

Vocabulary - Framing

Floor Framing

Timing: 1 minute

Materials Needed:

Key Terms Handout

Group Activity Handout

DO:

- Introduce yourself to the group. Explain this lesson will teach learners how to correctly frame a floor. Pass out the key terms handout and the group activity handout.

SAY:

- For today's lesson we will discuss how to correctly frame a floor. The first handout list key terms that we will discuss in more detail as we move through our lesson. The second handout is for a group activity we will complete later in the lesson. As we discuss each component in the framing assembly, write your notes describing the component. This will help you during your group activity. Let's get started.

[ADVANCE SLIDE]

Topic Overview



Write down mistakes listed in the video.

- Today we will discuss the components of framing a floor.
- It's important to know what materials are needed and the correct steps when assembling a floor frame.
- Terms to know: *see handout
balloon framing, platform framing, post-and-beam framing, girder, header, joist, sill, sill plate, bridging, sub-floor

Timing: 3 minutes

Materials Needed:

Handout with Key Terms

DO:

- Explain the lesson will discuss components of framing a floor. Remind learners to reference the key terms handout that was provided at the beginning of the lesson.

SAY:

- Today we will discuss components of framing a floor. A few key terms to know are balloon framing, platform framing, post-and-beam framing, girder, header, joist, sill, sill plate, bridging, and sub-floor. The definitions for these terms are listed on the handout you were given at the beginning of class.
- It's important to know what materials to use and the proper steps when installing flooring. Take a look at this video. As you watch, write down the mistakes listed. We will discuss with the class.

DO:

- Remind students to write down mistakes. Play video.

SAY:

- What mistakes were listed in the video?

DO:

- Facilitate discussion for one minute. Call on learners who volunteer to share answers.

Answers: attached deck to bay window, wrong screws used, no ledger strap, wrong size posts, posted installed incorrectly

SAY:

- Good job. Thanks for sharing. Let's look at our lesson objectives.

[ADVANCE SLIDE]

Outcomes



By the end of this lesson you will be able to:

- Explain the difference between framing methods: platform, balloon, post-and-beam framing.
- Describe different types of girders and beams and explain when each is used.
- Describe different types of joists and explain methods of installation.
- Describe different types of bridging installation.
- Describe materials used for subflooring.

Timing: < 1 minute

DO:

- Review the content on the slide.

SAY:

- By the end of this lesson you will be able to explain the difference between framing methods: platform, balloon, post-and-beam framing.

Describe different types of girders and beams and explain when each is used.

Describe different types of joists and explain methods of installation.

Describe different types of bridging installation.

Describe materials used for subflooring.

[ADVANCE SLIDE]

Match the picture with the correct name

Word Bank

platform girder sill joist bridging subfloor



Timing: 1 minute

DO:

- Explain learners will look at the pictures and match with the correct choices from the word bank.

SAY:

- Let's check your understanding of the parts or components of framing a floor. On your paper, list the letters a, b, c, d, e, and f. Then look at the pictures and write the correct word from the word bank. You have 30 seconds to write your answers. We will discuss answers with the class. Get started.

DO:

- Monitor learners to ensure they are writing down answers. Set a timer for 30 seconds.

SAY:

- (after 30 seconds have lapsed). Let's look at the correct answers.

DO:

- Provide the correct answers to learners. Say the letter and then the correct answer.

Answer Key:

- A. sill
- B. joist
- C. girder
- D. subfloor
- E. bridging
- F. platform

SAY:

- This was a quick assessment to see what you know about framing. No worries if you did not get the answers correct. We will learn about each of these in our lesson today.

[ADVANCE SLIDE]

Framing Assembly Component #1

Framing

Methods

- Platform Framing- most common
- Balloon Framing
- Post-and-beam Framing



Timing: 1 minute

DO:

- Explain the first component is framing and there are three different methods.

SAY:

- Let's discuss the first component in framing assembly. Make sure you are understanding each component because you will take a quiz at the end of the lesson.
- Remember to write your notes on the group activity handout in the second column under the describe component label.
- The first component is framing and there are three different methods. Let's take a look at each method.

[ADVANCE SLIDE]

Framing Methods

Balloon Framing

Type of building construction with upright studs that extend from the foundation sill to the rafter plate. A ribbon supports the second floor joists.

Not used in new construction.

Might encounter when remodeling.

