BUILDING INDUSTRY TECHNOLOGY ACADEMY

A program promoted by the California Homebuilding Foundation

UNIT SIX:

POWER TOOLS-BAND SAW

California Homebuilding Foundation®
Scholarship | Research | Education

1215 K Street, Ste. 1200 | Sacramento, CA 95814
916-340-3340 | mychf.org/bita

YEAR ONE
UNIT SIX: POWER TOOLS – BAND SAW

Table of Contents

Lesson #1: Band Saw History

Objectives

Students will be able to…

- Understand the history of the band saw.

Common Core Standards

Language Arts 11-12.4
Problem Solving 5.1 & 5.4
Health and Safety 6.2 & 6.10
Responsibility and Flexibility 7.4
Technical Knowledge Skills 10.0
Cabinetmaking and Wood Products A 4.1, A4.3, A4.4, & A 6.1
Residential and Commercial Pathway D2.1, D3.1, & D 5.2

Materials

Anticipation/Reaction Worksheet
History of the Band Saw Notes

Lesson Sequence

- Pass out the ***Anticipation/Reaction Worksheet***. Have students write yes or no if they believe the statement or not.
- As a class, read the ***History of the Band Saw Notes***. Highlight important information and check their response on the anticipation/reaction worksheet as the questions come up.

Assessment

Check for Understanding Through Questioning.
Exit Ticket-Have Students Write Down Three Things They Learned Today Before Leaving.

Accommodations/Modifications
Check for Understanding One on One Support High Light Important Information

Anticipation/Reaction Guide

Directions: Read each statement below and decide if you agree or disagree by writing yes or no. Respond before and after you read about the history of the band saw. Have you changed your beliefs? Confirmed or changed your opinions? Be ready to discuss your thoughts.

Title/Subject:		
Before I Read	Statement	After I Read
	The first band saws had a short life span because the blades could not withstand the force of the machine.	
	A French woman discovered a way to solder the blades together.	
	The blade for the saw is like a large band that keeps running in a loop	
	A circular saw is much easier to control though, than a band saw	

Band Saw History

An Englishman named William Newberry patented the first "band saw" in 1808. Unfortunately, it was almost four decades before this incredible machine would become a practical woodworking tool. The design and construction of the early band saws was sound, but the steel that was available at that time to make blades from was just not able to withstand the forces that the machine exerted on it. This was compounded by the fact that the welding processes of the day were not highly effective at holding the ends of a band saw blade together. These two problems combined to result in a very short blade life. The short blade life rendered the band saw highly impractical. This impracticality meant that the saw would go widely unused for nearly 40 years.

Then, two break throughs occurred that would finally allow the band saw to take its rightful place as an indispensable part of the woodworking industry. It began in 1846, when a French woman named Anne Pauline Crepin patented a practical and effective method for brazing the ends of band saw blades together. Her new method resulted in a nearly unbreakable joint. At the same time, steel makers developed a method of rolling spring steel that would finally provide an acceptable life span for the band saws blade. The new blade material combined with the new welding process finally allowed the band saw to achieve its potential. And that it did. So much so in fact, that by the turn of the 20th century, the band saw had gone from non-essential to indispensable in the woodworking industry! After the turn of the century, band saws became available that were smaller and less expensive than their larger industrial brethren. Small woodworking shops and contractors initially used these smaller machines. Contractors of the time used band saws in much the same way contractors use them today; to produce ornate trim such as 'gingerbread,' as well as other decorative details such as 'flying clouds' on rafter tails and corbels. From here, the band saw would eventually be scaled down even further, to the point where the average homeowner could have one for his or her personal shop.

The band saw is very unique in that it is the only saw with a band for a blade that runs in a continuous loop. Depending on the saw, the blades can vary in length from a few feet (for a bench top saw) to almost 100 feet! (for a log processing saw) The width of the blade also varies accordingly, from 1/8 inch to over 15 inches. Today, most sawmills use band saws (called band mills) instead of circular saws because their blades are thinner. For example, a circular sawmill blade is 1/2-inch-thick, so every cut the blade makes turns a half-inch wide strip of otherwise usable wood into sawdust. A large sawmill processes approximately 400 million board feet of lumber per year. Comparatively, an industrial band saw blade is just over 1/8 inch thick. By using a band saw instead of a circular saw, a sawmill can increase its lumber yield by 5 to 8 percent. So, it turns only a fourth of the wood being milled into sawdust per cut compared to a circular saw. That equals about 20 million more board feet of lumber produced instead of being turned into sawdust!

Getting more lumber from each tree we cut down is also very important in our environmentally conscious society. If we can get more usable lumber from a tree by using band saws instead of circular saw blades, we won't have to cut down as many trees to meet our lumber needs.

Beyond the efficiency of the band saw in turning logs into lumber, the band saw is also a highly versatile machine. It can make most cuts that a circular saw can (just not as cleanly) while also being able to re-saw as well as cut just about any radii. Circular saws can be used to re-saw, but they cannot be used to make radius cuts!

