



## WEATHERIZATION

### TOPIC OF STUDY

Building Sciences



90 MINUTES

### KEY TERMS

exterior wall finish  
platform framing  
balloon framing  
structural insulated panel (SIP)  
R-value  
vapor barrier  
vapor retarder

## LESSON

Balloon and Platform Framing

## OBJECTIVES

Students will:

- Describe the house framing methods in order to understand air leakage, insulation needs
- Use a model to explain how the frame of the house is built
- Describe how problems develop due to moisture

## BIG IDEA(S)

The framing of the house is an important variable when managing air flow/air leakage.

## TASK LIST SUBCATEGORY

**802** Describe the interconnection of systems using the “House as a System” framework

**803** Identify and evaluate mechanical, electrical, plumbing and roofing systems

**804** Identify infiltration and exfiltration points

**810** Use energy efficiency industry vocabulary

## OVERVIEW

House systems are interdependent. Change one and that affects other parts. The frame of the house is hidden, but is important to consider for air leakage. The frames, or bones of the house, are mostly made of wood such as columns, beams, joists, rafters, all making up the structural frame.

## STANDARDS

### PA/SDP

**3.4.10.D2.** Diagnose a malfunctioning **system** and use tools, materials, and knowledge to repair it.

**3.4.10.E7.** Evaluate structure design as related to function, considering such factors as style, convenience, safety, and efficiency.

### Construction Career Pathway (AC-CST):

(7) Compare and contrast the building systems and components required for a construction project.

### NGSS

**3.4.10.D2.** Diagnose a malfunctioning **system** and use tools, materials, and knowledge to repair it.

## DEFINITIONS OF KEY TERMS

Exterior wall finish: layer of material attached to the outside sheathing, used for air and moisture control and visual appeal

Platform framing: floor joists rest on a wall plate or on top of a stud wall





## DEFINITIONS OF KEY TERMS (CONTINUED)

**Balloon framing:** typical method of house framing used prior to 1940. Their flaw is that air can travel from basement to ceiling easily

**Structural insulated panel (SIP):** prefabricated used for building walls and roofs, are insulation and framing in one piece

**R-value:** rating of materials to resist heat transmission

**Vapor barrier:** any material that allows zero moisture through

**Vapor retarder:** material that slows the diffusion of water vapor through it

## INSTRUCTIONAL

### TEXT/REFERENCES

*Energy Conservation Handbook*, pp. 92-96

### MATERIALS NEEDED

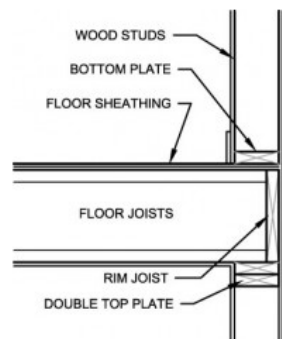
#### MATERIALS

- Scale model of a house with framing and systems, if available
- Actual portions of a framed house, if available in the lab

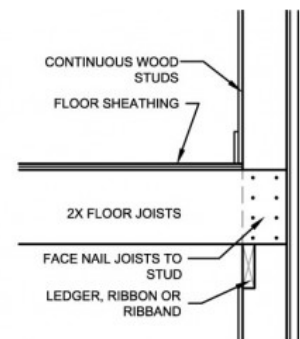
**Technology:** Computer with internet access

## IMPLEMENTATION (LESSON PLAN)

1. Framing. If a miniature house with a see-through exterior is available, use this to discuss how a house is put together and how the systems all work together as one house system.
2. Platform Framing. This is the most common form of wood framing today. In this situation floor joists will rest on a sill plate or on top of a stud wall. The next level of wall framing will then sit on top of the fully sheathed floor joists. This method provides a built in fire stop and also creates a platform on which to construct the upper level wall. Balloon framing does neither of these. Refer to drawing two (2) on the right. Platform framing is presented on p. 93 in the *Energy Conservation Handbook*.
3. Balloon Framing. This method of framing was fairly popular on the east coast and parts of the Midwest in the past. Today it is not generally allowed by current building codes. However, it is good to be aware of the method in the event that it is encountered in the field.
  - a. In this type of framing the wall stud rests on the sill plate with a rim joist in the interior side and then the floor joist. The stud wall is continuous from the sill plate to the top plate. At the second level the floor connection, joists rest on a ledger and are then face nailed to the studs. Refer to drawing one (1) on the right.



