and environmental systems that make up the community are providing a healthy, productive, meaningful life for all community residents, present and future.” \_Maureen Hart

There are three traditional aspects of community: economic, social and environmental. Because all these aspects influence one another, they are inherently connected. In a sustainable system, the influence of each aspect on another is recognized in any action or plan.

Preview the following website in preparation for this discussion: <a href="http://www.sustainablemeasures.com/Training/pdf/HEDTrSli.pdf">http://www.sustainablemeasures.com/Training/pdf/HEDTrSli.pdf</a>
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Comprehending the following key terms is necessary in order to understand sustainability:

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**Sustain:** to continue without lessening, to nourish, to allow to flourish.

**Develop:** to improve or bring to a more advanced state.

**Community:** a group of people who live and interact within a specific geographic area.

**Economy:** the way that goods and services are produced, distributed and consumed.

**Community Capital:** the natural, human, social, and built capital from which a community receives benefits and on which the community relies for continued existence.

**Carrying Capacity:** the population that can be supported indefinitely by its supporting systems.

# Lesson 1

## Introduction

First essential question: ***What is sustainability?***

Lesson Objectives:

- To introduce key terms: sustain, develop, community, community, economy, community capital, carrying capacity.
- To introduce the SDS Project and how each lesson progresses the ideas in sustainability toward an end product.

Procedure:

I. 10 minutes: Present the first essential question to the class and record the list of class responses. Select some slides for definition and discussion from <http://www.sustainablemeasures.com/Training/pdf/HEDTrSli.pdf>

II. 20 minutes: Starburst Game

- Clear a space in the room where the students can stand or sit in a circle.
- In the center of the circle place a bowl of Starbursts (2-3 bags depending on class size -the extra bags are for the end of the activity).
- Ask students to think about the word "community," give them a minute to think about what this word means. After a minute ask students to share what *community* means to them. There is no right or wrong answers; the point is to quickly brainstorm how people view communities.
- Explain that the students are going to create a hypothetical community and in the center of the circle are all the resources that this community needs to survive.
- Go around the circle and group the students into 4-5 separate groups.
- Explain that each group is a generation of people that will have a 3 second life span and in this time they are to go to the Starburst bowl and take all the resources they would like from their community. They should not eat the resources until after the activity.
- Begin with generation # 1 and give them 3 seconds to go to the bowl. Continue around the circle until all generations have had a turn. The Starburst's may run out before all generations have gone.
- Once all have taken a turn, go around and see how each generation did. Most likely the first generation will have the most Starbursts.
- Ask students what they thought about when it was their life span and they went to the bowl for resources.
- Next ask students to think about the word "sustainability." Give them a minute to think to themselves what this means.
- Play the game one more time and discuss any difference in the outcomes.
- Students may now eat the Starburst -the extra bags should be opened and given to the generations that may not have gotten any Starbursts from the bowl.

III. 10 minutes: What is a sustainable community?

Have students return to seats and ask the following questions. Record the answers along with the ones from the first essential question:

- What is a community?
- What makes your community a city?
- What is a sustainable community?
- Do you think that your community sustainable?
- Why or why not?

Discuss these responses comparing them with some of the initial ones made by the class.

#### IV. 5 minutes: Outline Project

The next few minutes can be spent explaining to students what they will be doing as part of the *SDS* project.

- The goal is to learn about sustainability and how our community designs and lifestyle choices influence sustainability.
- Students will be studying several components of sustainable communities including city planning, how communities change over time, sprawl, renewable and non-renewable resources, and community values. Their work will include watching videos, classroom discussions, talking to their parents and neighbors, Internet research, reading and model building.
- The final outcome of the project is a model of a redesigned community.
- This class will soon begin to think of itself as a *community council* of local citizens. This *council* will redesign their home community. In order to redesign their community, they will first be introduced to the ways that the community meets its resource needs (the Starbursts) and how much of these resources local citizens use. The factors which students will examine will be land and energy use, and water, transportation and waste management. Students will be challenged to come up with ways that their community can meet these community needs in a more sustainable way.
- The *community council* will eventually break up into *sub-committees* to research solutions to the challenges they uncover in their community.
- Then a *planning committee* will propose a new design. The class must work to reach consensus regarding the new plan, and from this plan create maps and/or building models of their proposal.
- The final models will be shared with community members at a public exhibition.

#### **Creating a thread for the next lesson:**

Ask students to use the questions from the following page to interview a parent, grandparent or older neighbor.

## ***Oral History Interview***

Interview a grandparent, parent or someone of the older generation to find out what their community was like when they were your age. Please record their answers on a separate piece of paper.

