# Energy Movement Quiz Answer Key

# Weatherization Energy Auditor – Single Family

DISCLAIMER: This quiz is intended for use as an interim review. Distribute to students after training the associated curriculum chapter, or the next day, to refresh the lesson. Being publicly available renders this specific quiz invalid for use as a formal assessment tool for accreditation.  See Tier 2.14(b) IREC 01022 ISPQ accreditation standard.

Learning Objectives

By attending this session, participants will be able to:

* Discuss the principles of energy and energy movement.
* List the three methods of heat transfer.
* Differentiate between thermal and air barriers and the proper location of each.
* Describe the forces that cause air leakage.
* Explain the connection between air leakage, energy waste, and moisture problems.
* Explain how air ducts affect the pressure balance within the home.

Questions and Rationale

**Objectives:**

* List the three methods of heat transfer.

**Question:**

1. The type of heat transfer that does not require physical contact or a medium is:

1. Conduction.
2. Convection.
3. Radiation.

**Rationale:**

**A** is incorrect because conduction is the mode of transfer through a material.

**B** is incorrect because convection is the mode of heat transfer through fluid (gas or liquid).

**C** is correct because radiation can transfer through a vacuum.

**Objectives:**

* Describe the forces that cause air leakage.

**Question:**

2. An example of a an air leakage driving force caused by a temperature difference between the inside and outside of a home is:

1. Wind effect.
2. Stack effect.
3. Fan effect.

**Rationale:**

**A** is incorrect because wind is a function of pressure difference caused by wind.

**B** is correct because stack effect is a function of temperature difference between inside and outside during the heating season.

**C** is incorrect because fan effect is a function of pressure difference caused by fans.

**Objective:**

* Differentiate between thermal and air barriers and the proper location of each.

**Question:**

3. The air barrier in most homes is made up of the:

1. Roof deck.
2. Insulation blanket.
3. Drywall.

 **Rationale:**

**A** is incorrect because the roof deck is most commonly adjacent to a cold attic.

**B** is incorrect because the insulation blanket should be on the cold side of the air barrier.

**C** is correct because the drywall is generally the primary surface that separates conditioned from unconditioned spaces.

**Objective:**

* Differentiate between thermal and air barriers and the proper location of each.

**Question:**

4. A well-sealed air barrierplays a major role in:

1. Insulating the thermal envelope and deadening sound.
2. Retarding the movement of heat and moisture through the building.
3. Providing a vapor retarder and retarding heat flow through the building.

 **Rationale:**

**A** is incorrect because insulation’s main function is to slow down heat transfer by conduction.

**B** is correct because moisture vapor is carried by convective air currents, which account for the majority of heat loss in homes.

**C** is incorrect because the function of a vapor retarder is to retard the flow of moisture by diffusion and this is not the major role of the air barrier.

**Objective**:

* Discuss the principles of energy and energy movement.

**Question**:

5. Which of these is one of the principles of thermodynamics?

* + 1. A body in motion tends to stay in motion.
		2. Energy always goes from high to low.
		3. E = mc2

**Rationale:**

**A** is incorrect because this is Newton’s first law of motion, not a principle of thermodynamics.

**B** is correct because this is one of the principles of thermodynamics. The other is that energy moves from higher to lower, or more to less.

**C** is incorrect because this formula describes the mass/energy equivalence. It is not a principle of thermodynamics.

**Objective**:

* Explain how air ducts affect the pressure balance within the home.

**Question**:

6. Positive pressure in a room is most likely caused by which of these scenarios?

1. A clothes dryer vented into the crawlspace below the room
2. Unsealed ductwork running through interior walls
3. Closed, tight fitting door and supply vents

**Rationale**:

**A** is incorrect because this is highly unlikely to cause measurable positive pressure in the room above.

**B** is incorrect because without knowing whether it is supply or return ducting, we cannot know if or how it might influence the pressure in that room.

**C** is correct because the room would be pressurized by the supply vents, likely causing a negative pressure wherever the return in located.

**Objective**:

* Differentiate between thermal and air barriers and the proper location of each.

**Question**:

7. What is the main difference between the thermal boundary and the air barrier?

1. Insulation is present in the thermal boundary.
2. The air barrier is always in the attic.
3. The air barrier limits heat flow between inside and outside.

**Rationale**:

**A** is correct because the thermal boundary, by definition, includes something that impedes heat transfer, i.e. insulation.

**B** is incorrect because the air barrier should encompass the entire building envelope, not just the attic.

**C** is incorrect because, though the air barrier reduces heat lost through convection, as stated above answer c is the defined purpose of the thermal boundary.