



Building Science Principles Recommended Lesson

You may use this lesson or develop your own based on the topics presented below.

Description

As part of clean energy basics, the Building Science Principles lesson teaches about energy use, occupant health and safety, indoor air quality, occupant comfort, durability of building materials, and conservation measures in relation to home performance. It also covers principles of building science to help learners understand how a house performs and the interacting relationships between different components of a house (house-as-a-system). Building science principles training is designed for entry-level workers in construction and weatherization fields.

For people with experience or prior related training, they can proceed to the other parts of the clean energy basic curriculum, or they can take the BPI certification exam and receive a Building Science Principles certificate upon successful completion.

Objectives

Upon completion of the building science principles portion of the clean energy training, students will be able to:

1. Explain energy use in terms of building science
2. Describe “House-as-a-System”
3. Discuss heat movement and insulation types
4. Explain air sealing and stack effect phenomenon
5. Discuss sources of moisture, moisture control, and indoor air quality
6. Describe whole-house mechanical ventilation systems and combustion science
7. Discuss electricity and water conservation strategies in a house
8. Explain evaluation strategies of house performance including building envelopes, mechanical systems, appliances, and lighting

Estimated length

Recommended: At least 10 hours

Learning environment & format

Recommended: Primarily offered in-person, classroom-based training with props and demonstrations. Some elements may be appropriate for online learning, with support from training staff and access to a facility with a computer.

Tools and equipment

Required: This program requires the following:

- Laptops and/or computer lab
- Course materials/books

Content overview

Required: Training programs will be required to cover the following workplace basic building principle content. The topics generally align with those in the BPI Building Science Principles certification curriculum, though programs are not required to use this curriculum.

1. Home performance and introduction to building science
2. House-as-a-System
3. Energy & the building shell (air leakage, residential insulation, windows & doors)
4. Residential heating & cooling
5. Lighting & appliances
6. Water heating
7. Health, safety & moisture management
8. Conservation strategies

Certifications

(Optional) Programs may opt to prepare students to take the test for the BPI Building Science Principles Certification.

Evaluation methods

Required: Must have measurable learning outcomes and be able to assess whether those outcomes are met, using a variety of formative (continuous assessment module by module or providing multiple quizzes when appropriate) and summative assessments (final evaluation after compilation of all the modules).

Recommended: We recommend administering a quiz at the end of each lesson and using demonstrations where appropriate.

References and example curriculum

- [Building Science Principles Certificate](#)
- Department of Energy: [Building Energy Education Fundamentals](#),