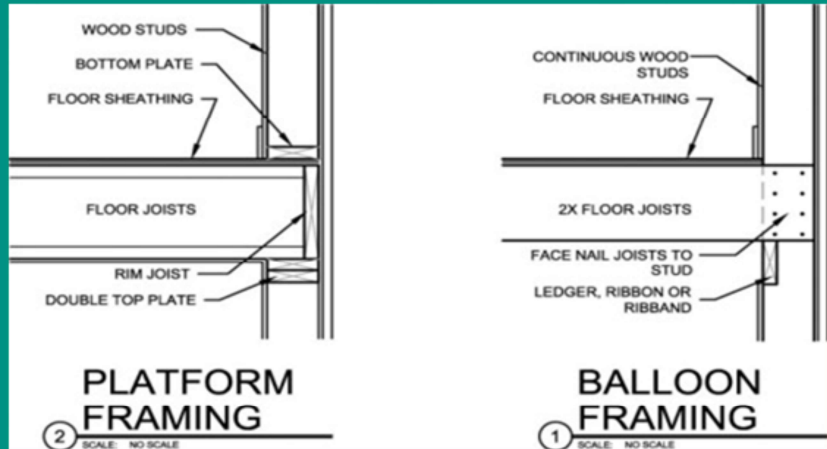
Platform Framing

A system of framing a building where the floor joists of each story rests on the top plates of the story below, and the bearing walls and partitions rest on the subfloor of each story.

First floor platform rests on a sill.

Sometimes platform rests on underpinning.

contains joists, studs, plates, and rafters
nominal 2" thickness material is used
engineered lumber often replaces sawn materials



Timing: 1 minute

DO:

- Explain the difference between platform and balloon framing. Remind learners to take notes on their group activity handout. Remind learners definitions are on the key terms handout they received at the beginning of class.

SAY:

- Make sure to take notes on your group activity handout. The definitions for each method are on the key terms handout. After we discuss the three methods, you will compare and contrast the methods with a partner.
- There are three different framing methods. One is the balloon framing method. This type of building construction includes upright studs that extend from the foundation sill to the rafter plate. A ribbon supports the second floor joists. This method is not used in new construction.
- The second method is the platform method is a system of framing a building where the floor joists of each story rests on the top plates of the story below, and the bearing walls and partitions rest on the subfloor of each story.
- Both these methods contain joists, studs, plates, and rafters and nominal 2" thickness material.

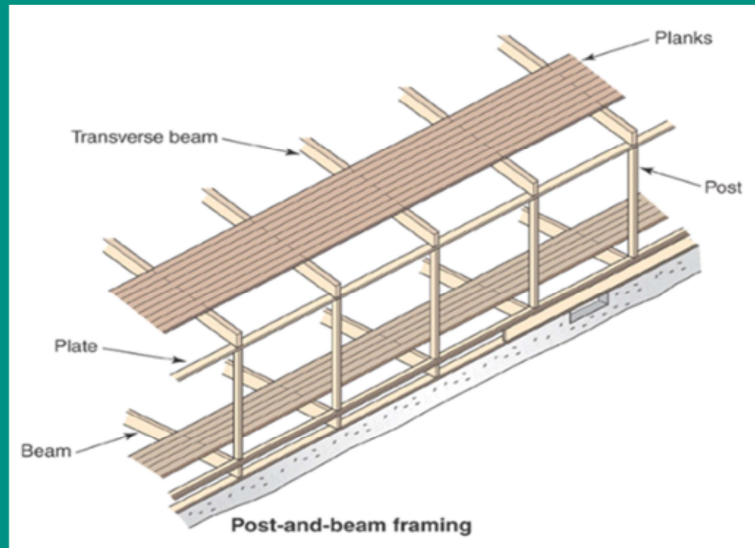
[ADVANCE SLIDE]

Framing Methods

Post and Beam Framing

A framing method in which loads are carried by a frame of posts connected with beams, eliminating the need for load bearing walls.

Heavy structural members are at least 4" thick.



Timing: 1 minute

Materials Needed:

DO:

- Explain the post and beam framing method

SAY:

- The last framing method is the post and beam. With this framing method loads are carried by a frame of posts connected with beams, eliminating the need for load bearing walls. Heavy structural members are at least 4" thick. Let's take 2 minutes to work with a partner to share how each method is alike and different. You will share with the person to your left or right. Be prepared to share with the class.