- Describe what your community was like when you were my age.
- How often did you interact with your neighbors (visit, talk, share food, or household items, etc.)?
- Approximately many people lived in your community?
- How much did people in your community drive or travel each week?
- How did you family members get to their jobs?
- How much time did they spend commuting?
- How far was the store, your school, places you would go? How did you get to these places?
- How did you heat and cool your house?
- What did you do for fun or entertainment?
- What did you do with your garbage or trash?
- Where did most of your food come from?
- Did you eat out often?
- Did you feel safe in your community'?
- What things did you use or do in your community that you considered being an asset?
- What would you have liked to change about your community then?

## **Lesson 2 Preparation**

### **Changing Communities**

Preparation Time: 15 minutes

Preparation: Read through background

Materials:

- Overhead projector
- World population growth overhead
- Community Assessment Activity sheet -1 for each student
- “Your Community” questionnaire -1 for each student (optional)

Background:

Communities are constantly changing in planned and unplanned ways. The following questions and ideas give the students, as residents and future decision-makers of a community, a base from which to make decisions. It is essential in urban community planning to find what is important, what are the wants and needs of the individual community members.

- How is the community today different from the community of our parents and grandparents?
- Do we spend evenings on the front porch or visiting neighbors like many of our grandparents and parents?
- Do we want to spend time like that?
- How are our lives different?
- What has influenced these changes and are they changes for better or for worse?

Urban sprawl is a major issue facing communities today. As cities spread and merge, cultural and environmental diversity is lost, and inner cities and communities die. Yet, at the same time outward growth is inexpensive, attractive to some and profitable on a short-term basis. This type of growth allows people to raise their standard of living and pursue their dream homes and jobs. This issue of sprawl affects people of all backgrounds, each with different values, wants, and needs.

## **Changing Communities**

### **Lesson 2**

Second Essential Question: **How does change affect a community?**

Lesson Objectives:

- To explore how cities and communities change and grow over time and what influences those changes.
- To learn about urbanization and its effects on their community.

Procedure:

I. 20 minutes: Ask students to take out **Oral History Interview** results. On an overhead projector, dry erase board, or chalkboard compile lists of community features from the student's oral histories homework. Find keywords and phrases with which to organize your lists.

II. 10 minutes: Distribute the **Community Assessment** activity sheet. Have the students individually complete the **Community Assessment** worksheet.

III. 5 minutes: Ask students to briefly compare the answers from the **Oral History Interview** with their **Community Assessment** answers.

Students could be assigned to write a one page essay that compares and contrasts the information from their interview and their personal assessment.

IV. 10 minutes: Show the two aerial photos of the local area and explain how to read the photos and what objects look like from the air. Discuss the apparent changes in land use and population with these guiding questions:

- What major differences do you notice between the two photos?
- What is lost and what is gained when cities merge with each other?
- What changes do you see as beneficial? Harmful?
- How do these photos relate to your **Oral History Interview** and to your **Community Assessment**?
- These photos were taken years apart. What do you think your community will look like or be like twenty years from now?

Final comments:

Change is inevitable. It is an inherent part of life on Earth. Environmental changes have demanded that surviving organisms respond with changes of their own. Our species' ability to survive has been quite evident given the great surges in human population growth

and land use; in fact those adaptations have brought about greater changes to the Earth than brought by any other species.

If we look at the affect these changes hold for us on a local level we must ask ourselves: “Can we, as residents of a community, control and manage the changes or will we allow these changes to control and manage us?”

<b>Optional/Additional Exercise</b>
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***Your Community***

Follow the instructions for each number listed below.

1. List no more than four things you like to do (e.g. bike, hike, read, eat, etc.).  
All things you list must also be connected to a place. Where do you bike, hike, read, etc?
2. List no more than four things you do regularly whether you like to do them or not (e.g. shop for food, work, go to school, etc.). Each item listed must be connected to a place. Where do you eat or work?
3. On a separate sheet of paper place an "X" in the center. The “X” represents your home.
4. Place each item you listed under questions in relation to your house. Start with places furthest away. When finished you will have created a small diagram of all the places you regularly visit.

<b>Creating a thread for the next lesson:</b>
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Distribute the handout, “Natural Capitalism” with a diagram about “Community Capital.
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## Community Assessment

To begin the process of designing a sustainable community it is important to evaluate the community you are living in now. Answer the questions below to the best of your ability. Record your answers on a separate sheet of paper.

- Describe what your community is like.
- How often do you interact with your neighbors (visit, talk, share food, or household items, etc.)?
- Approximately how many people live in your community?
- How much does your family drive or travel each week?
- How far is the store, your school, places you would go? How do you get to these places?
- How do you heat and cool your house?
- What do you do for fun or entertainment?
- What do you do with your garbage or trash?
- From where does most of your food come?
- Does your family eat out often?
- Do you feel safe in your community'?
- What things do you use or do in your community that you considered being an asset?
- What would you like to change about your community?

