Drill Press (Metal)

I. Competencies

Given a properly adjusted drill press, accessories, instruction and demonstration of use, each student will be able to:

A. Identify the major parts of the drill press.

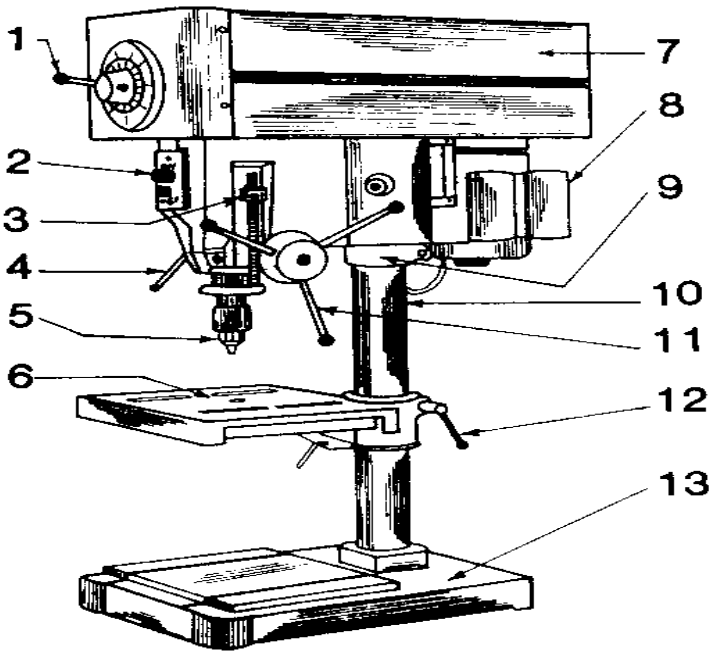
A. Pass a written test on safety and operating procedures of the drill press with 100 percent accuracy.

B. Demonstrate ability to use the drill press, following suggested safety rules and correct operation procedures.

II. Instructional Materials and Procedures

A. Identification of Basic Drill Press Parts

1. Variable speed control
2. Switch
3. Depth stop
4. Quill lock
5. Chuck
6. Table
7. Safety guard
8. Motor
9. Head support collar
10. Column
11. Pilot feed lever
12. Table locking clamp
13. Base



B. Drill Press Safety

1. Do not wear loose clothing or jewelry while operating a drill press. Confine long hair with a cap or hair net.

2. Wear industrial quality eye protection while drilling.

3. Keep all guards in place.

4. Keep work space around the drill press clean. Make certain that cutting oil and cooling lubricant are not spilled on the floor.

5. Turn off power before making adjustments.

6. Drill only with sharp drill bits with shanks that are matched to the type of chuck being used.

7. Secure bit by tightening in each hole of the drill chuck. Remove the chuck key before the drill press is turned on.

8. Clear the drill press table of all tools, metal, rags, etc. before drilling.

9. Secure all work in a drill press vise or with a clamp before drilling.

10. Never hold material by hand while drilling.

11. Never attempt to stop a revolving piece of work in the drill press by hand.

12. Never allow any part of your body to touch the drill bit or any revolving part of the drill press while it is in motion.

C. Drill Press Basic Operating Procedures

1. Adjust drill speed and feed to the type and size of hole being drilled. Check drill specifications for recommended drill speeds and feed.

2. Position long stock so it is to the left of the drill press operator while being drilled.

3. Select proper sized bit by using drill gauge. Make certain the drill shank and chuck are matched, i.e. use a straight shank drill in a Jacobs chuck and a tapered shank drill in a morse tapered chuck.

4. Tighten the drill bit securely in chuck.

5. Mark all metal be drilled with a center punch.

6. Support the end of long stock with a stand.

7. Clamp the metal to be drilled in vise. Place a block of wood under the metal being drilled to prevent the bit from cutting into the vise after coming through the work.

