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WHAT MAKES A SUSTAINABLE PLACE TO LIVE?

The Evolution of Egansville

Age Level:

Third grade and up

Subjects:

Science
Math
Social Studies
Language Arts

Time:

120 minutes total

This lesson may take more than one session and needs to be preceded by reading "*The Evolution of Egansville*" published by PAE Consulting Engineers. If you would prefer a hardcopy of the book instead of using the digital version, please contact Kim Knowles at AFO, kim@af-oregon.org.

https://bit.ly/egansville-ebook

Materials:

- Sheets of 8 1/2 x 11 white paper
- Number 10 pencils
- Computer with Internet access
- (Optional) Copy of Sustainable Design Vocabulary Match for each student
- Copy of Collage to Community Think Sheet for each student
- Magazine or way for children to print images
- Colored pens or pencils
- Glue or glue sticks
- Scissors

Learning Objectives:

- To introduce students to the concepts of green building and sustainable design
- To help students understand the positive impacts they can make to take care of the environment in their living spaces and community

Design Professional and Teacher:

Activities in this lesson will require Internet access. In conjunction with the activities printed in this lesson, they will offer students a broader scope of the impact and benefits of "green" building and design, living sustainably in their communities and in our world as well as get them thinking about why we need to make sure the places we live are healthy for everyone.

Rationale:

When a building and a community are carefully designed to positively utilize the natural environment, there is less negative impact on natural resources and therefore a healthier place is created for people and other living things. This lesson guides students through a discussion and suggested activities on the impact of buildings and their influence on our work, learning, home, social and natural environments and communities at large.

Overview of "Green" Design Concepts:

Suggested dialogue...

> *"Architecture that considers impact on the environment is sometimes called "green" or "sustainable." This approach to design and construction positively uses the natural environment so there is less negative impact on natural resources, and it makes the finished building a healthier place for people and other living things to live, work, learn and play.*
>
> *"Sustainable buildings are "healthy buildings" with better air quality and lighting. They are energy efficient, use natural resources wisely, and are operated in an environmentally friendly manner.*
>
> *"Designing buildings that naturally maximize light, heat and other natural resources is not a new thought. Before the invention of electricity, it was necessary for architects and builders to create structures that would automatically use natural resources to keep people warm or cool and let in light.*
>
> *"Historically, people also had to be aware of how much water was available to live on in their natural environment. Electricity now*

allows us to store and transport water and make water clean to drink. We cannot live without water. Architects who value sustainability think about minimizing water usage when they design a building in order to preserve water as a precious resource. Although the relative importance of water usage varies from region to region, an awareness and concern about adequate water supply is becoming more and more important worldwide.

"Sustainable building practices also incorporate what is called "rehabilitation." This involves reusing a building that has outlived its original function. Sometimes architects and builders reuse the entire structure, and sometimes the building's materials are recycled. For example, it costs less money and energy to reuse a window than it does to make a new one. Reusing a building or its materials also use less money and energy by not having to tear it down, haul it away, make new materials and transport them. Another thing to consider when designing buildings sustainably, is to make sure they can remain viable, or still inhabitable, even during and after natural disasters – like earthquakes."

What is Sustainable Design?

"Sustainable design is the art of designing and building using renewable resources, and in a way that doesn't deplete valuable resources. Such designs are called 'sustainable' because they do not permanently reduce the natural resources available to humanity and are designed to withstand the test of time and many different environmental factors."

Some examples of things you'll find in sustainably designed spaces:

• Solar Power:

https://sustainability.sou.edu/energy/

• Ecoroofs and Greenroofs:

https://www.portlandoregon.gov/bes/44422

• Windpower:

http://www.solaripedia.com/13/297/Twelve+West+-Catches+the+Breeze+%28Oregon%2C+USA%29.html

• Bioswales:

https://nrcsolutions.org/bioswales/

Why Sustainable Design?

Briefly talk through the list of reasons and following discussion questions with the class. The teacher and design professional can work together to move the discussion along in a timely manner. Depending on the students' attention space, you can pick and choose the topics that make the most sense to discuss with the class.

• Health:

"How do you feel when you are healthy? Do you feel better? Does that make you do better at your work, treat people nicer...?"