## **Lesson 3 Preparation**

### **Natural Capital and Natural Capitalism**

*Preparation Time:* 45 minutes

*Preparation:*

- Instructor will need to inform class how they will be divided.
- Read background
- Read “Natural Capitalism” by Paul Hawken handout.

*Materials:*

- Overhead projector
- TV and VCR
- **Wetlands** video
- **Wetland** cycle overhead
- **Car Video**
- Natural Capital overhead
- “Natural Capitalism” by Paul Hawken handout – 1 per student

*Background:*

"Natural capitalism," says Hawken -- author of *The Ecology of Commerce, an innovative take on business* -- is "not about capitalism," but "about natural capital."

What is natural capital? The environmental and natural systems that are "life itself," says Hawken. They are natural systems that provide services for which there are no substitutes, and cannot be made by humans.

"Natural capital," write Hawken and the Lovins, "includes all the familiar resources used by humankind: water, minerals, oil, trees, fish, soil, air, etceteras. But it also encompasses living systems, which include grasslands, savannas, wetlands, estuaries, oceans, coral reefs, riparian corridors, tundra, and rainforests. These are deteriorating worldwide at an unprecedented rate. Within these ecological communities are the fungi, ponds, mammals, humus, amphibians, bacteria, trees, flagellates, insects, songbirds, ferns, starfish, and flowers that make life possible and worth living on this planet."

All systems in nature function as a closed loop. Natural wetlands are an excellent example of a closed loop cycle. Water, coming from all types of users, flows through a wetland. As it flows through the wetland, decomposers, plants, animals, and the actions of the water break down the materials and produce clean fresh water, plants, food, a nature area, and much more. Then, the cycle begins again. As long as no area of the cycle is overloaded, the cycle will function indefinitely.

In a closed loop, every item uses the waste of another item. Nature is naturally frugal, naturally without waste, and place specific. Nothing extra is produced, nothing wasted. In the business world this closed loop system is being called Natural Capitalism. It is a capitalist structure that mimics nature. There is nothing more sustainable than mimicking this closed loop system in nature.

## Natural Capital and Natural Capitalism

### Lesson 3

Fourth Essential Question: What is natural capital?

*Intended Learning Outcome:*

Students will –

- be able to identify natural capital
- learn about natural capitalism and look at its function in a closed loop system like a wetlands

*Procedure:*

- I. 10 minutes: Discuss the basic tenets of Natural Capitalism, using an overhead slide of the “Community Capital” diagram. Collect student ideas and comments on the topic.
- II. 20 minutes: Wetlands as a closed loop system.
  - Show the **Wetlands** video
  - Show students wetland cycle on overhead. Describe how the cycle works.
  - Identify no waste, no excess.
  - Brain storm with students about other closed loop cycles.
  - Identify what happens when the cycle goes out of balance.
  - Natural Capitalism is the term for businesses that follow this natural cycle.
  - Highlight that students will follow this model when researching or simply mimicking nature to be the best type of sustainable project.
- II. 20 minutes: **Car** video
  - This video shows how a particular car plant is a closed loop cycle.
  - Discuss how this loop compares to the wetlands cycle.

**Creating a thread for the next lesson:**

Investigate the question: What are indicators for sustainability? Examples can be found at this website:

<http://www.sustainablemeasures.com/Indicators/index.html>

Use the handout on the next page to distribute to students to guide them in this investigation.

## **Indicators for Sustainability**

***Use the space below to answer this question in your own words and to provide examples or ideas: What are some indicators for sustainability?***

"An indicator is something that helps you understand where you are, which way you are going and how far you are from where you want to be. A good indicator alerts you to a problem before it gets too bad and helps you recognize what needs to be done to fix the problem."

\_Maureen Hart

You may want to investigate this site for ideas:

**(<http://www.sustainablemeasures.com/Indicators/index.html>)**

## **Lesson 4 Preparation**

### **Indicators of a Sustainable Community**

Preparation Time: 30 minutes

Preparation: Make signs with key terms and definitions. Familiarize yourself with the information from the website below. Read through background

Materials:

- Small signs with definition for indicator posted in the room
- Digital image projector
- Class computer set to:  
<http://www.sustainablemeasures.com/Indicators/index.html>

or

- Overhead projector
- Indicator Web overhead slide
- White paper and markers
- Ball of yarn

Background:

“An indicator is something that helps you understand where you are, which way you are going and how far you are from where you want to be. A good indicator alerts you to a problem before it gets too bad and helps you recognize what needs to be done to fix the problem. Indicators of a sustainable community point to areas where the links between the economy, environment and society are weak. They allow you to see where the problem areas are and help show the way to fix those problems.

Indicators of sustainability are different from traditional indicators of economic, social, and environmental progress. Traditional indicators -- such as stockholder profits, asthma rates, and water quality -- measure changes in one part of a community as if they were entirely independent of the other parts. Sustainability indicators reflect the reality that the three different segments are very tightly interconnected.

