

Green Architects

Primary Curriculum	Grade 2
Supplemental Curriculum	Grades 2–5
Notes	Living Wall investigation requires 2 – 3 weeks to complete. Standard unit/refill kit comes with enough materials for 30 students.

Description

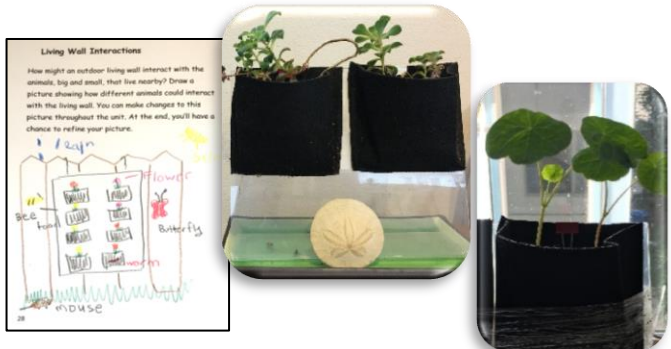
How can you design a building that uses less energy?

Most people think of buildings as just a collection of cement and steel, pipes and wires. In *Green Architects*, Callie tells us her story and helps us explore the ways buildings can be seen as dynamic participants in the community. Buildings can determine our energy usage and environmental impact while also contributing to our day-to-day well-being.


Using the overarching question of how to design a building or home that uses less energy, students explore properties of Earth, ecosystems, and engineering as they ask themselves: *“How can we develop buildings and communities that work with and preserve the environment?”*

Main Investigations

Living Wall Investigation and Model



Building a Green Home



Number of Lessons*

Full unit – 28 lessons

Supplemental program – minimum 5 lessons (requires 2–3 weeks for living walls to grow)

**Lesson = 30–40 min. block, 50% of full unit lessons can be delivered in non-science classes*

Best Suited For

- Classroom science instruction (Grade 2)
- Summer camps (Grades 2–5+, minimum 2 weeks)
- Afterschool programs that have regular attendance (Grades 2–5)

Overarching Enduring Understanding

Students will explore and learn how buildings and the environment can work together to create great spaces to live that work with and support the natural environment.

Number of Lessons*

Full unit – 28 lessons

Supplemental program – minimum 5 lessons (requires 2 – 3 weeks for living walls to grow)

*Lesson = 30 – 40 min block, 50% of full unit lessons can be delivered in non-science classes

FLOW OF INSTRUCTION

Investigation: Building Your Green Building (summative challenge, introduced in week 1 or 2, completed in weeks 8, 9, and 10)

*This summative challenge is the driving force behind the activities and lessons in this unit—the reason **why** students are working through the smaller investigations. With that in mind, we think it's best to introduce the summative challenge at the beginning, even though students won't technically be working on it until the end of the unit.*

In the summative challenge students will design and “construct” a green home that is suitable for the area in which they live. To build their house they must understand the following concepts as they relate green architecture: the natural resources in the area, the biodiversity of the area, the climate of the area, and the natural hazards in the area that occur on a short time scale and the natural hazards in the area that occur on a longer time scale. [Enrichment version—Have students use a region of their choice, although they will need to do more research.](#)

Investigation: What's Available? (mini-research activity, occurs during weeks 4–6)

In this investigation students gather information from various sources on the natural resources available in the area. This includes determining where water can be found, on Earth and in their region, as well as understanding options for building materials and plant life. At the conclusion of What's Available? students must summarize their findings on a map of the United States as well as a map of the region as a model of the shapes and kinds of land and water in those respective areas. At the end of the investigation students will make conclusions about how the natural resources in the area will influence their design for their green building.

Investigation: What's It Like Outside? (mini-research activity, occurs during weeks 7–9)

In this investigation students gather information from several sources about the types of natural disasters/natural hazards in an area, with the goal of understanding the design criteria for their green building. They will need to gather information to provide evidence that Earth events can occur quickly (flooding, earthquakes, snowstorms, forest fires) or slowly (wind and water erosion). As part of their conclusions for this part of the investigation they will need to compare different green building strategies to slow or prevent air or water erosion. Students will also need to gather data on temperature associated with the region to determine potential hazards that may occur from it being hot or cold. As part of this effort, they will need to determine what type of changes may occur due to the temperature and which ones are reversible or irreversible.