• Climate change – help earth and inhabitants:

"How many of you have heard of the term "climate change?" Climate change describes a change in average conditions - such as temperature and rainfall - in a region over a long period of time. NASA scientists have observed Earth's surface is warming, and many of the warmest years on record have happended in the past 20 years."

• Withstanding Natural Disasters:

"Sometimes things happen in communities like tornadoes, hurricanes, earthquakes and landslides (like in Egansville). Often, when designing sustainably, we can take into consideration what natural forces a building or space might be exposed to and minimize the negative impact.

"There are things that are happening that we can't change, but there are also some things we can do that will help! (A LOT!)"

If the design & building professional has time, read through *"Bad Future, Better Future, A guide for kids and everyone else about climate change and what we can do about it"* by the New York Times:

https://www.nytimes.com/interactive/2021/04/18/climate/climate-change-future-kids.html

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Suggested Class Discussion Questions:

1. *What are some things you think the town of Egansville could have done when designing the town and/or at least some of the structures that would have helped them recover more quickly from this massive landslide? (Share these thoughts: design to use resources differently, build ways to divert water away from town buildings, plants on hillside, build a retaining wall, etc.)*
2. *What do you think our world would be like if we ran out of fossil fuels, like oil or gasoline? (We would need to rely on more energy efficient transportation and more people would need to access things like bicycles and electric cars)*
3. *What would life be like if we couldn't heat our buildings with oil, electricity or natural gas? (We would need to build spaces that rely more on passive solar and natural light, etc.)*
4. *How many ways can you think of that you rely on electricity? (Remind students of things like hot water, refrigerators, traffic lights, microwaves, computers, etc.)*
5. *Can you think of ways electricity could be generated without using non-renewable resources? (Think of a couple of things we just talked about: solar energy, wind energy, what else can you think of?)*
6. *How do you think people lived without electricity 150 years ago? What kinds of things did they live without that we take for granted? (Electric ovens, clothes dryers, electric lamps, television, etc.)*
7. *List all of the ways that we use water. If we were required to restrict our water usage year-round, which of the ways that you use water would be most important to you? (Drinking water, brushing teeth, showering, flushing toilets, etc.)*
8. *Example of using water carefully: Can you imagine a toilet with 2 buttons instead of one? Why would you want 2 options instead of one? Can you think of better ways to use water than our culture does currently? How about using rain water?*
9. *Brainstorm Questions: What are some things we need to be able to count on if a distaster happended? (Energy, water, ways to get to safety, strong shelter, etc.)*
10. *Brainstorm Questions: Aside from how we use energy and how we design strong spaces, what makes a place healthy and safe to live in? (Treating everyone kindly and respectfully who use that space, etc.)*

Additional Resources (possible homework or extra credit assignment):

• Building Green - TIME for Kids

https://www.timeforkids.com/g34/building-green-2/

• Sustainable Development Facts for Kids

https://kids.kiddle.co/Sustainable_development

• 5 Ways Communities Around the World Prepare for Disasters

https://plan-international.org/emergencies/5-ways-communities-prepare-disasters

Vocabulary:

Below are important vocabulary words for students to understand as you begin to talk about sustainability. Have students work on the Sustainable Design Vocabulary Match if there is time, or they can do it as an assignment.

Building Reuse/Adaptation: Buildings are kept and reused by using the original walls and/or other parts from existing buildings as an alternative to demolishing the building and starting over.

Daylighting: A method of lighting the inside of buildings with natural light (like sunlight through windows) so that less artificial light (like from lightbulbs) is needed.

Eco-Roof: A light-weight, green living roof of plants and soil that doesn't need a watering system, fertilizer or pesticides.

Energy Efficiency: The ability to do something without wasting energy. Examples of being energy efficient are to turn out the lights when you leave a room or to turn off the water while you are brushing your teeth.

Environmentally Preferable: Products or services that don't effect human health and the environment as much as other products or services that serve the same purpose.

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Fossil Fuel: Fuel, such as coal, oil and natural gas, produced by the breakdown of ancient (fossilized) plants and animals. It is a source of non-renewable energy.

Green Building: A building that is more sustainable than typical buildings and results in structures that are environmentally responsible and healthy places to live, work, learn and play.

