



BUILDING INDUSTRY TECHNOLOGY ACADEMY

A program promoted by the
California Homebuilding Foundation



UNIT FIVE: POWER TOOLS-TABLE SAW

YEAR ONE

UNIT FIVE: POWER TOOLS-TABLE SAW

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Lesson #1: Table Saw and Safety Packet

Objectives

Students will be able to...

- Identify each of the major components of the Table Saw, and their purpose.
- Describe the uses of the Table Saw.
- Demonstrate the safe operation of the Table Saw.

Common Core Standards

RSIT 11-12.2
RLST 11-12.2
Problem Solving – 5.1 & 5.4
Health and Safety – 6.1, 6.2, 6.3 & 6.10
Cabinetmaking and Wood Products Pathway A4.1, 4.3, A4.4 & A6.1
Responsibility and Flexibility – 7.4
Technical Knowledge and Skills 10.1, 10.2
Demonstration and Application 11.1
Residential and Commercial Construction Pathway D2.1

Materials

Table Saw
Table Saw Identification and Safety Worksheet

Lesson Sequence

- Introduce a table saw to the students. (10 minutes)
- Hand out the *Table Saw Identification and Safety Worksheet* Complete the table saw component I.D. portion with students gathered around the saw. As you name the parts of the saw, not only discuss what their function is, but also demonstrate how they function. If possible, include anecdotes about personal experiences or other's experiences with the saw. (15-20 minutes)
- Return to the classroom and continue reviewing the questions as a whole class. Answer any questions as needed. (15-20 minutes)

Assessment

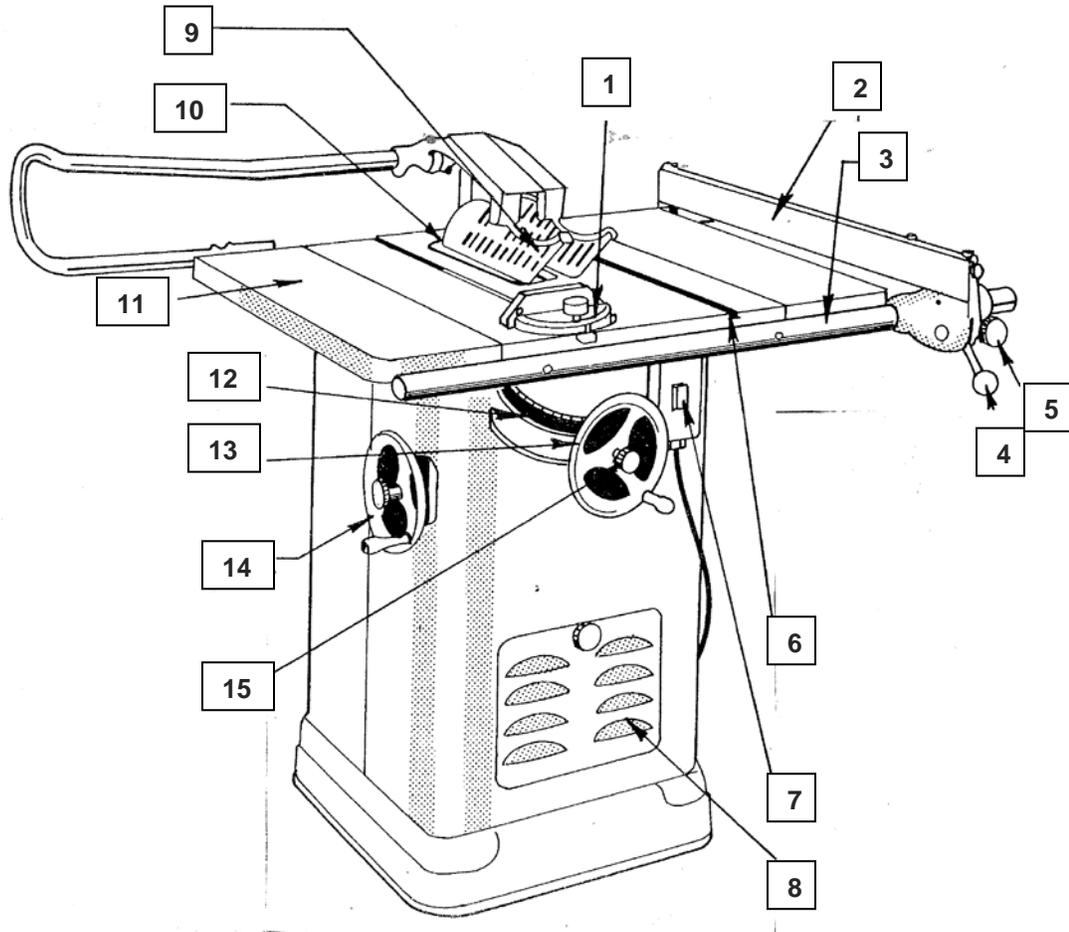
Check for understanding through questioning. Call on random students to answer questions during whole group lesson.

