LESSON

Typical Weatherization Measures

BIG IDEA(S)

Weatherization measures can be classified as old school or modern. Measures address building shell, insulation, mechanical systems, or baseload of a home.

OBJECTIVES

Students will:

- Compare and contrast old school vs modern weatherization measures
- Explain why some measures are more cost-effective than others

BRIGHT SOLAR FUTURES

WEATHERIZATION

TOPIC OF STUDY

Weatherization

90 MINUTES

TASK LIST SUBCATEGORY

102	Describe how energy is fundamental to our everyday lives
106	Describe the impact of energy systems (economic, health, environmental)
801	Identify the principles of building science
810	Use energy efficiency industry vocabulary

OVERVIEW

Weatherization measures can be classified as old school or modern. Measures address building shell, insulation, mechanical systems, or baseload of a home. Modern measures are grounded in scientific research and are often more of a priority. Modern measures also look at the whole house and how its components are related; the house as a system view. Many old school weatherization programs focused on replacing doors and windows. We now know that this is one of the least cost-effective measures.

KEY TERMS

Modern Weatherization Measures: based on recent lessons in building science

Old School Weatherization Measures: while still done, are not as cost effective

Baseload: how much energy is used before weatherization

STANDARDS

PA/SDP

3.4.10.A2. Interpret how **systems** thinking applies logic and creativity with appropriate comprises in complex real-life problems.

3.4.12.B1. Analyze ethical, social, economic, and cultural considerations as related to the development, selection, and use of **technologies**.

3.4.12.C3. Apply the concept that many technological problems require a multi-disciplinary approach.

3.4.12.E3. Compare and contrast energy and power **systems** as they relate to pollution, renewable and non-renewable resources, and conservation.

INSTRUCTIONAL

TEXT/REFERENCES

Training Handbook, pp. 19-22

MATERIALS NEEDED

Technology: Device with internet to watch YouTube video

IMPLEMENTATION (LESSON PLAN)

ENGAGE

1. 80s Gaming Analysis - ask students to compare and contrast current video systems such as Playstation or xBox with the Atari 2600. How has technology changed these products? What are some of the differences in "old school" and modern tech?
2. Ask students to brainstorm a list of old school weatherization techniques. If students have difficulty recalling old school weatherization products, share the images from the Old School Measures worksheet.

EXPLORE

1. In advance set up as many measures from the list as possible (blower door, a variety of insulation types, led lighting, CO monitor, heater filters, air sealing materials, etc.). Include a mix of old school and new school measures. Allow students to handle materials and equipment (with appropriate safety measures in mind).
2. In small groups have students classify measures as old school vs new school.
3. Have groups sort classify the measures into one of the four areas in the diagram below.

MECHANICAL MEASURES

- Clean, tune, repair, or replace heating and/or cooling systems.
- Install duct and heating pipe insulation.
- Install programmable thermostats and other HVAC controls.
- Repair/replace water heaters.
- Install water heater tank insulation.
- Insulate water heating pipes.
- Install solar water heating systems.
- Install waste heat recovery devices.

HEALTH & SAFETY MEASURES

- Complete combustion appliance safety testing.
- Repair/replace vent systems to ensure combustion gas draft safely outside.
- Install mechanical ventilation to ensure adequate indoor air quality.
- Assess fire hazards. Install smoke and carbon monoxide alarms when needed.
- Evaluate mold/moisture hazards.
- Perform incidental safety repairs when needed.

BUILDING SHELL MEASURES

- Install wall, floor, ceiling, attic, and/or foundation insulation.
- Complete Blower Door Testing.
- Perform air sealing.
- Repair/replace primary windows/doors.
- Install storm windows/doors.
- Install window film/solar screens/window louvers and awnings.
- Repair minor roof and wall leaks prior to attic or wall insulation.

ELECTRIC BASELOAD MEASURES

- Install motor controls.
- Install efficient light sources.
- Replace refrigerators and freezers with energy efficient models.

EXPLAIN

- Have each student team present one of the measures and describe to the class why it is old school or modern and the type of energy efficiency it may provide.

EXTEND/EVALUATE

- Have student groups look up the differences between incandescent, compact fluorescent, and led bulbs. Using the Year 1 Lesson 6 worksheet have students describe the amount of energy each bulb consumes.

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HOMEWORK

Ask students to take an inventory of the the "old school" measures in their own home.

RESOURCES/LINKS

PA Weatherization Field Guide

https://www.paweatherization.org/vertical/sites/%7BF27E296C-7668-49FF-9408-DF453C70C62E%7D/uploads/%7BCA71D0C1-C3CE-4B1A-9858-B75BD3F5AF92%7D.PDF

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