The natural resource base provides the materials for production on which jobs and stockholder profits depend. Jobs affect the poverty rate and the poverty rate is related to crime. Air quality, water quality and materials used for production have an effect on health. They may also have an effect on stockholder profits: if a process requires clean water as an input, cleaning up poor quality water prior to processing is an extra expense, which reduces profits. Likewise, health problems, whether due to general air quality problems or exposure to toxic materials, have an effect on worker productivity and contribute to the rising costs of health insurance.” \_ Maureen Hart

Be prepared to discuss with the class what indicators are and what are the characteristics of effective indicators. That they have:

1. relevancy
2. an ability to be easily understood
3. reliability
4. a basis of accessible data.

## **Indicators of a Sustainable Community**

### **Lesson 4**

Second Essential Question: **What are indicators for sustainability?**

Lesson Objectives:

- to learn what indicators are
- to explain how to identify good indicators of sustainability

Procedure:

I. 10 minutes: Make a list of student answers for the essential question. Ask the students to divide them into the following categories: environmental, economic and social.

II. 30 minutes: Building a Community Indicator Web

- Come to an agreement within the class about the most relevant indicators from the student list.
- Divide the class into 2 groups in an approximate 40/60 split.
- Make a small sign for each indicator and pass them out to the larger group (Group 2).
- Ask the smaller group (Group 1) to write 2 development scenarios for their community.
- Bring out a ball of yarn.
- Group 2 will form a circle. Group 1 reads a scenario.
- Group 2 analyzes how the scenario affects the community figuring out which indicators would be involved. As they decide on an indicator, the ball of yarn is tossed to the student wearing the indicator sign.
- When all relevant indicators have been identified, the class discusses the connections.
- Group 1 then reads their second scenarios and the process begins again.
- Keep notes on the board about key ideas or observations that emerge.

III. 5 minutes: Discuss how to identify good indicators of sustainability. Remind the students to complete their oral history interviews by the next class and to bring the results in as homework.

**Creating a thread for the next lesson:**

Ask students to make a list of sustainability indicators for their community.

## Lesson 5 Preparation Nitty Gritty

*Preparation Time:* 30 minutes

### *Preparation:*

Read through background.

Look over the overheads with statistics for water, waste, transportation and land use. Be ready to facilitate a discussion that calculates the statistics in these same areas for Oakton based on Oakton's vital data.

You may want to arrange extra time in the computer lab for your class to log on and do an ecological footprint quiz.

### *Materials:*

- Overhead projector
- Vital statistics for Fairfax County and its districts.
- Water Use Statistics Overhead
- Waste Management Overhead
- Land Use Statistics Overhead
- Ecological Footprint Accounts handout for each student.
- Large sheets of paper to record classes brainstorm ideas.

### *Background:*

Today your class will begin talking the four categories that have chosen to focus on for this year's sustainability project. The four categories are water, waste, energy, and transportation and are by no means the only elements of sustainability. They have been chosen for their relevance, accessibility, and to set bounds for the project.

In order to live, people consume natural resources. This is not bad if we don't take more than the Earth has to offer. Are we taking more than we should? The **Ecological Footprint** is a computer quiz whose answers can provide an interesting comparison of natural resource demand and supply available.

See the supplemental material about **Ecological Footprint Accounts** that are included in this lesson.

## Nitty Gritty Lesson 5

Third Essential Question: **Are there enough resources on this Earth for everyone?**

*Intended Learning Outcomes:*

Students will -

- view statistics related to transportation, water, waste and land use.
- be introduced to the Ecological Footprint as an indicator.
- explore the impact of their own consumption habits.

*Procedure:*

- I. 10 minutes: Review the student's list for local sustainability indicators.
- II. 20 minutes: Discuss the information on the overhead slides. Calculate the correlation for Oakton based on Oakton's vital data.
- III. 20 minutes: Ecological Footprint  
Distribute the **EF** handouts and introduce the idea of the Ecological Footprint. After introducing the key ideas from the handout, invite questions from the students while you record their initial inquiries and ideas surrounding the concept of measuring the impact of human's consumption habits.

**Creating a thread for the next lesson:**

Take the Ecological Footprint quiz:

<http://www.earthday.net/footprint/index.asp>

## **ECOLOGICAL FOOTPRINT ACCOUNTS:**

### ***MOVING SUSTAINABILITY FROM CONCEPT TO MEASURABLE GOAL***

1904 Franklin Street 6th Floor Oakland, CA 94612 voice.510.444.3041 fax.510.444.3191 info@rprogress.org

[www.RedefiningProgress.org](http://www.RedefiningProgress.org)

The Ecological Footprint Accounts compute sustainability in specific and understandable terms by using the best available scientific data. They allow individuals, policy analysts, organizations, and governments to measure and communicate the economic, environmental, distributional and security impacts of natural resource use.