Lesson #2: Band Saw I.D. and Safety Packet

Objectives

Students will be able to…

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

Common Core Standards

RSIT 11-12.2
RLST 11-12.2
Demonstration and Application 11.1
Problem Solving 5.1 & 5.4
Health and Safety 6.2 & 6.10
Responsibility and Flexibility 7.4
Technical Knowledge Skills 10.0
Cabinetmaking and Wood Products A 4.1, A4.3, A4.4, & A 6.1
Residential and Commercial Pathway D2.1, D2.3, D3.1, & D 5.2

Materials

Band Saw
Band Saw I.D. and Safety Packet

Lesson Sequence

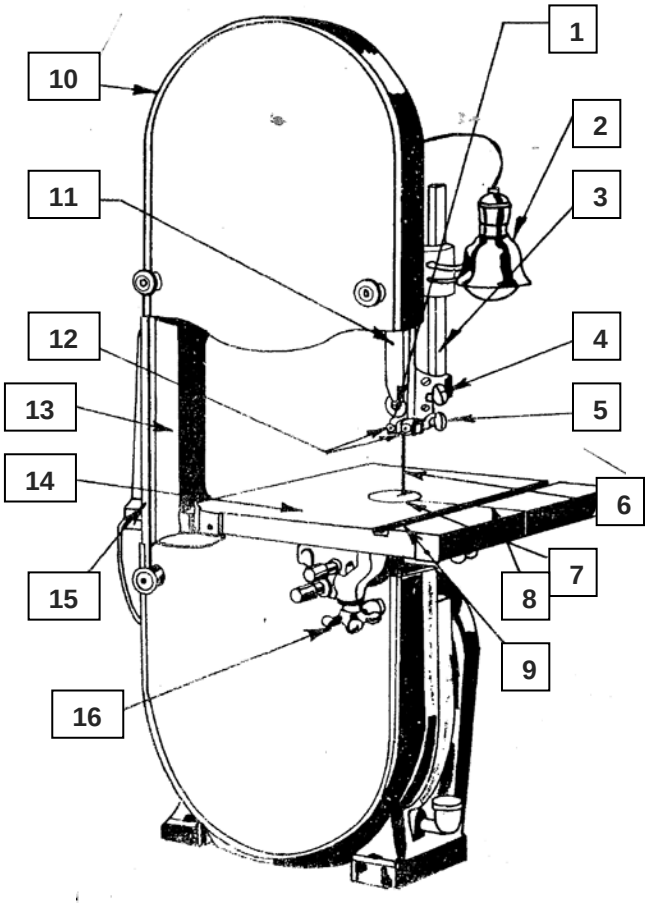
- Pass out the Band Saw I.D. and Safety Packet. Complete the band saw component I.D. portion with students gathered around the band saw. As you name the parts of the saw, not only discuss what their function is, but also demonstrate how they function.
- When done with the I.D. lecture/discussion, return to the classroom and complete the safety questions as a class. Answer any questions along the way as students have them.

Assessment
Check for student understanding by questioning throughout the whole class discussion. Call on random students to answer questions.

Accommodations / Modifications
Check for Understanding One on One Support High Light Important Information Visuals

Band Saw Identification 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. _____
16. _____

Part 2: Safe Operational Procedure

1. Adjust the upper guard and guide about 1/8" to 1/4" above material to be cut.
2. Select proper blade width. No cutting radius should be too small for the blade. General rules regarding minimum radius cuts by blade width:

Blade width	Minimum Radius
3/4"	1 ¾"
1/2"	1 ¼"
3/8"	1"
1/4"	¾"
3/16"	½"
1/8"	¼"

3. Keep blades sharp and properly set. If blade leads or wanders to one side, it may be dull, unevenly set, or a guide may be improperly set. Blade guides should be 1/32" from the blade on each side.
4. Keep floor and surrounding area free of scrap that might cause tripping.
5. Be sure saw is properly grounded.
6. Keep all guards in place at all times.
7. Get someone to assist in operations, which are not safely handled alone.
8. Make all adjustments with the power off and blade stopped.
9. Keep hands a safe distance from moving parts, never closer than 2 inches from the blade.
10. Give undivided attention to the job. The operator should be the only one inside the safety zone area.
11. Use a push block when sawing small stock.
12. Never reach around a moving blade.
13. When making a cut, do not place hands in line with the cutting edge.
14. Never attempt to remove small pieces of wood from near the blade while the saw is running.
15. Never leave a running saw unattended.
16. When finished cutting, shut off the switch and disconnect machine from power source. Do not leave the safety zone until the blade comes to a complete stop.
17. Blade tracking should be adjusted so that the blade runs on the center of the wheel.

Part 3: Completion Questions

1. Use only a sharp blade with proper _____for the radius being cut.
2. When the blade is properly installed, the teeth should point _____.
3. The blade support guide should be adjusted so it runs _____ of an inch from the blade.
4. Keep hands at least _____ inches from the blade.
5. Use a _____ _____ when sawing small stock.
6. Adjust the upper guide about _____ inches above the material being cut.
7. Properly adjust the blade tracking so it will run in the _____ of the upper wheel.
8. Move the upper guide only while the saw is _____.
9. The smallest radius that can be safely cut with a 1/2” wide blade is _____ inches.
10. A dull or improperly set blade will cause the blade to _____ one side on the work piece.