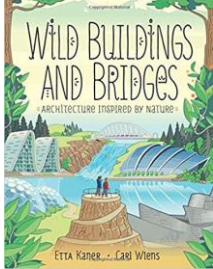
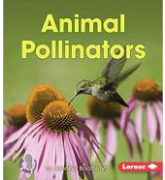
Investigation: Which Is Better? (comparison activity, occurs during week 10)

In this comparison activity students will compare two architectural or building strategies designed to slow or prevent wind or water from changing the shape of the land and decide, with a justification, which one they think is better. Alternatively, they can propose a third solution but must explain why they believe their solution is better through direct comparison with the other two solutions presented.

Investigation: The Wall Is Alive! (hands-on activity, occurs during weeks 3–10)

In this investigation students will design living walls and then plan out and conduct an investigation to monitor how they grow under different conditions. Living walls, basically a wall of plants, are used quite frequently in green building design and in urban settings where more plant life is desirable. This investigation begins with a short research activity during which the class outlines the design criteria for a living wall. These criteria include identifying plants that are common to the area and creating an initial model on how the plants in their living wall may interact with other animals in their region. After constructing their living wall and determining a range of growing conditions that use varying amounts of water and sunlight, students will monitor and compare plant growth. As the plants in the walls are growing students will research at least one other region and, by comparing plants and insects native to that region versus their own, they will compare what plants would be best used for a living wall in that location. After their research students will refine their models of how the plants in their living walls would interact with the animals in the area, specifically highlighting how plants and insects depend on each other for survival through nourishment (plant supporting insect/animal) and pollination (insect/animal supporting plant).

Parts List

Full Unit	
<p>Printed Materials</p> <ul style="list-style-type: none"> • Educator Guide • Individual <i>My STEM Explorer Notes™</i> notebooks • Individual <i>My STEM Stories™</i> notebooks • Timeline sheets • Introductory investigation sheets • Which is Better? You Decide! comparison cards (6 sets) 	<p>Trade Books</p>  
<p>Provided Equipment & Materials</p> <ul style="list-style-type: none"> • Living wall containers • Plastic stands • Binder clips • Seeds • Green building starter kit • Aluminum foil for trays 	   <ul style="list-style-type: none"> • <i>National Geographic Kids Beginner's World Atlas</i> • <i>Earth-Friendly Buildings Bridges and More: The Eco-Journal of Corry Lapont</i> • <i>Wild Buildings and Bridges: Architecture Inspired by Nature</i> • <i>Insect Pollinators</i> • <i>Animal Pollinators</i>
<p>Common Equipment & Materials Needed but NOT Provided</p> <ul style="list-style-type: none"> • water • Soil • Seeds from local plants (optional) 	<p>Digital Resources</p> <ul style="list-style-type: none"> • Electronic copies of printed materials¹ • How-To videos for investigations¹ • Easy-to-use links to publicly available videos and other information.

Supplemental Unit

Printed Materials

- Educator Guide
- Individual My STEM Explorer Notes™ notebooks
- Individual My STEM Stories™ notebooks
- Timeline sheets
- Introductory investigation sheets
- Which is Better? You Decide! comparison cards (6 sets)

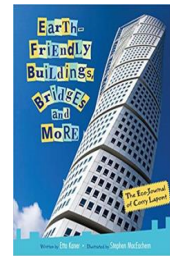
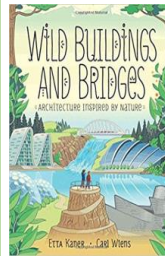
Provided Equipment & Materials

- Living wall containers
- Plastic stands
- Binder clips
- Seeds
- Green building starter kit
- Aluminum foil for trays

Common Equipment & Materials Needed but NOT Provided

- water
- Soil
- Seeds from local plants (optional)

Trade Books



- *Earth-Friendly Buildings Bridges and More: The Eco-Journal of Corry Lapont*
- *Wild Buildings and Bridges: Architecture Inspired by Nature*
- *Insect Pollinators*
- *Animal Pollinators*

Digital Resources

- Electronic copies of printed materials
- How-To videos for investigations
- Easy-to-use links to publicly available videos and other information.

Refill Kit

Printed Materials

- Educator Guide
- Individual My STEM Explorer Notes™ notebooks
- Individual My STEM Stories™ notebooks
- Timeline sheets
- Introductory investigation sheets

Provided Equipment & Materials

- Seeds
- Green building starter kit
- Aluminum foil for trays

Digital Resources

- Electronic copies of printed materials¹
- How-To videos for investigations¹
- Easy-to-use links to publicly available videos and other information.