### ***HUMANITY 'S FOOTPRINT THE EARTH 'S REGENERATIVE CAPACITY***

There are only 1.9 global hectares (4.7 acres) of biologically productive space available per person on the Earth. The world average Ecological Footprint of 2.3 global hectares (5.6 acres) per person means humanity is currently exceeding the biosphere's ecological capacity by over 20% using 1999 data, the latest available. (Due to population increase, the capacity per person decreased by four percent from 1999 to 2002.) Leaving space untouched for other species makes the ecological deficit even larger.

The biosphere needs about one year and two months to renew what humanity consumes in one year. Humanity, as a result, is depleting the earth 's natural capital stock.

In many countries, the demand for ecological capacity exceeds its available biologically productive area. These nations are running a national ecological deficit. In this case, the country 's area alone cannot provide sufficient ecological services to satisfy its population 's current patterns of consumption. It must, as a result, rely on foreign sources or deplete its own capacity.

### ***CALCULATING THE ECOLOGICAL FOOTPRINT***

Ecological Footprint Accounts document humanity's demands on nature. A population 's Ecological Footprint is the biologically productive area needed to produce the resources used and absorb the waste generated by that population. Since people use resources from all over the world, the Ecological Footprint Accounts calculate the combined size of these areas —wherever they may be on the planet. Ecological Footprints (representing human demand) can be compared to the biological capacity (representing ecological supply) in a specific region or for the entire planet. When human demands exceed ecological production, the natural capital (assets on which current and future generations depend) declines. This situation is called "overshoot," or the global ecological deficit. Current calculations assess a nation's consumption in over 60 categories of resources by adding imports to, and subtracting exports from, domestic production. Each category includes primary products (such as milk or timber) and the manufactured products derived from them. Resource use and waste emissions are expressed in global hectares (or acres) by calculating how much biologically productive space is required to provide these services using current technology.

***The average world citizen has an Ecological Footprint of 2.3 global hectares (5.6 acres), the average German's is 4.7 global hectares (12 acres), and the average American's is 9.6 global hectares (24 acres).***

## **Lesson 6 Preparation**

### **Citizen Action: First Town Meeting- Assessing the Indicators**

*Preparation Time:* 15 minutes

#### *Preparation:*

Read background.

On a board or presentation easel pad, display the “Warrant” for the meeting, using any of the following items:

- discussion about the students’ results for the EF quiz
- indicators which the students have identified
- discussion connecting the indicators with the SDS focus areas- Water, Waste, Transportation and Land Use.

#### *Materials:*

- Presentation Easel with Pad and colored marking pens
- Refreshments (if you want to simulate a real town meeting; what adults don’t meet with food?)

#### ***Background:***

- What is a Town Meeting?

Town Meeting is a meeting of citizens, coming together to form a group that examines local issues and makes local decisions.

- The Town Meeting agenda is called "the Warrant."

Town meetings have been used in this country for many years to make decisions about town activities and for passing new laws or rules. These days, not every town has a meeting, but there are still many that do. Generally, this is how a town meeting works: Before the meeting, townspeople make suggestions for ideas they would like to see discussed and voted on. A list of the ideas is sent to every voter in town. At the meeting, someone makes a motion on the first item from the list ("I move that we . . .), and another person seconds it ("I second the motion."). The meeting can now discuss the motion. Voters speak for or against the motion.

When everyone who wishes to speak has done so, the townspeople vote on the idea. First the moderator calls for those in favor of the motion to raise their hands. ("All those in favor of . . ., raise your hands.") Vote counters count the raised hands and record the number. The moderator then calls for “those not in favor” of the motion to raise their hands. "All those not in favor of . . ., raise your hands.") Vote counters count the raised hands and record the number. If more people vote for something than against it, the idea is passed.

**Citizen Action: First Town Meeting**  
**Assessing the Indicators**  
**Lesson 6**

*Intended Learning Outcomes:*

Students will -

- compile a list of indicators for sustainability or lack thereof and begin to organize them into the four SDS focus areas – land use, water, waste and transportation.
- experience democracy in action by taking part in a town meeting.

*Procedure:*

- I. Move to the easel and begin the town meeting by reviewing the Warrant (agenda) and opening the floor up to student discussion. Assign a student to serve as a chairperson and another as a recorder.
- II. Review results of the EF quiz.
- III. Create the list of student generated indicators
- IV. Organize the indicators by focus areas.
- V. Decide which indicators signal a critical need for attention.

**Creating a thread for the next lesson:**

By the end of this meeting, the class should have identified problems that the community has in regards to sustainability. Ask the students to begin to brainstorm solutions to the problems.