Band Saw Identification and Safety Packet – *Answer Key*

Part 1:

1. Ball bearing blade support
2. Lamp attachment
3. Guide post
4. Blade support lock screw
5. Blade guide lock srew
6. Blade
7. Table insert
8. Blade slot
9. Miter gage groove
10. Upper wheel guard
11. Blade guard
12. Blade guides
13. Arm
14. Table
15. Rear blade guard
16. Table clamp

Part 3:

1. Width
2. Downward
3. 1/32”
4. Two
5. Push block
6. 1/8
7. Center
8. Off
9. 1 and ¼
10. Lead

Lesson #3: Band Saw Safety Video & Exam

Objectives

Students will be able to…

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

Common Core Standards

RSIT 11-12.2
RLST 11-12.2
Demonstration and Application 11.1
Problem Solving 5.1 & 5.4
Health and Safety 6.2 & 6.10
Responsibility and Flexibility 7.4
Technical Knowledge Skills 10.0
Cabinetmaking and Wood Products A 4.1, A4.3, A4.4, & A 6.1
Residential and Commercial Pathway D2.1, D2.3, D3.1, & D 5.2

Materials

YouTube Video https://www.youtube.com/watch?v=wcc0HPVkEdE
Band Saw Safety Exam

Lesson Sequence

- ***Watch YouTube Video*** https://www.youtube.com/watch?v=wcc0HPVkEdE and answer any questions that students may have. (15 minutes)
- Pass out ***Band 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 19 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

Students must pass Safety exam before working on any projects.

Accommodations / Modifications

Read Aloud
High Light Important Information
One on One Support

Band Saw Safety Exam

Large	Adjustments	Movements	3/8”	Extension-table
Downward	Upward	2”	Thickness	Hands
¼”	Dull	Width	Guarded	Spring block
Wheel	Backing-out	Moving-in	Safety-zone	Push-stick
Brake	Concentration	Blade	Disconnected	1/32”
Obstruction	5/8”	Grinding		

1. The band saw blade is continuous and rides on two wheels that must be

   _____.
2. The band saw blade will stretch, making it necessary to make frequent

   _____.
3. The blade guard must clear the material being cut by no more than

   _____.
4. When changing a band saw blade, make sure the teeth are pointing

   _____.
5. The recommended safe distance between your hand and the band saw blade is

   _____.
6. If the saw is running or is off, it is never safe to remove scrap by using your

   _____.
7. Lack of control and an unsafe situation is created if the band saw blade becomes

   _____.
8. The only safe way to stop a band saw blade is by using the factory-installed

   _____.
9. The minimum radius to be cut, using the band saw is determined by blade

   _____.

10. When adjusting the band saw, make sure the blade is centered on the

    _____.

11. You must wait until the saw has come to a complete stop before leaving the

    _____.

12. Cutting small pieces of material is safely accomplished with a

    _____.

13. In order to be safe when cutting larger material, you will need assistance or a

    _____.

14. In order to do a quality job safely, the operator must have total

    _____.

15. Be aware that at the completion of the cut, your hand can unexpectedly move towards the

    _____.

16. Adjust the blade guides and support wheels when the saw is stopped and

    _____.

17. The distance from the band saw blade to the blade support wheel, when the blade is stopped is

    _____.

18. Make sure the material to be cut is free of foreign objects, such as nails or any other type of

    _____.

19. When making radius cuts, always preplan your cuts in order to avoid

    _____.

Band Saw Safety Exam – *Answer Key*

1. The band saw blade is continuous and rides on two wheels that must be **guarded**.
2. The band saw blade will stretch, making it necessary to make frequent **adjustments**.
3. The blade guard must clear the material being cut by no more than **1/4"**.
4. When changing a band saw blade, make sure the teeth are pointing **downward**.
5. The recommended safe distance between your hand and the band saw blade is **2".**
6. If the saw is running or is off, it is never safe to remove scrap by using your **hands**.
7. Lack of control and an unsafe situation is created if the band saw blade becomes **dull**.
8. The only safe way to stop a band saw blade is by using the factory-installed **brake**.
9. The minimum radius to be cut, using the band saw is determined by blade **width**.
10. When adjusting the band saw, make sure the blade is centered on the **wheels**.
11. You must wait until the saw has come to a complete stop before leaving the **safety-zone**.
12. Cutting small pieces of material is safely accomplished with a **push-stick**.
13. In order to be safe when cutting larger material, you will need assistance or an **extension table**.
14. In order to do a quality job safely, the operator must have total **concentration**.
15. Be aware that at the completion of the cut, your hand can unexpectedly move towards the **blade**.
16. Adjust the blade guides and support wheels when the saw is stopped and **disconnected**.
17. The distance from the band saw blade to the blade support wheel, when the blade is stopped is **1/32".**
18. Make sure the material to be cut is free of foreign objects, such as nails or any other type of **obstruction**.
19. When making radius cuts, always preplan your cuts in order to avoid **backing out**.