Indoor Air Quality: The quality of air in an indoor space.

Activity:

Hand out the Collage to Community Think Sheet. Brainstorm with students what they think a healthy living space needs to have (sustainable design features, clean water, reliable electricity or power of some sort, a place for people to gather, eat, sleep, wash, etc., even an understanding that the people who live there can rely on each other and work together).

Suggested Dialogue...

> *"Use the Collage to Community Think Sheet to think through the design of your collage. Really communicate what you think the most important elements of a living space are.*
>
> *"Create a cut paper collage that shows things you think a healthy, sustainable living space has. You can incorporate some things you've drawn to illustrate what you are thinking too.* ***Guiding question:*** *What are some things that you thought about and heard during the discussion that you think are really important to have in a healthy living space?"*

Instructions:

1. Use images from magazines that you have permission to cut pictures from, things you can print out with permission and drawings that you make.
2. Collect the items to glue into your base (paper, cardboard, etc.). Use your imagination and anything you have on hand to make your collage.
3. Decide what glue to use.
4. Create a collage that answers the guiding question above.

Bonus Activity

Create another cut paper collage that shows things you think a healthy, sustainable community has.

This lesson is a partnership between Architecture Foundation of Oregon and PAE Consulting Engineers and was adapted from Architecture as a Basic Curriculum Builder, the Architects in Schools Curriculum Guide from Architecture Foundation of Oregon. "What Makes a Sustainable Place to Live?" is one lesson recommended to be used with instruction that supports "The Evolution of Egansville," a text published by PAE Consulting Engineers.

SUSTAINABLE DESIGN VOCABULARY MATCH

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What Makes a Sustainable Place to Live?

NAME	DATE

Match the word to the definition by drawing a line between the word and the correct definition:

Heat from the sun is used to heat and power things in a building like a house, office or school.	Wind Power
A system in a building's design that uses wind or warm air to supply air to the inside of a building.	Building Reuse
A method of lighting a building inside with natural light (sunlight) instead of artificial (light bulbs).	Green Building
Buildings are recycled by using the original walls and/or other parts from existing buildings.	Rainwater Harvesting
Collecting and saving used materials for remaking something useful again.	Recycling
Power systems that convert the energy of wind into electricity.	Solar Power
Rain that falls on a roof and is used for irrigation and grey water uses.	Daylighting
A building that is more sustainable and results in structures that are environmentally responsible and healthy places to live, work, learn and play.	Natural Ventilation

SUSTAINABLE DESIGN VOCABULARY MATCH - TEACHER KEY

What Makes a Sustainable Place to Live?

Heat from the sun is used to heat and power things in a building like a house, office or school.	Solar Power
A system in the building's design that uses wind or warm air to supply air to the inside of a building.	Natural Ventilation
A method of lighting the inside of buildings with natural light (like sunlight through windows) so that less artificial light (like from light bulbs) is needed.	Daylighting
Buildings are recycled by using the original walls and/or other parts from existing buildings.	Building Reuse
Collecting and saving used materials for remaking something useful again.	Recycling
Power systems that convert the energy of wind into electricity.	Wind Power
Rain that falls on a roof and is used for irrigation and grey water uses.	Rainwater Harvesting
A building that is more sustainable and results in structures that are environmentally responsible and healthy places to live, work, learn and play.	Green Building

COLLAGE TO COMMUNITY THINK SHEET

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What Makes a Sustainable Place to Live?

NAME	DATE

You are to be the architect and the builder of a living space and/or community that is healthy, sustainable and designed for everyone who will use the space. Use this page to think about what we brainstormed as a class, plan how you will address the identified question, create thumbnails (small sketches), and take notes. Remember, the better you plan, the better your creation will be!

1. Thinking about our class discussion, use the space below to write 8 things that you think are the most important in a healthy place to live:

1.	5.
2.	6.
3.	7.
4.	8.

2. Use the spaces below to create 3 potential thumbnail sketches for your piece. You can use these to decide your final collage design. Think about what you most want to communicate in your design.

3. Use the space below to record any thoughts, feelings, inspiration, or other information you think may be helpful as you create your final piece.

4. On the back of this sheet, do a final sketch of your design and where you want your images to be placed before creating your final collage.