**Lesson 7 Preparation**  
**Town Meeting 2**  
**Assessing the Problems/Designing Initiatives**

*Preparation Time:* 10 minutes

*Preparation:* Read Background

*Materials:*

- Presentation Easel with Pad and colored marking pens
- Lists created at the last town meeting
- Refreshments

*Background:*

Initiatives:

The first step that communities take when beginning a sustainable project is to define initiatives for their community. Initiatives are established to guide the community and its future. Initiatives can be as simple as a list of things which community members consider important: safety, family, equality, environment, parks. Initiatives might also be specific; salmon running in the river, living wage, more sustainable energy, no auto emissions by 2004.

(Optional preparation) Invite City Planner to talk with the class about the area's infrastructure and answer questions from the students.
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**Town Meeting 2**  
**Assessing the Problems/Designing Solutions**  
**Lesson 7**

Fifth Essential Question: **Can every problem have a solution?**

*Intended Learning Outcome:*

Students will –

- learn what community initiatives are and their importance in planning change in a community.
- begin to develop their ideas about sustainable solutions to consumption and production as it relates to water, waste, transportation, and land use.

*Procedure:*

- I. Students review the problems identified in the town meeting.
- II. Initiative list -Explain what initiatives. Create a list of initiatives that the group wants to address during the project. Create no more than 10 initiatives.

Initiative examples:

General initiatives- I want my community safe; I want community members to be more interactive; I want more places to enjoy nature in our community.

Specific initiatives – I want our community to reduce car use by 40%; our community will restore wetland bird migration area; we will hold regular seminars to educate our community about alternative energy.

- III. Planning subcommittees – Divide the class into groups that will focus on specific problems or initiatives.

**Creating the thread for the next lesson**

Each subcommittee will develop ideas for the area of initiatives assigned to them.

## **Lesson 8 Preparation Researching Solutions**

*Preparation Time:* 5 minutes

*Preparation:* Read Background

*Materials:*

- **Solutions Criteria/Assessment** worksheets as needed
- Library time, computer time, and books or other resources may be needed to help the students complete their research.

*Background:*

Students will gather in their groups to start discussing the **Solutions Criteria/Assessment** worksheets. In addition, they will decide which solutions should be pursued further or by more people, which solutions should not. This is a good time for the teacher to delegate responsibility within each group.

## **Solutions Criteria/Assessment**

On a separate sheet of paper, answer as many of the following questions as possible. The more thorough your answers, the better your group's research and presentation and ultimately, the class's final display will be.

*Solution Name:*

*Description:*

- Is this solution more sustainable than the present method of consumption or production in your category? How?
- In what ways will this solution benefit all or a portion of the community?
- If this solution will affect the sustainability of other categories, explain how.
- If this solution is controversial, explain the controversy surrounding it.
- What are the negative side-effects of this solution? Are there future solutions to these negative effects?
- Explain why or why not this solution is realistic.
- Identify and discuss what lifestyle changes will have to be made if this solution is put into action.
- If you have found information about economic benefits this solution may provide, please include them in your research report.

## **Researching Solutions**

### **Lesson 8**

#### *Intended Learning Outcomes:*

Students will

- Explore what the ways other communities have addressed problems similar to the ones identified by the students.

#### *Procedure:*

Students can spend the whole class researching existing community initiatives and solutions to the problems in their focus area. Ask the student to use the worksheet to evaluate their ideas.

#### **Creating the thread for the next lesson**

Ask the students to finalize their research and to begin to brainstorm the format their subcommittee will use to present their research to the whole class.

## **Lesson 9 Preparation**

### **Preparations for Solution/Initiative Reports**

*Preparation Time:* 10 minutes

*Preparation:*

- Students may need additional **Solutions Criteria/Assessment** worksheets.
- Students may need art and display materials, computers, paper, writing and drawing utensils and so forth for their presentations.

*Background:*

The reports for Lesson 10 serve many purposes. Each report is a means for a group to share with the other students their research information. So not only does the report reflect a group's research but also its understanding of the research topic. It is good practice for the class's final display.

Moreover, each presentation can provide useful material for the envisioning the final model, creative inspiration for how the final model could be designed.

## Preparations for Solution/Initiative Reports Lesson 9

### *Intended Learning Outcomes:*

Students will

- synthesize information from their research.
- organize their research material and results.
- share what they know or do not know about their solution topics.

### *Procedure:*

*Students prepare within their groups for research report presentations.*

Students will spend the whole class making final preparations for their report on the group's solution topic. Remind students that they are allowed only 10 minutes to present their research results. (It may be beneficial to suggest they rehearse their presentation once before the end of class or outside the class.) Allow students to ask questions about their presentations and to work in their smaller groups to prepare.

Students may also want to use computers, the library, or other resources. Students need to figure out the best method to present their research. This may include the use of:

- Power Point,
- Overheads,
- posters,
- a model. or
- other methods they devise.

The entire group should be involved in some part of the report's presentation.

### **Creating the thread for the next lesson**

Each group's research and report presentations should be ready by next lesson.

