

**LOS ANGELES UNIFIED SCHOOL DISTRICT  
DIVISION OF ADULT AND CAREER EDUCATION  
SAFETY TEST FOR PHOTOVOLTAICS PROGRAM**

School: \_\_\_\_\_ Industry Sector: Energy, Environment & Utilities

Class: \_\_\_\_\_ Date: \_\_\_\_\_

Teacher: \_\_\_\_\_ Room: \_\_\_\_\_  
(Please Print)

Your Name: \_\_\_\_\_ Phone: \_\_\_\_\_  
(Last) (First)

Date of Birth: \_\_\_\_\_ Age: \_\_\_\_\_ Email: \_\_\_\_\_

Address: \_\_\_\_\_  
(Street) (City) (Zip)

In Case of Accident, Notify: \_\_\_\_\_ Phone: \_\_\_\_\_

**To the Student:**

These instructions are an important part of training in the Photovoltaics program. All members of the class must observe safety rules and precautions. Habits of carelessness or of failure to follow these rules are sufficient cause for dismissal from the class.

All students are required to learn these safety rules as part of the Photovoltaics program. Additional specific safety instructions are taught in the classroom about the various operation of machines and other workplace equipment.

All students will be required to pass this safety examination with 100% accuracy and to sign the back page of this examination indicating that you have received these instructions.

***This test must be on file in the school records for 5 years.***

**Directions: Mark "T" for true if the following statements are completely true or "F" for false if any part of the statement is untrue. The first statement will serve as an example:**

- |  |                             |
|--|-----------------------------|
| 0. Most accidents in the classroom are due to unsafe acts by people.   | <u>    <b>T</b>    </u>     |
| 1. All classroom injuries and accidents must be reported to the teacher immediately.   | <u>                    </u> |
| 2. The school elevator may be used during an emergency such as fire or earthquake.   | <u>                    </u> |
| 3. It is permissible to store heavy items on top of file cabinets and bookcases as long as nothing is stored within 18" of the sprinkler system.   | <u>                    </u> |
| 4. Objects or materials must be passed carefully to or at another student.   | <u>                    </u> |
| 5. You may lift or carry heavy boxes or equipment in school less than 25 lbs. using proper lifting techniques.   | <u>                    </u> |
| 6. Any frayed cord or even the slightest shock or spark from electrical wire or connections must be reported to the instructor immediately.  | <u>                    </u> |
| 7. When broken tools or an unsafe classroom condition are found, or a machine needs repair, it is permissible to make the needed repair and then report the condition to the instructor. | <u>                    </u> |

- 8. Smoking on school campus is a violation of District rules and the Health Code. \_\_\_\_\_
- 9. Hands must be dry when handling any electrical equipment. \_\_\_\_\_
- 10. All four legs/wheels of the chair must be on the floor. Tilting back can cause the loss of balance. \_\_\_\_\_

**Directions: Choose the best answer from the (a), (b), (c), or (d) choices to complete each statement. Write the letter of your choice on the line provided in the right margin.**

**GENERAL SAFETY**

- 1. Before working with any machines, equipment, or power tools in the shop, you must: \_\_\_\_\_
  - a) Pass a safety test and be sure there's an instructor in the shop
  - b) Learn how to turn on the machines
  - c) Check each machine by turning it on for a short time
  - d) Have prior experience on the machine, equipment, or tool
  
- 2. When there is even the slightest accident, injury, or illness in the shop, you should first:
  - a) Tell your instructor
  - b) Get the first aid kit and use it
  - c) Get the injured person to the nurse
  - d) Put a Band-Aid on the injury and continue working
  
- 3. Whenever you find broken tools, an unsafe shop condition, or a machine in need of repair, you should first: \_\_\_\_\_
  - a) Make the needed repair at once
  - b) Use the tool, complete the repair and then report the broken tool
  - c) Report the condition to your instructor
  - d) Warn your classmates to be careful
  
- 4. Since loose clothing, ties, dangling jewelry and long hair could get caught in moving parts or machines, you should: \_\_\_\_\_
  - a) Get another student to help you
  - b) Get your hair cut before using machinery
  - c) Stay away from such machinery
  - d) Wear properly fitting clothes and tuck in all loose ends before working on a project
  