8. Align the drill bit with the center punch mark.

9. Make certain the chuck key had been removed from the chuck before starting the drill press.

10. Make sure that guard(s) is/are in place and the table locking clamp is tightened securely.

11. Use the proper cutting lubricant for the material being drilled.

12. Set the drill speed to match the material being drilled and hole size. Note that variable speed drill presses require the machine to be running to adjust the operating speed.

13. Turn on the power and apply appropriate cutting lubricant. The cutting lubricant should be applied to the upper portion of the bit.

14. Apply pressure to pilot feed lever, feed drill bit into metal fast enough to keep drill bit cutting at all times. Continue to apply lubricant as needed.

15. Just as the bit begins to cut through the metal, reduce the feed pressure so the bit will not seize the metal. Seizing causes the material to be grabbed by the bit, which will cause the material to revolve around the bit or will break the bit. Stop the drill press before removing any revolving material.

16. After the hole is drilled release the pilot feed lever slowly and allow the chuck to return to the starting position.

17. Turn off power.

18. When work is removed from the vise be careful, the underside of the hole may have sharp burrs which will need to be filed or ground smooth.

19. Remove drill bit, clean, and return it to proper storage place.

20. When drilling long stock; put work on the drill press table, long end to the left of the drill press operator. Lower the drill bit to the work and align the center punch mark with the drill bit. Then tighten the quill lock and clamp the material to the table using a clamp. Use a support to hold up the unclamped end of the stock. Release the quill lock and drill the hole.

21. When drilling round stock; use a V-shaped drill block to support and hold the material. After the material is center punched and aligned with the drill bit, clamp the stock to the drill press table using clamp, then drill the hole.

III. Written Test

Drill Press Safety and Operation Test

Name_____ Date_____ Class_____

Multiple Choice – Place the letter of the most correct answer on the answer sheet.

1. When operating the drill press, what should be done with long hair?

    a. Hold it away from the drill bit with one hand
    b. Put it under a cap or hair net and keep your head away from moving parts
    c. Get a haircut
    d. Keep your head back away from moving parts

2. What type of drill press chuck should be used with a straight shank twist drill?

    a. Universal 3-jaw chuck
    b. Jacobs chuck
    c. Morse tapered chuck
    d. Any of these are acceptable

3. Which item(s) of protective equipment is/are absolutely necessary when operating the drill press?

    a. Leather gloves
    b. Leather apron
    c. Steel toed shoes
    d. Safety glasses

4. Which of the following conditions would be unsafe when operating a drill press?

    a. Floor is slippery from spilled cutting oil
    b. Drill area is cluttered with tools and scrap metal
    c. The belt guard is loose
    d. All of above

5. If the metal being drilled begins to revolve, you should _____.

    a. turn off the drill press and free the metal
    b. tap the metal lightly with a hammer to free it from the bit
    c. stop it with your hands
    d. move the drill press table to foul the rotating piece of metal

6. To select the proper twist drill, one should check _____.

    a. size, sharpness and type of shank
    b. drill speed
    c. lubrication needed
    d. length of the drill cutting lips

7. Before turning on the drill press the operator should _____.

    a. tighten the drill press table locking clamp
    b. clamp work in a vise
    c. remove the chuck key
    d. all of the above

8. Which is not a safe way to secure metal while it is being drilled?

    a. Hold it firmly by hand, but securely on the drill press table
    b. In a drill press vise
    c. Clamp
    d. Between supports mounted on the drill press table

9. Which <u>should</u> be done while drilling metal with the drill press?

    a. Change speed of the drill press
    b. Maintain enough feed pressure to keep the bit cutting at all times
    c. Keep the drill press quill locked
    d. Lubricate the chuck

10. When a bit seizes it may _____.

    a. break the bit
    b. cause the vise to turn
    c. cause the bit to slip in the chuck
    d. all of the above

11. After the drilling is finished, which of the following should be completed first _____.

    a. turn off the drill press
    b. remove the drill bit from the chuck
    c. remove the work from the drill press vise
    d. none of the above should be done first