[ADVANCE SLIDE]



Think-Partner-Share

Time: 2 minutes

Directions: Work with your partner to compare the different framing methods. Draw a line down the middle of your paper. Label one column alike, the other column different. List ways the methods are alike and different in the correct column.

Alike	Different

Timing: 3 minutes

Materials Needed:

Notebook paper, pencil/pen

DO:

- Explain the think pair share activity. Give learners 2 minutes to complete this activity.
- Set timer for 2 minutes. After 2 minutes have lapsed, facilitate discussion to share correct answers with class.

SAY:

- For this activity you will work with your partner to your left or right to compare the different framing methods. Draw a line down the middle of your paper. Label one column alike, the other column different. You will have one minute to list ways the methods are alike and different in the correct column. Then one minute to share with your partner. Be prepared to discuss with the class. Get started.

DO:

- Set a timer for one minute. Walk around the room to ensure students are working independently to write responses on paper.
- After one minute has lapsed, remind students to work with partners. Set a

- timer for one minute.
- After one minute has lapsed, facilitate class discussion.

SAY:

- (after 1 minute has lapsed). Share your response with the person to your left or right.
- (after 1 minute has lapsed) Let's check our work. Who would like to share your response for how the methods are alike?

DO:

- Use answer key to facilitate discussion with class about how methods are alike.

Possible answers:

All methods are ways to frame a floor.

Use similar materials (especially the platform and balloon framing).

Builders must follow certain steps and take measurements.

SAY:

- Great job finding ways the methods are alike. Who would like to share how the methods are different?

DO:

- Use answer key to facilitate discussion with class about how methods are different.

Possible answers:

Balloon framing is not used in new construction and uses ribbons to support second floor joists.

Placement of studs, rafters, and joists is different for each method.

Post and beam has no load bearing walls and uses heavy structural members at least 4" thick.

SAY:

- Great job finding ways the methods are different. This helps you really think about the components of framing. Let's look at the second component.

[ADVANCE SLIDE]

Framing Assembly Component #2

Girders

- beam used to support other beams or the ends of joists
- solid timbers
- built-up lumber
- engineered lumber
- steel beams



Timing: 1 minute

DO:

- Explain there are different types of girders.

SAY:

- Girders are beams used to support other beams or ends of joists. Laminated-veneer lumber (LVL) or laminated-strand lumber (LSL) is frequently used for girders because of its ease in installation and strength.
- In some locations, a steel beam is used. The W-beam (wide flange) is generally used in residential construction.
- For girder and beam support, steel posts are usually used.
- Adequate footings must be provided for girder posts and columns. For moisture protection, footings for columns must extend above the floor level and can be secured with a post anchor.
- Let's watch a short video that explains girders.

[ADVANCE SLIDE]



Girders and Beams



Timing: 2 minutes

DO:

- Play the video. Start video at 2:44 minutes and end at 3:55 minutes when it begins to discuss subfloors.

SAY:

- Now that you have an understanding of girders and beams, let's look at the third component.

[ADVANCE SLIDE]

Framing Assembly Component #3

Sill

- wood member that is attached by bolts or other metal fasteners embedded in the foundation and supports the frame
- also called sill plate or mudsill
- sill sealer used to seal crack between bottom of the sill and top of foundation wall
- Attached to foundation wall with anchor bolts or straps



Timing: 1 minute

DO:

- Explain what the sill is.

SAY:

- The sill is a wood member that is attached by bolts or other metal fasteners embedded in the foundation and supports the frame.
- Building codes specify that a sill must have a minimum level of protection against termite and decay damage.
- Location of the sill on the foundation depends on the type of exterior covering the building will have.
- Sills are usually 2×6 lumber. However, width varies depending on type of construction.
- They are attached to the foundation wall with anchor bolts or straps.
- Let's watch a short video to learn more.

[ADVANCE SLIDE]



Sills



Timing: 2 minutes

DO:

- Play the video. Start video at 55 seconds. Stop video at 1:39 seconds.

SAY:

- Now that you have an understanding of sills, let's look at the fourth component.

[ADVANCE SLIDE]

Additional Resources:

Website: Installing a mudsill (2 minutes)

<https://www.youtube.com/watch?v=bQk8r0dCQRQ>

Framing Assembly Component #4

Floor Joist

- framing members that carry the weight of the floor between the sills and girder.

Residential Types:

- I-joists
- nominal 2" lumber placed on edge
- open-web truss joists

Commercial or Heavier Types:

- steel bar joist
- reinforced concrete joists



Timing: 1 minute

DO:

- Explain what a floor joist is.