- 5. To protect your feet from falling objects, spilled acid, or objects on the floor of the shop, you should wear: \_\_\_\_\_
  - a) Sneakers
  - b) Sandals
  - c) Solid shoes with full tops, preferably with rubber soles and heels
  - d) Shoes with full tops and oil resistant soles

6. When lifting heavy objects, keep your back and head as straight as possible, and use your:
- a) Arm muscles
  - b) Back muscles
  - c) Leg muscles
  - d) Stomach muscles
- 
7. Lifting heavy objects and carrying long pieces should be done by:
- a) More than one person
  - b) Someone else
  - c) Knocking obstacles out of your way
  - d) All the above
- 
8. In case a fire begins in the shop, you should first:
- a) Know where fire extinguishers are and how to use them
  - b) Report the fire and follow only your instructor's directions
  - c) Know how to turn off the power machinery
  - d) All the above
- 
9. Paint, plaster, dry wall mud, or varnish spilled on the floor should be cleaned up to prevent:
- a) Fire
  - b) Slips and falls
  - c) Both a and b
  - d) Neither a nor b
- 
10. When moving a ladder, be sure that:
- a) It is closed
  - b) There are no tools or materials left on top of the ladder
  - c) Be aware of electrical lines
  - d) All the above
- 
11. When working with an A frame ladder:
- a) It is acceptable to stand on the top step
  - b) It is acceptable for two people to work on the ladder at the same time
  - c) It is acceptable for one leg to be broken or uneven
  - d) Do not stand on the top two steps as you may lose your balance
- 
12. Extension ladders:
- a) Should be carried by at least two people
  - b) Can be used for scaffolding planks
  - c) Should not exceed the specified load limit
  - d) A and C
- 
13. When working on or around electrical items, use a:
- a) Wood ladder
  - b) Metal ladder
  - c) Fiberglass ladder
  - d) All the above
-

14. The top of an extension ladder must extend above the roof or platform at least:
- a) 36"
  - b) 6"
  - c) Two feet
  - d) 12"
- 
15. When working around ladders, it is important to:
- a) Wear a hard hat
  - b) Wear safety goggles
  - c) Never work under a ladder if someone is on the ladder
  - d) Have someone hold the ladder for you while you are on it
- 
16. When placing an extension ladder against the wall, the recommended distance from the base of the ladder to the wall is:
- a)  $\frac{1}{4}$  the height
  - b)  $\frac{1}{3}$  the height
  - c)  $\frac{1}{2}$  the distance
  - d) Equal distance
- 
17. When climbing the ladder:
- a) Use both hands
  - b) Take one step at a time
  - c) Carry tools in tool bags and not your hands
  - d) All the above
- 
18. Do not lean ladders against:
- a) Windows
  - b) Doors
  - c) Moveable objects
  - d) All the above
- 
19. Using the tool of the right size, shape, and recommended "work load" for the job is important. Do not just pick up any available tool to "get by" because:
- a) The wrong tool can slip and hurt you
  - b) Over-loading a tool can cause breakage and injury
  - c) Both (a) and (b)
  - d) It is permissible to use any available tool
- 
20. Which is a good safety practice when working with hand tools?
- a) Giving tools to another person by the handles first
  - b) Cleaning off greasy handles so they aren't slippery
  - c) Both a and b
  - d) Neither a nor b
-

