Unit 1: Introduction to Sustainability and Green Building

Students are introduced to the key principles of green building, including current standards and considerations for regional factors. They are also introduced to the five components of green building that include energy, water, sustainable sites, materials and resources, and indoor environmental quality. The hands-on audit provides students with an opportunity to gather basic information about their school building and grounds to prepare them to do more in-depth audits related to energy, water, and more.

Student Readings:
- Introduction to Sustainability (1.1)
- Defining Sustainability (1.2)
- Ecological Footprint (1.4)
- Wind Energy (1.6)
- What Is Green Building (1.8)
- Sidebar: Green Building Statistics

Unit 2: Energy and the Built Environment

Students examine how our energy sources are captured, transported, and converted for use as fuel. Students learn how patterns of energy use have changed over time, why our current level of consumption is unsustainable, and about the choices individuals can make to reduce their own personal energy use. The hands-on audit invites students to assess their school’s energy use and consumption by examining the HVAC system, lighting, office equipment, and other energy-consuming systems and devices. Students study their school’s energy bills, interview facilities staff, and discuss current energy management policies.

Student Readings:
- Energy Basics (2.1)
- Human History and Energy (2.3)
  - Sidebar: Renewable Energy Contracts
- Domestic Energy Use (2.6)
- Impact of Personal Choices (2.7)
  - Sidebar: Daylight Harvesting
  - Sidebar: Distributed Generation
  - Sidebar: Hybrid Appliances
  - Sidebar: On-Site Power Generation
- Hidden Energy in Buildings (2.10)
Unit 3: Water and the Built Environment

Students learn about the key issues related to water use and consumption, including pollution, competition, overuse, and waste. They also learn how conservation and resource protection can address these issues. Finally, they examine strategies, technologies, and policies that help achieve more sustainable water use and consumption. The hands-on audit asks students to evaluate their school’s water use and consumption by inventorying all of the indoor water fixtures. They calculate how much water their school would use if each fixture was used once (e.g., toilet flush) or was run for one minute (e.g., faucet, dishwasher), and then predict actual water use. They compare their predictions to the school’s water bills, and bring these ideas home in a household water audit.

Student Readings:

- The Science of Water (3.1)
- The Water Cycle and Watersheds (3.2)
  - Sidebar: Acid Rain
- Biomes and Water Availability (3.3)
- Drinking Water (3.4)
  - Sidebar: Graywater Systems
- Wastewater Treatment (3.5)
- The Journey of Pollutants (3.6)
- Competition for Water (3.7)
  - Sidebar: Rainwater Harvesting
- Indirect Water Use (3.8)
- Household Water Audit and Conservation Tips (3.9)
- School Water Audit (3.10)
- Efficient Technologies (3.11)
  - Sidebar: Regional Resource Conservation
  - Sidebar: Water-Saving Plumbing Fixtures

Unit 4: Indoor Environmental Quality

Students explore issues related to indoor environmental quality in buildings. They examine the areas of air quality, acoustics, and lighting and learn why buildings can become “sick.” Then, they learn how buildings breathe and what sustainable strategies, technologies, and policies exist for improving indoor environmental quality. The hands-on audit invites students to assess the school’s indoor air, light, and sound quality. They start first with their own classroom, and then apply their process to evaluate large communal areas around the school.
Unit 5: Materials and Resources

Students learn about the solid waste stream, including its major sources and disposal methods. They explore how the four Rs (rethink, reduce, reuse, recycle) can help achieve a more sustainable society, including the practices for managing materials and resources in buildings from design to retrofit. The hands-on audit gives students the tools to assess the school’s solid waste stream by auditing their own personal trash generation. They also examine the impact of building materials choices by auditing the resources used to maintain the materials in their building and discussing the economic, environmental, and health impacts.

Student Readings:

- Municipal Solid Waste (5.1)
- Waste Disposal (5.2)
- Construction and Demolition Waste (5.3)
- Hazardous Waste (5.4)
- The Future Starts Here (5.5)
  - Sidebar: Adaptive Re-use
- Building Blocks (5.6)
  - Sidebar: Fly-Ash Concrete
  - Sidebar: Linoleum
- Adopt a Chunk (5.8)
  - Sidebar: Life Cycle Analysis

Unit 6: Sustainable Sites and Land Use

Students study how patterns of land use have changed over time and the ways in which present-day land use are not sustainable. They learn about options for green building site use and selection, and how site and landscape design can maximize natural benefits. Finally, they examine the ways in which sustainable sites safeguard the surrounding environment, conserve resources, and promote healthy living and working spaces. The hands-on audit brings students outdoors to photograph key areas of their school site. They study various aspects of the site (i.e. amount of impervious surface) to make recommendations to improve stormwater management, transportation policies, passive heating and cooling capabilities, and more.
Student Readings:

- The Air We Breathe (6.1)
  - Sidebar: Legionnaires Disease
- Sound and Light (6.3)
- Ventilation (6.7)
  - Sidebar: Thermal Comfort
- Indoor Environmental Quality Audit (6.10)

Unit 7: Building Science

Students are introduced to the core principles of building science. Building science is a systems-based approach to construction that examines the building as a system of parts and materials that interact with one another, its occupants, and the environment in profound ways. Students learn about the building as shelters, designed to protect occupants through the design and construction of performance-based building envelopes. Students are also introduced to key energy measurements, and perform a home energy audit to synthesize and apply key understandings from the unit.

Student Readings:

There are no student readings for this unit.

Unit 8: Present and Future of Green Building

Students explore the wide range of resources, tools, and trends that reflect the latest approaches to green building. Students examine current and emerging job opportunities, and develop an understanding of the commitment to continuous learning that is required of industry professionals. They also learn about key trends in building design and construction, such as the application of biomimicry, net-zero buildings, and building in high risk zones. Finally, they place green building in a broader sustainability context by completing a home and community design project that maximizes the sustainability and green building concepts they have learned in the course.

Student Readings:

There are no student readings for this unit.