12. Metal chips should be removed from the drill press _____.

    a. by wiping with the hand
    b. by blowing with compressed air
    c. by using a brush
    d. any of the above are satisfactory

13. When drilling long material what precaution(s) should be taken?

    a. Support the clamped end with a stand
    b. Put the long end of the stock to the right of the operator
    c. Support the unclamped end with a stand
    d. None of the above

14. After a drilling operation is completed what potential hazard should the operator be alert to_____.

    a. the twist drill will be dull
    b. sharp edges and burrs around the hole
    c. hot cutting oil
    d. stresses built up in the metal being drilled

15. To prevent seizing one should _____.

    a. keep the bit well lubricated
    b. reduce feed pressure when the hole is about finished
    c. reduce speed of the drill bit
    d. put a block of wood under the metal being drilled

IV. Performance Test for the Drill Press

Student_____

Student performs the following while using the drill press:

	Yes	No	N/A
1. The guard is kept in place.	___	___	___
2. Safety glasses are worn at all times.	___	___	___
3. Work area is cleared of tools, stock, rags, etc.	___	___	___
4. Good footing is maintained by the student.	___	___	___
5. Loose clothing, long hair, and jewelry are secured or removed before operating the drill press.	___	___	___
6. Stock is secured in a vise or clamped down while being drilled.	___	___	___
7. A proper size bit, with shank matched to chuck, is used.	___	___	___
8. The drill press table is locked securely.	___	___	___
9. The drill bit is tight in the chuck.	___	___	___
10. The metal is marked with a center punch.	___	___	___
11. The long end of the stock is to the left of the operator and is supported.	___	___	___
12. The drill press speed is matched to the work.	___	___	___
13. The lubricant is appropriate for the material being drilled.	___	___	___
14. Proper feed pressure is maintained.	___	___	___
15. The machine is turned off immediately after the drilling operation is completed.	___	___	___
16. The chuck key is removed from the chuck before drilling is started.	___	___	___
17. Correct procedures that are safe and acceptable.	___	___	___

Comments_____
_____
_____

I hereby certify that the student has satisfactorily demonstrated ability to operate the drill press by passing the above performance test.

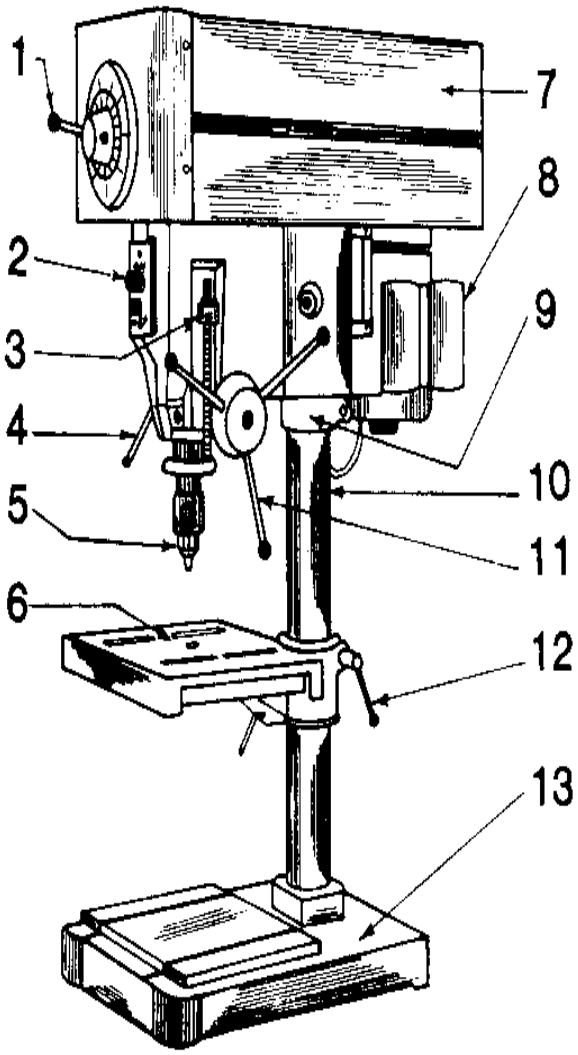
_____ _____ _____ _____
Signed (Student) Date Signed (Teacher) Date