21. Never carry sharp-edged tools in your pocket or with the point toward your body because:
- a) You'll get hurt if you slip and bump against them
  - b) They will ruin your clothes
  - c) You'll forget where you left them
  - d) Someone else might be injured
- 
22. Be sure sharp-edged tools are kept sharp because:
- a) A dull tool can slip over the work and injure you
  - b) A dull tool needs more pressure and is harder to control, and thus it is more dangerous
  - c) Both a and b
  - d) Neither a nor b
- 
23. When you work with a screwdriver:
- a) Be sure the tip is not worn, chipped, or broken
  - b) Hold your work in the palm of your hand
  - c) Use any sized tip since it will probably do the job
  - d) Keep both hands on the screwdriver
- 
24. When operating power machinery, the first thing to do in an emergency is to:
- a) Turn the power off
  - b) Finish the job and then report the trouble
  - c) Get away from the machine fast
  - d) Notify your instructor
- 
25. Before leaving a power machine, be sure that:
- a) All parts have stopped moving
  - b) The power has been turned off
  - c) Both a and b
  - d) Neither a nor b
- 
26. The power must be off when you are oiling, cleaning, or adjusting any power equipment to:
- a) Save electricity
  - b) Keep your attention on your work
  - c) Prevent catching your hands or clothing in moving parts
  - d) None of the above
- 
27. Before you start a power machine, be sure that you:
- a) Get your instructor's instructions and permission
  - b) Keep your attention on your work
  - c) Prevent catching your hands or clothing in moving parts
  - d) None of the above
- 
28. When using an extension cord:
- a) Route the wires above the work if possible
  - b) Make sure that there are no cuts or nicks in the cord
  - c) Make sure that the grounding prong is intact
  - d) All the above
-

29. When a student is using power tools:
- a) Do not in any way distract the operator of the tool
  - b) Start and stop the machine to help the operator
  - c) Make sure the operator stands in front of the blade
  - d) Let the blade continue to run after the work is finished
- 
30. When using any portable electric tool, check the electrical plug at the end of the cord to see that the \_\_\_\_\_ is not broken:
- a) Ground prong
  - b) Insulation
  - c) Drill bit
  - d) All the above
- 
31. When using a heavy-duty drill, hold the drill motor with both hands to:
- a) Avoid breaking the drill bit
  - b) Avoid drilling an offset hole
  - c) Avoid twisting
  - d) Control the drill angle
- 
32. Extension cords should be:
- a) Red in color
  - b) Draped across aisles
  - c) Checked for worn insulation
  - d) Yanked out of the outlet when finished
- 
33. When using power equipment, be sure your hands and feet are dry because wet hands and feet invite:
- a) Shocks
  - b) Blisters
  - c) Dirt
  - d) None of the above
- 
34. While drilling with the electric drill:
- a) Brace yourself well and be ready to release the switch in case the drill grabs
  - b) Keep your face away from the drill
  - c) Both a and b
  - d) Neither a nor b
- 
35. When drilling a small piece of material:
- a) Hold it in your lap
  - b) Never hold it in your hand
  - c) Use extra pressure
  - d) Use pliers to hold the material
-

36. Make adjustments on the band saw \_\_\_\_\_ :
- a) At any time
  - b) When the saw is shut off and not running
  - c) While the band saw is running
  - d) During the cutting process
37. Make sure the blade guard on a skill saw is in place and is \_\_\_\_\_ .
- a) Binding tightly
  - b) Up and tight
  - c) Operating freely
  - d) Loosely attached
38. The two most important safety features on the skill saw are the \_\_\_\_\_ and \_\_\_\_\_ .
- a) Ground wire and the guard
  - b) The base and adjusting levers
  - c) The gears and oil bath gear box
  - d) Cord and handle
39. When using the skill saw, always stand to the side of the project, never in line with the \_\_\_\_\_ .
- a) Handle
  - b) Work pieces
  - c) Blade
  - d) Cord
40. When changing a reciprocating saw blade, the cord must be \_\_\_\_\_ .
- a) Plugged in
  - b) Unplugged
  - c) Over your shoulder
  - d) Away from water
41. Use the proper \_\_\_\_\_ for the material you are cutting.
- a) Blade
  - b) Device
  - c) Stance
  - d) Clothing
42. When the drill begins to cut through the work, ease up on the:
- a) Chuck
  - b) Feed pressure
  - c) Vise
  - d) Drill speed

43. An improperly sharpened drill bit can cause the drill to:
- a) Dig into the work
  - b) Throw the work
  - c) Both a and b
  - d) Neither a nor b
44. The machine should be stopped before removing work, chips, or cuttings. Chips and cuttings should then be removed from the table with:
- a) An air gun
  - b) Your hand
  - c) A brush
  - d) A shop towel
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### PHOTOVOLTAICS INTRODUCTION NIOSH SAFETY