Accommodations/Modifications

One on One Support
Check for Understanding
Partner Students Up If Needed
Visuals

Table Saw Identification and Safety Worksheet

Part 1: Identify the numbered parts on the saw illustrated below.



- | | |
|----------|-----------|
| 1. _____ | 9. _____ |
| 2. _____ | 10. _____ |
| 3. _____ | 11. _____ |
| 4. _____ | 12. _____ |
| 5. _____ | 13. _____ |
| 6. _____ | 14. _____ |
| 7. _____ | 15. _____ |
| 8. _____ | |

Part 2: Safe Operational Procedures

1. Crosscutting:

- a. Use a crosscut or combination blade. Always use sharp blades. Make sure blade is always cutting down toward from or operator's side of table.
- b. Adjust the depth of cut so that the teeth clear the thickness of material by the depth of the teeth.
- c. Be sure saw guard and splitter are in place. Check anti-kickback device to make sure it is working.
- d. Always use the miter gage when crosscutting. A wood facing is recommended for the miter gage.
- e. Never use the ripping fence as a guide when crosscutting short pieces. Use a stop on the miter gage or stop blocks clamped to the ripping fence or the tabletop.
- f. Place board against miter gage and saw the board, saving the cutting line.
- g. Do not force work through the saw.

2. Ripping:

- a. Use a ripping or combination blade.
- b. Use ripping fence as a guide. Never saw freehand.
- c. Double check cutting width by measuring from fence to outer teeth. Also check front and back of blade so fence will not bind material to blade.
- d. When ripping narrow pieces, use a push stick.
- e. Be sure guards are in place for all sawing operations.
- f. Use a helper or a roller stand to support long pieces of material while sawing.
- g. Adjust blade to proper height, $\frac{1}{4}$ " to $\frac{1}{2}$ " above the material being sawed.
- h. Do not force material into blade. If blade overheats, stop saw immediately and check for dullness or binding of blade.

3. Plowing:

- a. Use a dado blade if available. A combination blade may be used, and the fence varied with each piece.
- b. Raise the saw to the desired depth of cut. Make pass on waste piece before cutting into actual work piece.
- c. This operation may require the guard to be removed if the material is to be dadoed on edge.

4. Bevel cuts (ripping):

- a. Use a combination or ripping blade.
- b. Adjust saw by tilting the arbor to the angle desired.
- c. Adjust blade to proper height, $\frac{1}{4}$ " to $\frac{1}{2}$ " above work.
- d. Adjust ripping fence to desired width of cut.