**PLATFORM FRAMING**  
② SCALE: NO SCALE



**BALLOON FRAMING**  
① SCALE: NO SCALE

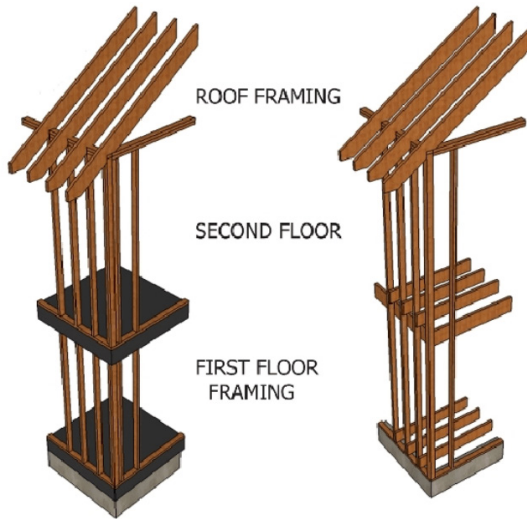
Balloon and Platform Framing



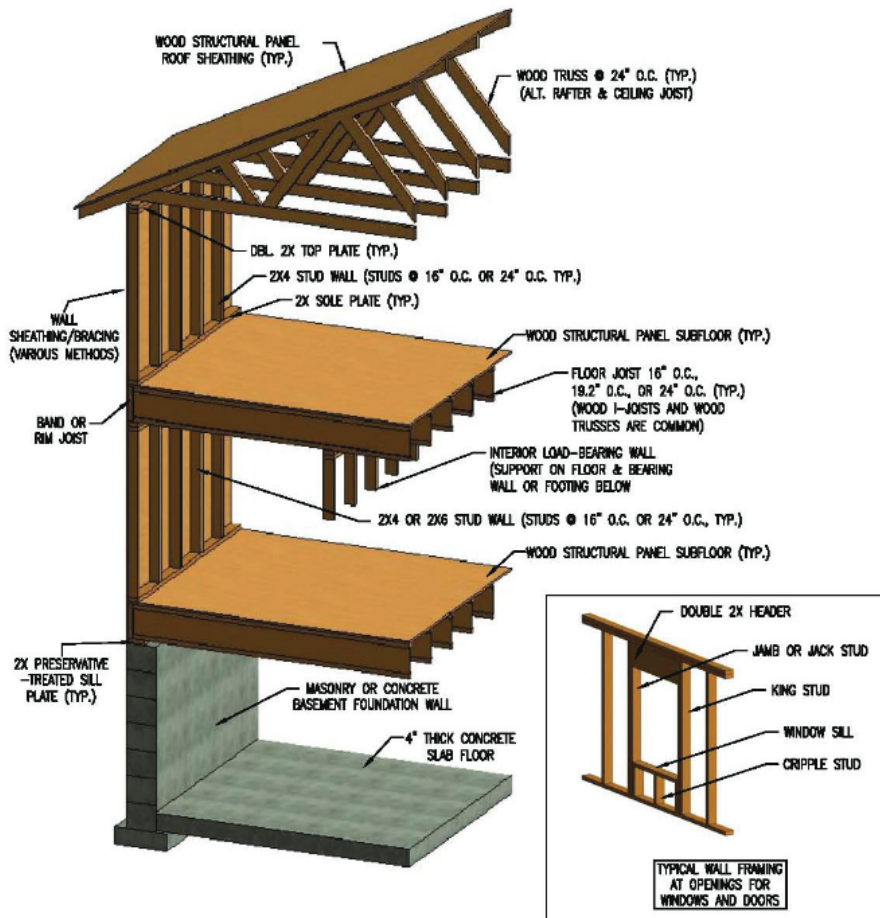
## IMPLEMENTATION (LESSON PLAN) - CONTINUED

### 4. Comparing the two types.

The following view allows students to see how each framing method with a larger view of the frame.



Close up of common framing elements for a platform frame:



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## IMPLEMENTATION (LESSON PLAN) - CONTINUED

5. Review past lessons on moisture problems, infiltration, exfiltration and how house framing is part of these issues and systems.
6. **Quiz:** Building Construction (*Energy Conservation Handbook*, pp. 167-168). Provide practice by giving students the diagram to study before asking them to fill in.

## RESOURCES/LINKS

Platform, Balloon and Advanced Framing Methods. Advanced presented in Year 2.

<https://evstudio.com/three-wood-framing-methods-balloon-platform-advanced/>



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