Drill Press Parts Identification Test

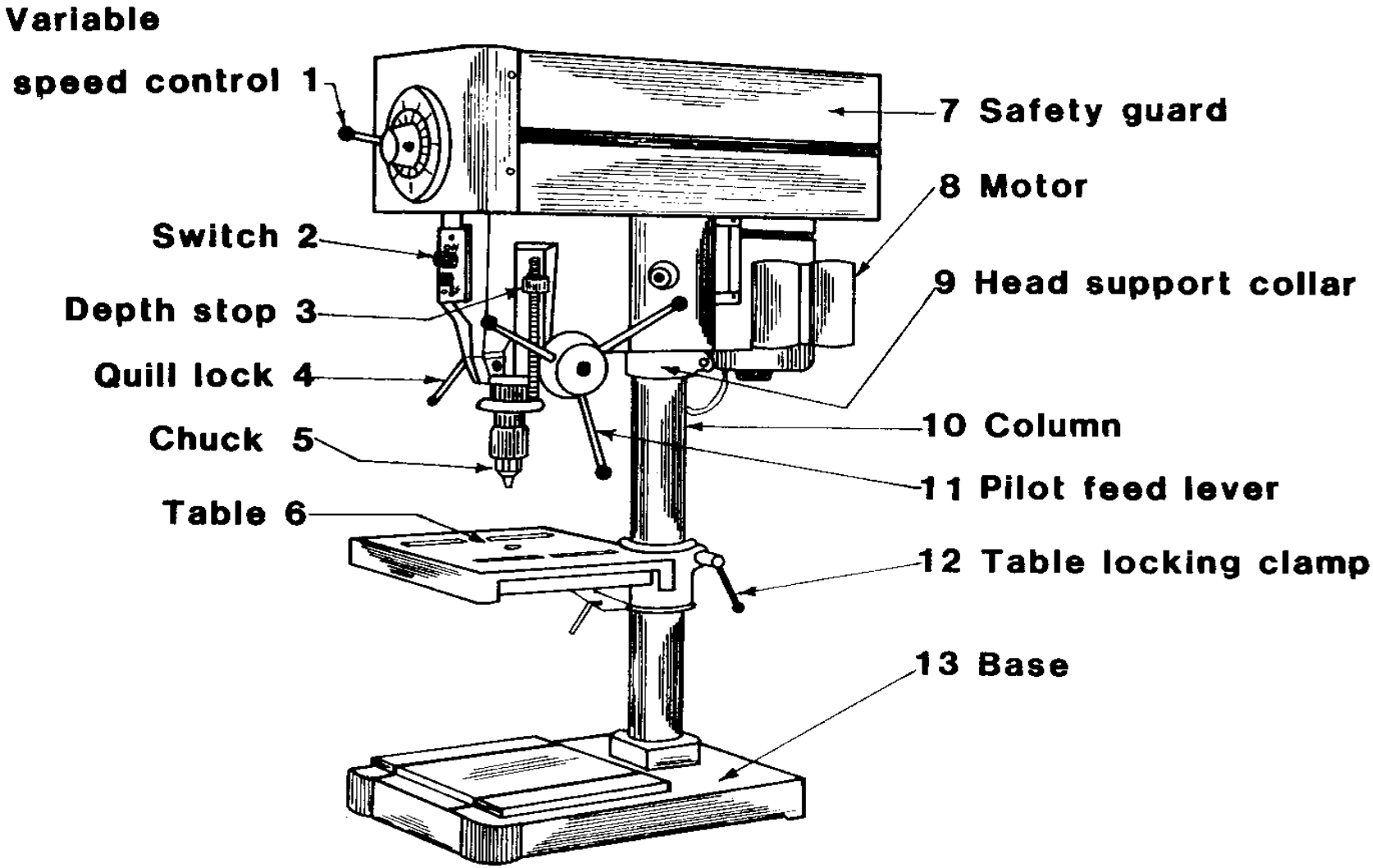
Name_____

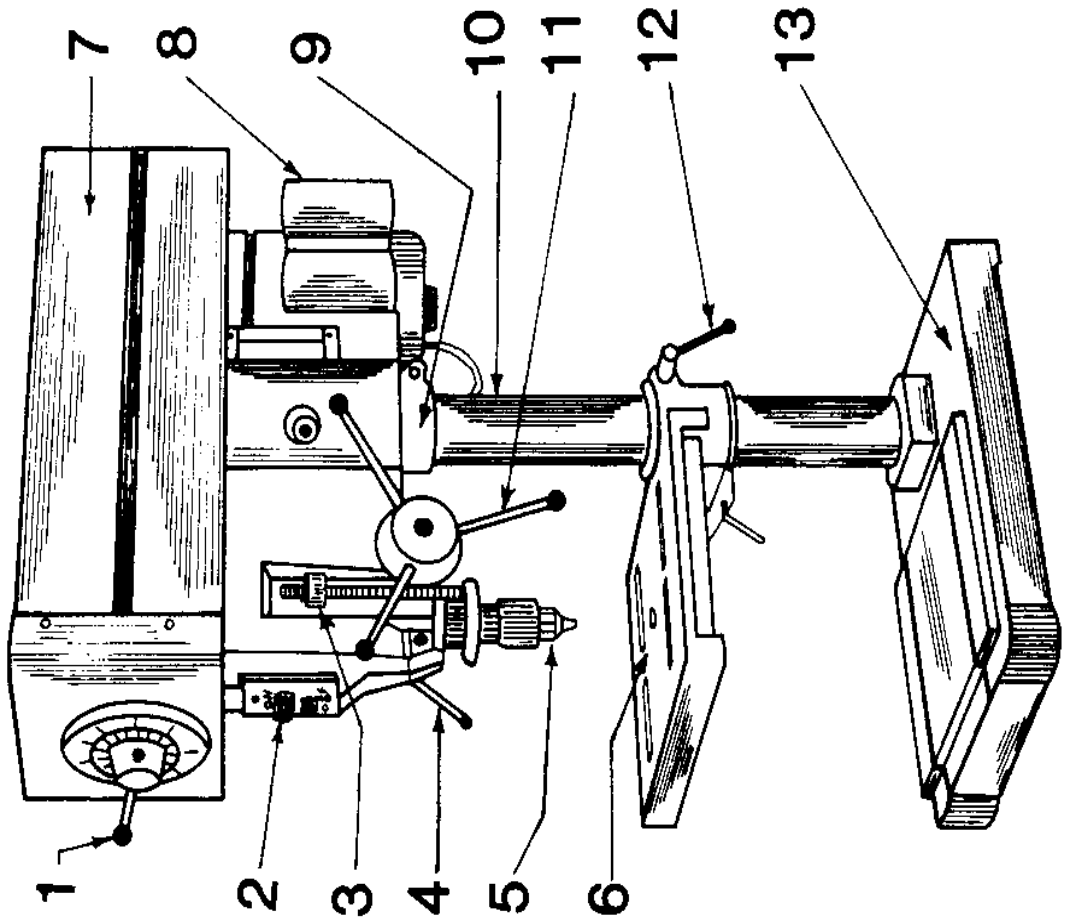
Match the number of each drill press part with the correct part name.

___ A. Safety guard
___ B. Depth stop
___ C. Table
___ D. Base
___ E. Pilot feed lever
___ F. Variable speed control
___ H. Switch
___ I. Column
___ J. Quill lock
___ K. Head support collar
___ L. Chuck
___ M. Table locking clamp



BASIC DRILL PRESS PARTS

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