5. Bevel cuts (cross cutting):

- a. a combination or crosscutting blade.
- b. Use miter gage (not the ripping fence) and follow the steps as listed in Item

Part 3: General Safety Practices

1. Wear eye protection, hearing protection, and proper clothing when operating this machine.
2. Obtain permission from instructor to operate table saw.
3. Use only sharp blades of the proper type for the job.
4. Be sure blade is correctly installed in the saw. Make certain power is off and properly disconnected before removing blade insert. To loosen arbor nut, turn wrench toward normal direction of travel holding blade with waste piece of wood. Do not over-tighten arbor nut when replacing blade.
5. Do not stand in line with the blade while sawing or allow fingers or hands to be in line of cut.
6. Be sure that all adjustments are tight, and the table part of the saw is free of tools, chips, small pieces of wood, or other materials.
7. Do not talk to anyone while using the saw. The operator should be the only person inside the safety zone.
8. Be sure the floor is clean and free from scraps and rubbish. Do not work on wet or slippery floors. Non-skid materials are recommended.
9. Saw only material that has a straight edge. To avoid chipping of material such as plywood or Masonite, saw with face grain or good surface down.
10. Study the adjustments and make sure they are understood before starting to work.
11. Use the saw guard where possible.
12. Use a "push" stick for ripping narrow pieces.
13. Hold material against the ripping fence when ripping, and the miter gage when crosscutting. Never saw freehand.
14. Never use the ripping fence for a gage when crosscutting short pieces.
15. Do not place the hands over or in front of the blade. Never reach over the blade.
16. Turn off the saw before removing short pieces from near the blade.
17. Be sure the power is "locked" off before adjusting or working on the saw.

Part 4: Completion Questions

1. A _____ or _____ is used to support long pieces of material while sawing.
2. The _____ is used for a guide when ripping.
3. The _____ is used as a guide when crosscutting.
4. A _____ or _____ blade may be used for crosscutting.
5. A _____ is used when ripping narrow pieces.
6. When making a bevel cut, the saw is adjusted by tilting the _____.
7. Saw only material that has an _____ edge.
8. The saw should be _____ before removing short pieces from the blade.
9. A _____ or _____ blade can be used when plowing.
10. The blade should extend above the material the depth of one _____.

Table Saw Identification and Safety Worksheet – *Answer Key*

Part 1:

1. Miter gage
2. Fence
3. Guide bar
4. Fence clamp
5. Fence micro set knob
6. T slot for miter gage
7. Switch
8. Clean out
9. Saw guard
10. Blade inserts
11. Table
12. Title scale
13. Raising wheel
14. Tilt handle
15. Lock knob

Part 4:

1. Helper or roller stand
2. Ripping fence
3. Miter gage
4. Crosscut or combination
5. Push stick
6. Arbor
7. Straight
8. Turned off
9. Dado blade or combination
10. Fourth or one half

Lesson #2: Table Saw Safety Exam

Objectives

Students will be able to...

- Identify each of the major components of the Table Saw, and their purpose.
- Describe the uses of the Table Saw.
- Demonstrate the safe operation of the Table Saw.

Common Core Standards

RSIT 11-12.2
RLST 11-12.2
Problem Solving – 5.1 & 5.4
Health and Safety – 6.1, 6.2, 6.3 & 6.10
Cabinetmaking and Wood Products Pathway A4.1, 4.3, A4.4 & A6.1
Responsibility and Flexibility – 7.4
Technical Knowledge and Skills 10.1, 10.2
Demonstration and Application 11.1
Residential and Commercial Construction Pathway D2.1

Materials

Table Saw Safety Exam

Lesson Sequence

- Have students grab some safety glasses and enter the shop for a safety and operations demonstration on the table saw. (15 minutes)
- Return to classroom and hand out *Table Saw Safety Exam*. No one starts a project until all the required safety tests are passed. Collect the tests when the students are done and re-distribute them to their classmates for grading. Have the students write “corrected by” and print their name somewhere on the front side of the test and circle it. Read and discuss each question with the correct answer. Take this opportunity to again reinforce/solidify operational safety in the student’s minds. When finished, have

the students write the number correct out of 14 on the front of the sheet and turn them in.

- Return tests that have any incorrect answers to their original owners. Have these students 'correct' each wrong answer by writing out the question (with the correct answer) on the back of the test 2 times. Students will retake the test tomorrow.