SAY:

- Joists are framing members that carry the weight of the floor between the sills and girder.
- Joists must not only be strong enough to carry the load that rests on them, they must be stiff enough to prevent bending or vibration.
- Building codes typically specify allowable span distances for floor joists based on the size of the joist and the species and grade of wood.
- Joists can be directly laid out on the sill to position them.
- Joists are doubled where extra loads must be supported and around openings in the floor frame for stairways, chimneys, and fireplaces.
- You must familiar with the plans at each floor level so adequate support can be provided.
- Use great care in working with I-joists. They are unstable until properly braced.
- Open-web trusses for floor joists are light, strong, and provide space for electrical, piping, and HVAC installations.
- Let's watch a short video to learn more about joists.

[ADVANCE SLIDE]



Floor Joists



Timing: 3 minutes

DO:

- Play the video. Start video at 1:39 seconds. Stop video at 2:45 seconds.

SAY:

- Now that you have an understanding of floor joists, let's look at the fifth component.

[ADVANCE SLIDE]

Framing Assembly Component #5

Bridging

- wood or metal pieces fitted in pairs from bottom of one floor joist to top of adjacent joist, used to distribute the floor load.

Types:

- **Cross-bridging**- set between joists to form an X.
- **Solid bridging**- solid pieces of framing lumber installed between the joists.
- **Steel bridging**- can be installed quickly.



Timing: 1 minute

DO:

- Explain what bridging is.

SAY:

- Let's discuss the fifth component. Bridging is wood or metal pieces fitted in pairs from the bottom of one floor joist to the top of adjacent joist and used to distribute the floor load.
- Bridging may be eliminated if joists are properly secured at the ends and subflooring is adequate and carefully nailed.
- Some building codes require bridging.
- Bridging should be installed at intervals of no more than 8'.
- Cross bridging, is composed of pieces of 1×3 or 2×2 lumber diagonally set between the joists to form an X. It keeps joists in a vertical position and transfers the load from one joist to the next.
- Solid bridging consists of solid pieces of framing lumber installed between the joists and is easier to cut and install when there are odd-sized spaces in cross bridging.
- Steel bridging can be installed quickly.
- After the bridging is installed, the floor frame should be carefully checked to see that nailing patterns have been completed in all members.
- Now the frame is ready for the subfloor.

[ADVANCE SLIDE]

Framing Assembly Component #6

Subflooring

- a covering of panels nailed to the joists over which a finish floor is laid.

Constructed with:

- OSB- moisture resistant, commonly used
- Plywood

Purpose:

- adds rigidity to the structure
- provides base for finishing floor
- creates work surface to construct additional framing



Timing: 1 minute

DO:

- Explain what a subfloor is.

SAY:

- Subflooring is the final step in completing the floor frame,
- Subfloors are made of either OSB or plywood.
- Subfloor serves three purposes:
 - Adds rigidity to the structure
 - Provides a base for finish flooring material
 - Furnishes a work surface where a carpenter can lay out and construct additional framing
- OSB is more resistant to moisture than plywood. During installation, joints are staggered for added strength.
- Let's watch a short video to learn more about subflooring.

[ADVANCE SLIDE]



Subflooring



Timing: 1 minute

DO:

- Play the video. Start video at 4:02 seconds. Stop video at 4:21 seconds.

SAY:

- Now that you have an understanding of all the components of flooring assembly, let's take a short quiz to test your knowledge.

[ADVANCE SLIDE]



Test Your Knowledge

Time: 2 minutes

Complete this short quiz to show what you know.
Number your paper 1 - 5. Write the letter of the correct choice beside each number.

Directions: Number your paper 1 to 5. Write the letter of the correct answer for each question.

1. The type of framing used in most residential construction is ____ framing.
A. platform B. balloon C. post-and-beam D. plank-and-beam
1. ____ may be solid timbers, built-up lumber, engineered lumber, or steel beams.
A. ribbons B. joists C. sills D. girders
1. Cross-bridging keeps joists in vertical position and transfers load from one joist to the next.
A. True B. False
1. OSB is preferred for subflooring because it does not split into layers when exposed to ____.
A. heat B. termites C. heavy loads D. moisture
1. _____ is not typically used as floor joists in residential construction.
A. I-joists. B. Nominal 2" lumber C. Steel bar joists. D. Open-web truss joists.