## **Lesson 10 Preparation**

### **Presentations of Initiatives and Solutions**

*Preparation Time:* 15 minutes

*Preparation:*

- investigate the presentation plan for each group.
- explore formats and design ideas for the class's final display.

#### **The Final Display:**

After all of the groups have presented, the class must begin to work on a design for one display for a final exhibition on May 22, 2003. How the final display is completed is the decision of the instructor. Below are some suggestions. (Reviewing the **Presentation Format** may help guide your decision.)

*Suggestions for creating the final display:*

- Students can vote on the best method to decide on a final display idea or plan after reading "Suggestions for creating the final display" and the guidelines for the **Presentation Format**.
- Students brainstorm in smaller groups the suggestions that are nominated for the vote.
- Each group may be responsible for designing one part of the display.
- The class could simply integrate everyone's information into a comprehensive final class display.
- The teacher could assign tasks to different groups: for instance, one group to be responsible for model blueprint or layout, one group to be responsible for the written information, one to be responsible for references and so forth.
- Some groups could work to combine the information and recommend its use to explain various community systems or infrastructure. One group could work on integrating the recommendations and applying those to the final design for the class's display.
- Use the Vienna/ Oakton map as a foundation to incorporate all information in an applied manner.

## **Presentations of Initiatives and Solutions**

### **Lesson 10**

#### *Intended Learning Outcomes:*

Students will

- learn about other students' research.
- gain public speaking and presentation skills.
- begin, as a class, to envision a final display.

#### *Procedure:*

I. 10 minutes per group: Students give their report presentations  
Each group is allowed 5-7 minutes to present material and 1- 3 minute  
for questions.

II. If time: Final Display discussion.  
Discuss what to do for the final display.

#### **Creating the thread for the next lesson**

Come to the next class with a clear idea for the final display.

## **Lesson 11 Preparation**

### **Deciding on a Design for the Final Display**

*Preparation Time:* 10 minutes

*Preparation:*

The **Guidelines for the Final Display** clearly posted for the class.  
(See this list in accompanying lesson material.)

*Materials:*

- Easel with pad and marking pens
- Graph paper
- Straight edges and writing utensils

*Background:*

Follow the **Presentation Format** and your display method to design a display.

## **Deciding on a Design for the Final Display**

### **Lesson 11**

Sixth Essential Question: ***How can a few committed citizens bring about positive change?***

*Intended Learning Outcomes:*

Students will -

- learn how to integrate their research into a plan for the final display
- share with each group a researched solution for the display design
- demonstrate with their design what they have learned about a sustainable community

*Procedure:*

I. (If not covered in class 8) 10 minutes: Final Display

Describe how the final display will be made.

II. Remainder of project: Discuss and decide on the class's final display.

## **PRESENTATION FORMAT**

Below is a list of requirements regarding the format of your display for the Final Exhibition Presentation. How you accomplish this is at your discretion. There are suggestions on how to make this display in the "Background" section of lesson 8.

1. The display area is a table with the maximum space of 3 feet wide by 2 feet deep. You may also use an easel for a poster with explanatory information or you can hang banners.
2. Your display must put all of the solutions together in a format that can be viewed as one system. Your display should be clear, easy to read and understandable to the general public.
3. Sustainable Initiatives must be included as a portion of your final display but may be no more than 10.
4. All solutions that have been chosen for the display must be physically identified in the display, e.g. power plant, sewage treatment facility. If the display is not specific or detailed enough to show an actual solution, e.g. low- flow faucet, the area it is likely to be used in must be identified.
5. All solutions identified in the display must be explained, and the explanation must contain the following information:
  - A brief explanation of the technology
  - An idea, estimate, or actual figure as to how the solution reduces consumption or enhances sustainability
  - All research materials must be referenced, and references cited.
6. Your display must include a map, model or other facsimile of the Vienna/Oakton district.

## **Lesson 12-14 Preparation Making the Final Display**

*Preparation Time:* 20-30 minutes

*Preparation:*

Investigate before class what materials the students need to work on the model in class and make sure these materials are available.

*Materials:*

Students will need whatever materials are necessary to create your final display: writing and drawing utensils, computers, books, magazines, display materials, etc.

*Background:*

Follow the **Presentation Format** and your display method to create a display.

## **Making the Final Display**

### **Lesson 12-14**

#### *Intended Learning Outcomes:*

Students will -

- integrate their research into a final display.
- create support material to explain the science behind the design.
- demonstrate with their final display and support material what they have learned about a sustainable community.

#### *Procedure:*

I. Reminder of project: Work on the class's final display.

*Homework:* Work on final display per instructor's instructions.

## **Sustainable Design Exhibition Lesson 15**

### *Intended Learning Outcomes:*

Students will -

- have completed a display model of their plan for a sustainably designed Oakton.

### **Procedure:**

Exhibition per Presentation Format: (see below).