Assessment

When students pass the table saw exam, they are able to then use the table saw in the shop.

Accommodations/Modifications

One on One Support
Check for Understanding
Extra Time
Test Read Aloud

Table Saw Safety Test

Directions: Fill in the blank spaces with the words from the word bank.

1. You should not work on a _____ floor.
2. The _____ should be in place when ripping material.
3. The saw blade must be placed on the arbor with the teeth pointing _____ the direction from which the wood is to be fed.
4. You should not remove any _____ without the Instructor's permission.
5. You should not extend the saw blade as far as possible through the stock, it should be _____ above the material being cut.
6. You should never saw _____ or _____ stock.
7. You should never do _____ sawing.
8. You should always use a _____ when ripping narrow stock.
9. You should not use this machine before the instructor has _____ its safe use.
10. It is unsafe to stand directly _____ with the saw blade.
11. You should not _____ to the operator while sawing.
12. When using the rip-fence, make sure that it is _____ in place before you begin the cut.
13. When ripping, the material being cut must be held _____ against the table surface as well as the fence. Otherwise, the operator may experience a kickback.
14. In order to protect your eyes, _____ should always be worn.

1/4"
Free hand
Crosscut
Splitter guard
In line
Twisted
Push stick
Messy
Combination
Locked
Demonstrated
Talk
Warped
Guards
Firmly
Miter
Safety glasses
Toward

Table Saw Safety Test - ANSWER KEY

1. You should not work on a **messy** floor.
2. The **splitter guard** should be in place when ripping material.
3. The saw blade must be placed on the arbor with the teeth pointing **toward** the direction from which the wood is to be fed.
4. You should not remove any **guards** without the Instructor's permission.
5. You should not extend the saw blade as far as possible through the stock, it should be **1/4"** above the material being cut.
6. You should never saw **twisted** or **warped** stock.
7. You should never do **free hand** sawing.
8. You should always use a **push stick** when ripping narrow stock.
9. You should not use this machine before the instructor has **demonstrated** its safe use.
10. It is unsafe to stand directly **in line** with the saw blade.
11. You should not **talk** to the operator while sawing.
12. When using the rip-fence, make sure that it is **locked** in place before you begin the cut.
13. When ripping, the material being cut must be held **firmly** against the table surface as well as the fence. Otherwise, the operator may experience a kickback.
14. In order to protect your eyes, **safety glasses** should always be worn.

1/4"
Free hand
Crosscut
Splitter guard
In line
Twisted
Push stick
Messy
Combination
Locked
Demonstrated
Talk
Warped
Guards
Firmly
Miter
Safety glasses
Toward

Lesson #3: Radial-Arm Saw I.D. and Safety Packet

Objectives

Students will be able to...

- Identify each of the major components of the Radial-Arm Saw and their purpose.
- Describe the use and operation of the Radial-Arm Saw.
- Demonstrate the safe operation of the Radial-Arm Saw.

Common Core Standards

RSIT 11-12.2
RLST 11-12.2
Problem Solving – 5.1 & 5.4
Health and Safety – 6.1, 6.2, 6.3 & 6.10
Cabinetmaking and Wood Products Pathway A4.1, 4.3, A4.4 & A6.1
Responsibility and Flexibility – 7.4
Technical Knowledge and Skills 10.1, 10.2
Demonstration and Application 11.1
Residential and Commercial Construction Pathway D2.1

Materials

Radial-Arm Saw I.D. and Safety packet
Radial-Arm Saw

Lesson Sequence

- Complete the *Radial Arm Saw Component I.D.* portion with students gathered around the saw. As you name the parts of the saw, not only discuss what their function is, but also demonstrate how they function. If possible, include anecdotes about personal experiences or other's experiences with the saw. (30 minutes)
- When done with the I.D. lecture/discussion, return to the classroom and continue with answering the safety questions as a class (15-20 minutes).