Timing: 3 minutes

Materials Needed:

Notebook paper, pencil or pen

Answer Key

1. A.
2. D.
3. A.
4. D.
5. C.

DO:

- Explain that learners will work independently to answer five multiple choice questions. When they are finished, they will raise their hand for quiz to be collected.

SAY:

- It is time to test your knowledge with a short quiz. You have 2 minutes to answer five multiple choice question. Take out a piece of paper and write your name at the top. Number your paper 1 to 5.
- Place all objects under your desk. When ready, you can begin the quiz. Write the letter of the correct choice beside each number.
- When you are finished, raise your hand and I will collect your quiz for it to be

graded. Good luck and do your best.

DO:

- Set a timer for two minutes. Walk around the room to monitor learners and collect quizzes. If learners have questions, provide clarification but avoid providing any answers to the questions so their knowledge can be accurately assessed. When learner raises hand, collect the quiz so it can be graded.

SAY:

- (2 minutes have lapsed) Time is now up. If you have not already turned in your quiz, I will collect your quiz now.

[ADVANCE SLIDE]

How do I choose the correct components when assembling a floor frame?

Directions:

10 minutes

You will be assigned a component of the floor framing assembly and work in groups to:

- Describe the component (use your notes)
- Explain how it relates to other framing assembly components
- Share how you will choose an installation using scenario provided

10 minutes

Each group will have two minutes to share with the class.

While other groups present, you will take notes using the handout.



Timing: 1 minute

Materials Needed:

Group activity handout

Key terms handout

DO:

- Explain the group activity

SAY:

- Think about what you have learned about the components of assembling a floor frame. For this group activity you will be assigned to work to groups. Each will have an assigned component. You will use your notes you wrote earlier during our discussion and viewing of the videos to describe the component and explain how it relates to other framing assembly components.
- Your group will decide how you will install the component using the scenario provided. You have 10 minutes to do this. See the examples listed on your handout to guide you.
- Then for the next 10 minutes each group will share for two minutes. While other groups are presenting, you will take notes on the handout so that you have a completed list. Let's get started.

DO:

- Remind learners to use the handout that was distributed at the beginning of the lesson when working in groups.

[ADVANCE SLIDE]

Time: 20 minutes

Group Presentation



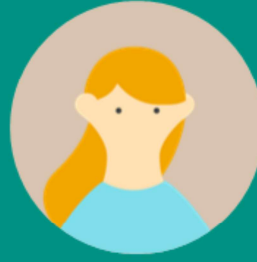
Framing
Group 1

Describe 3 methods, how frame relates to other components in the assembly process, and which method you will use.



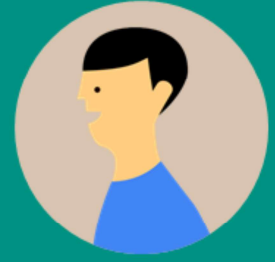
Girders
Group 2

Explain types of girders, how girders relate to other components in the assembly process, and which type you will use.



Floor Joists
Group 3

Explain types of joists, how joists relate to other components in the assembly process, and which type you will use.



Subfloor
Group 4

Explain types of subfloor, how subfloors relate to other components in the assembly process, and which type you will use.

Timing: 20 minutes

Materials Needed:

Group activity handout
Key terms handout

DO:

- Assign learners to a group. You can point to each student and count 1, 2, 3, 4, and keep repeating 1, 2, 3, 4 until all learners are assigned a number. Or you can assign groups by tables or rows. Try to make sure there is an even distribution of learners in each group. Once all learners are assigned a group, have them group together. Then facilitate groups working together to plan a presentation.
- Group 1- Framing; Group 2- Girders; Group 3- Floor Joist; Group 4- Subfloor

SAY:

- Find your group members. Then look at the handout for your assigned component. Work with your group to plan how you will explain its use in the floor frame process. You have 10 minutes. Get started.

DO:

- Set a timer for five minutes. Walk around the room to facilitate group collaboration. Use the answer key to provide clarification for each group if they

have questions.

- Once five minutes have lapsed, remind students they have five more minutes. Set a timer for five minutes. When five minutes have lapsed, tell learners time is up.

SAY:

- (after 5 minutes have lapsed). You have five more minutes to finalize what your group will present to the class. Make sure one person is selected from your group to share with the class.
- (after 5 minutes have lapsed) Time is up. Go back to your seat.

DO:

- Call each group one by one to share with the class. Set a timer for two minutes before each group member begins.