### **PRESENTATION FORMAT**

Below is a list of requirements regarding the format of your display for the Final Exhibition Presentation. How you accomplish this is at your discretion. There are suggestions on how to make this display in the "Background" section of lesson 8.

1. The display area is a table with the maximum space of 4 feet wide by 2 feet deep. There is space for an easel. There is also space for banners or posters.
2. Your display must put all of the solutions together in a format that can be viewed as one system. Your display should be clear, easy to read and understandable to the general public.
3. All solutions that have been chosen for the display must be physically identified in the display, e.g. power plant, sewage treatment facility. If the display is not specific or detailed enough to show an actual solution, e.g. low- flow faucet, the area it is likely to be used in must be identified.
4. All solutions identified in the display must be explained, and the explanation must contain the following information:
  - A brief explanation of the technology
  - An idea, estimate, or actual figure as to how the solution reduces consumption or enhances sustainability
  - All research materials must be referenced, and references cited.
  -
5. Must include a map, model or other facsimile of Oakton in your display.
6. All materials, excluding the display table, are to be provided by you.
7. Sustainable Initiatives must be included as a portion of your final display but no more than 10.

## Glossary of Terms

- **Carrying Capacity** - the population that can be supported indefinitely by its supporting systems.
- **Closed loop system** – a system that constantly recycles the same materials over and over again. In nature, materials flow in a closed loop in which waste from one form of life becomes nutriment for another.
- **Commons** - the common resources that are owned by everyone
- **Community** - (ecology) an assemblage of living organisms that interact with each other; (sociology) a group of people who live and interact within a specific geographic area.
- **Community Capital** - the natural, human, social, and built capital from which a community receives benefits and on which the community relies for continued existence.
- **Community Initiative** - a venue where a community can work on issues of common concern.
- **Conservation** – a system for conserving objects or resources from the past for the future.
- **Culture** - "the total way of life of a people," "a way of thinking, feeling, and believing," or "a set of techniques for adjusting both to the external environment and to other men"
- **Develop** - to improve or bring to a more advanced state.
- **Ecological Footprint** - each organism uses resources from the ecosystem to exist, and this essential requirement can be expressed as an area of the planet that annually supplies these requirements each year and defined as the organism's ecological footprint.
- **Ecology** - the study of how plants, animals and their environment interact with one another.
- **Economy** - the way that goods and services are produced, distributed and consumed.
- **Environment** – the total surroundings and forces that act upon a living thing.
- **Geographical boundaries** – a defined area that a population of living organisms resides or migrates within.
- **Green Map** – a chart or diagram that shows the places where nature and the human-designed world interconnect.
- **Infrastructure** -as people began to civilize, literally to "gather in cities," they needed constructed facilities to support human activities. Infrastructure is the physical facilities which move people, goods, commodities, water, waste, energy and information.
- **Model** - a representation of some aspect of reality. The purpose of creating a model is to help understand, describe, or predict how things work in the real world by exploring a simplified representation of a particular entity or phenomenon.
- **Natural capital** – a concept that refers to the earth's natural resources and the ecological systems that provide vital life-support services to society and all living things.
- **Natural capitalism** - a new business model that works within four major elements:

- a) Radically increase the productivity of resource use.
  - b) Shift to biologically inspired production with closed loops, no waste, and no toxicity.
  - c) Shift the business model away from the *making and selling* of "things" to *providing the service* that the "thing" delivers.
  - d) Reinvest in natural and human capital.
- **Non-renewable** - resources can never be replaced once they are gone.
  - **Open loop system** - a system where resources are extracted at one end, turned into products in the middle, and then discarded back to nature in the form of air, water, and land pollutants at the end. The system is great for the people in the middle - that's where products are used and profits are extracted. But it leaves costs at each end. In the short run, those costs are perfectly affordable. But in the long run, they mount until they threaten the economy's foundation.
  - **Renewable** - resources that can be restored and replenished by nature in a reasonable amount of time.
  - **Sustain** - to continue without lessening, to nourish, to allow to flourish.
  - **Sustainability** – a system that uses the available resources to satisfy the needs of a community while ensuring that in meeting its own needs, it is not hurting the ability of those in other communities to meet their needs.
  - **Sustainable Production** - the creation of goods and services using processes and systems that are nonpolluting; conserving of energy and natural resources; economically efficient; safe and healthful for employees, communities, and consumers; and socially and creatively rewarding for all working people.
  - **System** - a set of interrelated components related by flows of energy, material, or information.
  - **Town center** - a compact area with a mix of retail, office and commercial activity and housing that serves as a hub of community activity.
  - **Town meeting** –a gathering of a town's eligible voters,
  - **Urban sprawl** – an endless outward development around major cities.
  - **Watershed** - the area of land that catches rain and snow and drains or seeps into a marsh, stream, river, lake or groundwater.