Assessment

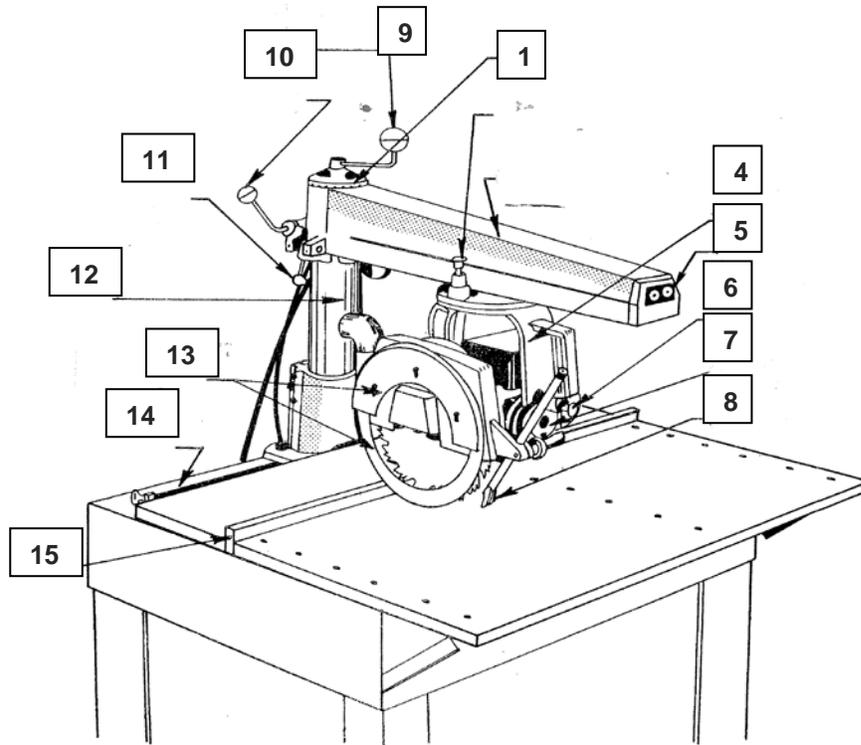
Check for student understanding during whole class instruction through questioning and randomly calling on students.

Accommodations/Modifications

One on One Support
Check for Understanding
Visuals
Partner Students Up as Needed

Radial-Arm Saw I.D. and Safety packet

Part 1: Identify the numbered parts on the saw illustrated below.



- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____
- 6. _____
- 7. _____
- 8. _____

- 9. _____
- 10. _____
- 11. _____
- 12. _____
- 13. _____
- 14. _____
- 15. _____

Part 2: Safe Operational Procedures

1. Changing the saw blade:

- a. Shut off main power switch or disconnect from wall plug.
- b. Select the proper type blade for job.
- c. Remove the saw guard, the arbor nut, and arbor collars. Remember the arbor has left-hand threads. Remove the blade.
- d. Before replacing new blade, check the inside collar. It should be replaced on the arbor with the recessed side out.
- e. Place the saw blade on the arbor so the teeth on the bottom of the blade or nearest the table point back or toward the elevating column. Generally, blades are marked "this side out."
- f. Place the outside collar on the arbor with the recessed face against the saw blade.
- g. Tighten the arbor nut using the same wrenches used in removing.
- h. Before replacing the guard, check the squareness of the saw blade and table by resting a framing square against the face of the blade and tabletop. If out of adjustment, consult the operator's manual for the saw.
- i. Assemble the guard kickback and elbow.
- j. Replace the guard and lock in place.
- k. While the saw is still disconnected from electricity, rotate the saw blade by hand to see that it runs clear and free.