SAY:

- Let's share with the class. Framing group you are up first. You have two minutes to share with the class. Remember while other groups present you are taking notes on your handout.

DO:

- Once two minutes have lapsed, call the next group. Repeat this until all four groups have shared.

SAY:

- (after 2 minutes have lapsed) Great job framing group. Girders you are next.
- (after 2 minutes have lapsed) Girder group well done. Floor joist group it's time to hear from you.
- (after 2 minutes have lapsed) Floor joist group you did awesome. Subfloor group it's your turn.
- (after 2 minutes have lapsed) Thank you all for your hard work and working together. It's time to test your knowledge of flooring assembly components with a short quiz.

[ADVANCE SLIDE]



Test Your Knowledge

Time: 2 minutes

Complete this short quiz to show what you know.

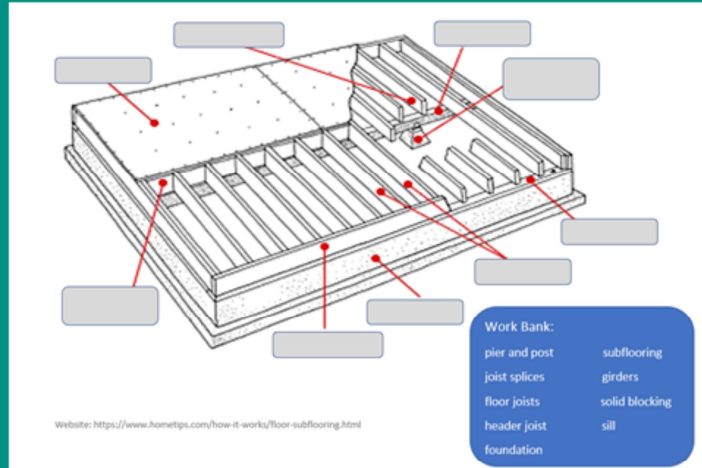
Directions:

Use the key terms handout for help.

Write your name at the top of the quiz.

Write the component name in the correct box. Use the word bank.

When you are finished, raise your hand so your quiz can be collected.



Timing: 3 minutes

Materials Needed:

Worksheet
Key terms handout
Answer Key

DO:

- Explain that learners will work independently to answer questions. When they are finished, they will raise their hand for quiz to be collected.

SAY:

- Place all objects under your desk and get out a pencil or pen. You can use the key terms handout to help you. You have 2 minutes to answer the questions. Once I give you the handout, you can begin the quiz.
- When you are finished, raise your hand and I will collect your quiz for it to be graded. Good luck and do your best.

DO:

- Distribute quiz.
- Set a timer for two minutes. Walk around the room to monitor learners and collect quizzes. If learners have questions, provide clarification but avoid providing any answers to the questions so their knowledge can be accurately

assessed. When learner raises hand, collect the quiz so it can be graded.

SAY:

- (2 minutes have lapsed) Time is now up. If you have not already turned in your quiz, I will collect your quiz now.

[ADVANCE SLIDE]

What would you do?

When building your own home would you use manufactured wood joists or traditional framing lumber?

Explain why.



Timing: 2 minute

DO:

- Read the content on the slide. Facilitate class discussion.

SAY:

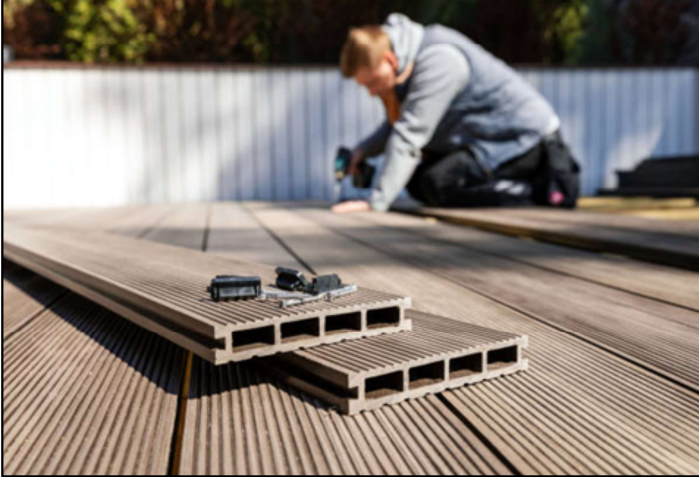
- We are almost at the end of our lesson. For the next minute, think about this question to help you apply what you are learning to your daily life. You can share your thoughts with the class. When building your own home would you use manufactured wood joists or traditional framing lumber? Explain why.