Overarching Enduring Understanding

Students will explore and learn how buildings and the environment can work together to create great spaces to live that work with and support the natural environment.

Number of Lessons*

Full unit – 28 lessons

Supplemental program – minimum 5 lessons (requires 2 – 3 weeks for living walls to grow)

*Lesson = 30 – 40 min block, 50% of full unit lessons can be delivered in non-science classes

FLOW OF INSTRUCTION

2-ESS1-1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly.

2-ESS2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.

2-ESS2-2. Develop a model to represent the shapes and kinds of land and bodies of water in an area.

2-ESS2-3. Obtain information to identify where water is found on Earth and that it can be solid or liquid.

2-PS1-4. Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.

2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow.

2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants. [NYSSLS: Develop a simple model that illustrates how plants and animals depend on each other for survival.]

2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats.

Investigation: Building Your Green Building (summative challenge, introduced in week 1 or 2, completed in weeks 8, 9, and 10)

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In the summative challenge students will design and “construct” a green home that is suitable for the area in which they live. To build their house they must understand the following concepts as they relate green architecture: the natural resources in the area (2-ESS2-2, 2-LS4-1), the biodiversity of the area (2-LS4-1), the climate of the area (2-PS1-4), and the natural hazards in the area that occur on a short time scale (2-PS1-4, 2-ESS1-1) and the natural hazards in the area that occur on a longer time scale (2-ESS1-1, 2-ESS2-1). **Enrichment version—Have students use a region of their choice, although they will need to do more research.**

Investigation: What's Available? (mini-research activity, occurs during weeks 4–6)

In this investigation students gather information from various sources on the natural resources available in the area. This includes **determining where water can be found, on Earth and in their region** (2-ESS2-3), as well as understanding options for building materials and plant life

(2-LS4-1, 2-ESS2-1). At the conclusion of What's Available? students must summarize their findings on a map of the United States as well as a map of the region as **a model of the shapes and kinds of land and water in those respective areas** (2-ESS2-2). At the end of the investigation students will make conclusions about how the natural resources in the area will influence their design for their green building.

Investigation: What's It Like Outside? (mini-research activity, occurs during weeks 7–9)

In this investigation students gather information from several sources about the types of natural disasters/natural hazards in an area, with the goal of understanding the design criteria for their green building. They will need to gather information to **provide evidence that Earth events can occur quickly** (flooding, earthquakes, snowstorms, forest fires) or **slowly** (wind and water erosion) (2-ESS1-1). As part of their conclusions for this part of the investigation they will need to **compare different green building strategies to slow or prevent air or water erosion** (2-ESS2-1). Students will also need to gather data on temperature associated with the region to determine potential hazards that may occur from it being hot or cold. As part of this effort, they will need to **determine what type of changes may occur due to the temperature and which ones are reversible or irreversible** (2-PS1-4).

Investigation: Which Is Better? (comparison activity, occurs during week 10)

In this comparison activity students will compare two architectural or building strategies **designed to slow or prevent wind or water from changing the shape of the land** and decide, with a justification, which one they think is better. Alternatively, they can propose a third solution but must explain why they believe their solution is better through direct **comparison with the other two solutions presented**. (2-ESS2-1)

Investigation: The Wall Is Alive! (hands-on activity, occurs during weeks 3–10)

In this investigation students will design living walls and then **plan out and conduct an investigation to monitor how they grow under different conditions**

(2-LS2-1).

Living walls, basically a wall of plants, are used quite frequently in green building design and in urban settings where more plant life is desirable. This investigation begins with a short research activity during which the class outlines the design criteria for a living wall. These criteria include identifying **plants that are common to the area** (2-LS4-1) and creating an initial model on how the **plants in their living wall may interact with other animals in their region**

(2-LS2-2).

After constructing their living wall and determining a range of growing conditions that **use varying amounts of water and sunlight**, students will **monitor and compare plant growth**.

(2-LS2-1).

As the plants in the walls are growing students will research at least one other region and, by **comparing plants and insects native to that region versus their own**, they will compare what plants would be best used for a living wall in that location (2-LS4-1). After their research students will refine their models of how the plants in their living walls would interact with the animals in the area, **specifically highlighting how plants and insects depend on each other for survival through nourishment** (plant supporting insect/animal) **and pollination** (insect/animal supporting plant)

(2-LS2-2).