2. Crosscutting:

- a. Select a crosscut or combination blade.
- b. Have all guards in proper place and make sure they are free to operate.
- c. Push the saw to the rear of the table. Tighten the rip lock to keep the saw from running forward when it is turned on.
- d. Adjust height of blade by turning the elevating handle until the teeth just touch the tabletop.
- e. Adjust saw at right angle to fence and perpendicular to the table.
- f. Place the material to be cut on table with the straightest edge tight against the fence and with the mark in line with the saw blade.
- g. Be sure the saw blade is not engaging the material. Start the saw and release the rip lock.
- h. Hold wood with left hand and saw with right hand, standing slightly to the left of the like of the saw blade.
- i. Pull saw toward operator, feeding slow enough that the saw does not grab.
- j. Return the saw to the rear of the table. Lock in place until ready to make another cut.

3. Ripping:

- a. Select ripping or combination blade.
- b. Turn saw parallel to fence by releasing the swivel lock and turning the saw yoke. Lock in position with rip lock at proper width of cut.
- c. Adjust safety guard to approximately 1/8" above the board and the anti-kickback device at 60° when touching material to be ripped.
- d. Adjust height of saw with elevating handle so that teeth just touch table.
- e. Feed material from opposite end of anti-kickback device or into the bottom of the saw blade, which is turning toward the operator.
- f. Use a push stick when near blade to keep hands away from blade.
- g. Get an assistant to help with long material or use a roller support.

4. Miter cuts:

- a. Select a crosscut or combination blade.
- b. Set the motor yoke and the lock in the same position as for crosscutting. Release the arm clamp and the miter latch.
- c. Swing the radial arm to the desired angle as indicated on the miter scale. Most saws have a notch or hole at 30o, 45o, 60o, etc. so that the miter latch can be re-engaged at these angles. If there is no such notch, the arm can be clamped at any angle.
- d. Re-engage the miter latch and tighten the arm clamp.
- e. Make the cut in the same manner as described for crosscutting.

5. Bevel cuts:

- a. Select a crosscut or combination blade.
- b. Lock the radial arm and the motor yoke in the same position as for crosscutting.
- c. Raise the saw until the motor can be tilted to the desired bevel. Release the bevel clamp and the locating pin.
- d. Tilt the saw end of the motor downward to the desired bevel as indicated on the bevel scale.
- e. Re-engage the locating pin and tighten the bevel clamp.
- f. Make the cut in the same manner as described for crosscutting.
- g. Bevel rips can be made in a similar manner except the saw yoke is turned and locked in place as in ripping. Follow same procedures as discussed in straight ripping.
- h. A bevel-miter (compound angle cut) is a combination bevel and miter cut.

Part 3: General Safety Practices

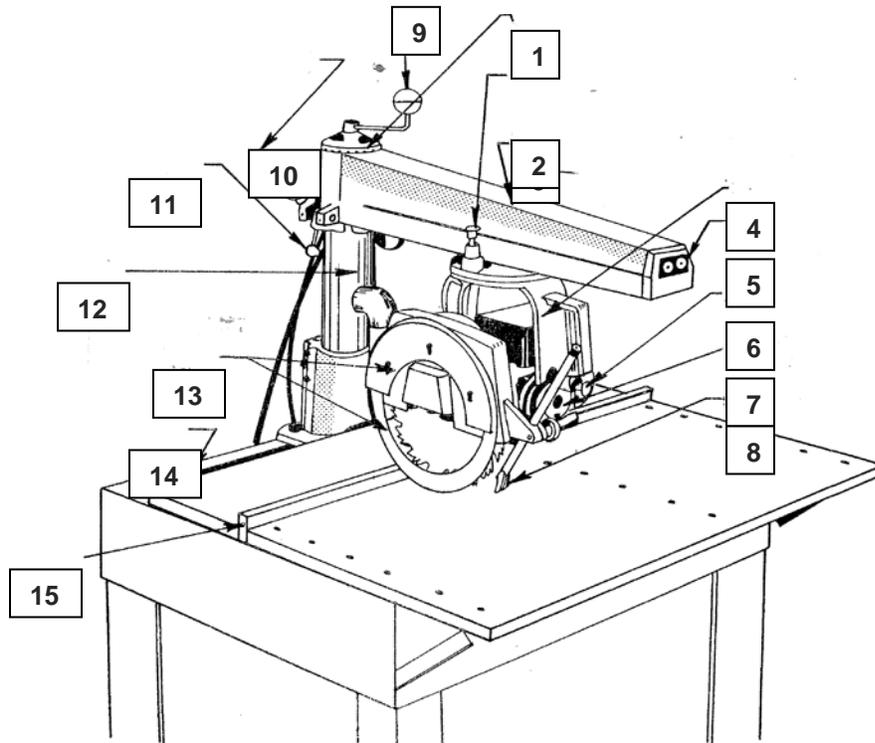
1. Wear eye protection, hearing protection, and proper clothing at all times when operating this machine.
2. Do not operate saw without permission from the instructor.
3. Be sure blade is sharp, sound, and of the proper type.
4. All adjustments should be tight and all guards in place.
5. Never leave tools, scraps, or other materials on saw table. Keep area around saw clear.
6. Do not leave machine while it is running.
7. Be sure machine is grounded properly.
8. Be sure material is free of knots, nails, or other foreign matter.
9. Do not adjust machine while it is running.
10. Tighten rip lock before starting the saw.
11. Pull saw slowly through material. Return saw to rear of table after sawing and before removing stock.
12. When ripping, make sure that the blade is rotating upward toward the operator. Feed the stock from the end opposite the anti-kickback device. Always use a push stick when ripping.
13. Do not stop blade by pushing stock against the blade.
14. Do not saw material freehand without a guide.