DO:

- Set a timer for one minute. When one minute has lapsed, set the timer for one minute and call on volunteers to share their responses. Answers will vary. There is no wrong answer as long as learners can explain their response.

[ADVANCE SLIDE]

Summary



Key Takeaways:

- Type of framing used is determined by the building's design such as one-story, two-story, or split level.
- Location determines how a frame is built and what materials are used. Consider: will there be high winds, earthquakes, or heavy snow?
- All structures should be built to reduce lumber shrinkage, warping and resist fire.

Timing: <1 minute

DO:

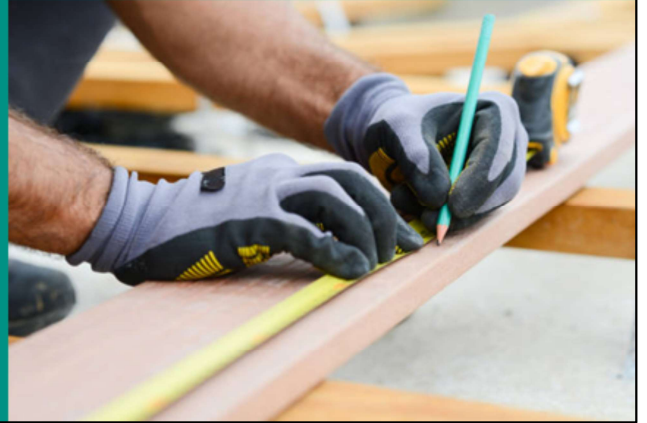
- Explain the key takeaways from the lesson.

SAY:

- Today we discussed the floor framing assembly components. It's important to remember:
- The type of framing used is determined by the building's design such as is it one-story, two-story, or split level.
- Location determines how a frame is built and what materials are used. Consider will there be high winds, earthquakes, or heavy snow? This will help you plan your frame build..
- All structures should be built to reduce lumber shrinkage, warping and resist fire. Keep this in mind when building.

[ADVANCE SLIDE]

Taking time to plan, using the correct materials and completing all the required framing assembly steps ensures the floor frames you build are safe and strong.



Timing: <1 minute

Materials Needed:

Handout with checklist (job aid)

DO:

- Explain the lesson main idea.

SAY:

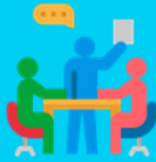
- Today we learned about framing assembly components so that the floor frames you build will be structurally sound and safe to use. I am giving you a checklist that you can refer to later to remind you of these components.

DO:

- Distribute the handout to learners.

[ADVANCE SLIDE]

Lesson Summary



How will you use what you learned when assembling a floor frame?

- Framing methods include platform, balloon, post-and-beam. Platform is most used.
- Girders support other beams or ends of joists. Steel posts are often used.
- Sills support the frame and are usually 2×6 lumber. Location on the foundation depends on type of exterior covering.
- Joists must be strong enough to carry load that rests on them and stiff enough to prevent bending or vibration.
- Bridging may be eliminated if joists are properly secured at the ends and subflooring is adequate and carefully nailed.
- Subfloor serves three purposes. OSB material is preferred over plywood because it resists moisture better.

Timing: 2 minutes

DO:

- Review the content on the slide.
- Ask if learners have any questions.
- Ask learners to share how they will apply what they have learned to their daily work practices.

SAY:

- We learned about the components for a floor frame assembly. We discussed the topics listed here in depth in our lesson today.
- Take a minute to reflect and answer this question: How will you use what you learned in this lesson when assembling a floor frame? Be prepared to share with the class if asked to do so.

DO:

- Set a timer for 1 minute. Once a minute has lapsed, ask learners to share their response.

SAY:

- (after a minute has lapsed) Who would like to share with the class how you will use what you learned?

DO:

- For one minute facilitate class discussion by calling on students that volunteer to share.

[ADVANCE SLIDE]

Next...



- Use plans to determine materials required to build the deck structure.
- Measure and create a materials shopping list.

Timing: <1 minute

DO:

- Thank learners for participating.

SAY:

- Thank you all for your hard work and working together today to learn about floor framing assembly. In the next lesson we will discuss how to use plans to determine materials required to build a deck structure and to how measure and create a shopping list.

[END OF PRESENTATION]