Part 4: Completion questions

1. _____ or _____ types of blades may be used for crosscutting.
2. A _____ blade or feeding the saw to _____ may result in the saw grabbing the material.
3. The depth of cut into the table is adjusted by turning the _____.
4. Material should be fed opposite from the _____ when ripping.
5. The saw blade should be placed on the arbor so the teeth on the _____
6. of the blade point back toward the elevating column.
7. Be sure all _____ are tight before the saw is turned on.
8. Return the saw to the _____ of the table after making a crosscut.
9. A _____ angle cut is a combination bevel and miter cut.
10. When the saw is perpendicular to the table, the bevel gauge should read _____ degrees.
11. To crosscut a board at other than a 90° angle across the board, the _____ must be released.

Radial Arm Saw Identification and Safety - Answer Key

Part 1: Identify the numbered parts on the saw illustrated below.



- | | |
|--------------------------|--|
| 1. <u>miter scale</u> | 9. <u>elevating handle</u> |
| 2. <u>swivel latch</u> | 10. <u>arm clamp handle</u> |
| 3. <u>cantilever arm</u> | 11. <u>miter latch</u> |
| 4. <u>yoke</u> | 12. <u>circular column</u> |
| 5. <u>on-off switch</u> | 13. <u>self-adjusting blade guards</u> |
| 6. <u>bevel latch</u> | 14. <u>metal base</u> |
| 7. <u>bevel scale</u> | 15. <u>fence</u> |
| 8. <u>kickback guard</u> | |

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Part 4: Completion questions

1. _____ **combination** _____ or _____ **crosscut** _____ types of blades may be used for crosscutting.
2. A _____ **dull** _____ blade or feeding the saw to _____ **fast** _____ may result in the saw grabbing the material.
3. The depth of cut into the table is adjusted by turning the _____ **elevating handle** _____.
4. Material should be fed opposite from the _____ **anti-kickback device** _____ when ripping.
5. The saw blade should be placed on the arbor so the teeth on the _____ **bottom** _____ of the blade point back toward the elevating column.
6. Be sure all _____ **adjustments** _____ are tight before the saw is turned on.
7. Return the saw to the _____ **rear** _____ of the table after making a cross cut.
8. A _____ **bevel-miter (or) compound miter** _____ angle cut is a combination bevel and miter cut.
9. When the saw is perpendicular to the table, the bevel gauge should read _____ **0** _____ degrees.
10. To crosscut a board at other than a 90o angle across the board, the _____ **miter latch** _____ must be released.

Lesson #4: Radial-Arm Saw Safety Exam

Objectives

Students will be able to...

- Identify each of the major components of the Radial-Arm Saw and their purpose.
- Describe the use and operation of the Radial-Arm Saw.
- Demonstrate the safe operation of the Radial-Arm Saw.

Common Core Standards

RSIT 11-12.2
RLST 11-12.2
Problem Solving – 5.1 & 5.4
Health and Safety – 6.1, 6.2, 6.3 & 6.10
Cabinetmaking and Wood Products Pathway A4.1, 4.3, A4.4 & A6.1
Responsibility and Flexibility – 7.4
Technical Knowledge and Skills 10.1, 10.2
Demonstration and Application 11.1
Residential and Commercial Construction Pathway D2.1

Materials

Radial-Arm Saw Safety Exam
Radial-Arm Saw

Lesson Sequence

- Have students grab some safety glasses and enter the shop for a safety and operations demonstration on the radial-arm saw.
- Return to classroom and hand out *Radial-Arm Saw Safety Exam*. No one starts a project until all the required safety tests are passed. Collect the tests when the students are done and re-distribute them to their classmates for grading. Have the students write "corrected by" and print their name somewhere on the front side of the test and circle it. Read and discuss each question with the correct answer. Take this opportunity to again reinforce/solidify operational safety in the student's minds. When finished, have the students write the number correct out of 15 on the front of the

sheet and turn them in.

- Return tests that have any incorrect answers to their original owners. Have these students 'correct' each wrong answer by writing out the question (with the correct answer) on the back of the test 2 times. Students will retake the test tomorrow.

Assessment

When students pass the table saw exam, they can then use the table saw in the shop.

Accommodations/Modifications

One on One Support
Check for Understanding
Extra Time
Test Read Aloud

Radial Arm Saw Safety Exam

Directions: Fill in the blank spaces with the words from the word bank.

1. Always wear _____ fitting clothes.
2. When switching a blade, tighten the arbor nut using the _____ wrenches used in removing the blade.
3. Be sure to always _____ all clamps, guards, and locking handles.
4. When ripping, feed material from _____ end of anti-kickback device.
5. Never leave saw _____ outward on the arm.
6. Never make _____ while saw is running.
7. Never leave the _____ zone while saw is running.
8. Be sure blade is not warped, _____ or cracked.
9. Do not attempt to _____ the machine by forcing a piece of wood against the blade.
10. The teeth of the blade should be facing _____ from the operator.
11. Do not crosscut in _____ direction.
12. Always use the _____ blade for the specific cross or rip cut.
13. Always keep your fingers _____ inches away from the blade.
14. It is _____ safe to talk to the operator while the saw is in use.
15. Please be sure to get _____ from your instructor before making any changes to the machine.

Permission
Four
Opposite
Snug
Reverse
Proper
Safety
Same
Extended
Eight
Dull
Tighten
Away
Not
Six
Adjustments
Stop

Radial Arm Saw Safety Exam – Answer Key

Directions: Fill in the blank spaces with the words from the word bank.

1. Always wear **snug** fitting clothes.
2. When changing a blade, tighten the arbor nut using the **same** wrenches used in removing the blade.
3. Be sure to always **tighten** all clamps, guards, and locking handles.
4. When ripping, feed material from the **opposite** end of anti-kickback device.
5. Never leave the saw **extended** outward on the arm.
6. Never make **adjustments** while saw is running.
7. Never leave the **safety** zone while saw is running.
8. Be sure the blade is not warped, **dull**, or cracked.
9. Do not attempt to **stop** the machine by forcing a piece of wood against the blade.
10. The teeth at the bottom of the blade should be facing **away** from the operator.
11. Do not crosscut in **reverse** direction.
12. Always use the **proper** blade for the specific cross or rip cut.
13. Always keep your fingers **six** inches away from the blade.
14. It is **not** safe to talk to the operator while the saw is in use.
15. Please be sure to get **permission** from your instructor before making any changes to the machine.