1. Who should have the key you use to lock out the electrical service panel?
- a) Only you
  - b) You and your buddy
  - c) 3 men in a 3-man crew
  - d) None of the above
- 
2. A ground fault circuit interrupter
- a) Detects current leakage from a circuit to ground
  - b) Protects people from electric shock
  - c) Protects you from a high electric bill due to leakage
  - d) Both a and b
- 
3. What is the meaning of PPE?
- a) Personal promotion equipment
  - b) Polypropylene equipment
  - c) Personal protective equipment
  - d) Pages of exceptions in the codebook
- 
4. Which conductors should you treat as energized?
- a) All conductors until they are de-energized
  - b) All conductors until they are de-energized and locked out
  - c) All conductors until they are de-energized, locked out, and checked with a meter
  - d) All conductors until they are de-energized, checked with a meter, locked out and tagged
- 
5. What precautions should you take with ladders? *(Choose 2 answers)*
- a) Beware of soft soil after a rain.
  - b) Use ladders to reach the tiers on scaffolding instead of climbing the cross braces.
  - c) Always use ladders to carry heavy items to the roof.
  - d) Avoid dry wooden ladders.
-



6. What is standard PPE for an installer on a PV job?
  - a) Insulating boots
  - b) Insulating hard hat
  - c) Safety glasses
  - d) All the above
  
7. What is the hazard of overhead wiring?
  - a) More than half of all electrocutions are caused by it.
  - b) You may accidentally contact it with a crane.
  - c) You may accidentally contact it with pipe or scaffolding.
  - d) All the above
  
8. What can you do to avoid electric shock?
  - a) Keep one hand in your pocket when possible.
  - b) Wear electrician's gloves.
  - c) Avoid water.
  - d) All the above

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**Directions: Circle the correct answer, True or False, on the line provided in the right margin.**

**PHOTOVOLTAICS INTRODUCTION TRUE OR FALSE**

- |   |   |   |
|---|---|---|
| 1. Safety is a full-time job and the responsibility of every employee.                          | T | F |
| 2. You can always work on a PV system alone.  | T | F |
| 3. If the disconnect switch and inverter are off, then there is no need to measure for voltage. | T | F |
| 4. A typical PV 12V battery can release over 6000 amps when short-circuited.                    | T | F |
| 5. A module can produce voltage in very low light.  | T | F |
| 6. A module can produce significant amperage in low light.                                      | T | F |
| 7. In summer take a break and get into the shade for a few minutes each hour.                   | T | F |
| 8. When a worker is dangling from his safety harness, his life is in danger.                    | T | F |
| 9. You can't get hurt working on a small PV system.   | T | F |
| 10. Sunscreen is an important personal safety tool.   | T | F |
| 11. Metal exposed to the sun for long durations is a burn hazard.                               | T | F |
| 12. Rubber gloves are proper safety equipment for battery work.                                 | T | F |

- |   |   |   |
|---|---|---|
| 13. Electric shocks on ladders can kill.  | T | F |
| 14. Voltage at 20V and amperage at 20mA can possibly kill you.  | T | F |
| 15. Always use metal ladders.   | T | F |
| 16. PV schematics are always correct.   | T | F |
| 17. A way to avoid shock is to measure voltage from wire to wire, wire to ground, wire to box, and never disconnect a wire before this check. | T | F |
| 18. It is safer to work with one hand when measuring voltages to ground.  | T | F |
| 19. If you don't know CPR, call 911 and the operator will talk you through it.  | T | F |
| 20. You can wear some jewelry when working PV systems.  | T | F |
| 21. Always cover the end of a wire with a wire nut or tape when working on it.  | T | F |
| 22. If you find a worker unconscious, do not touch him/her with your hands if they are touching any part of the PV system.                    | T | F |
| 23. If you find a worker unconscious, check for a pulse and use CPR if needed.  | T | F |
| 24. Burns are not common injuries with PV systems.  | T | F |

<b>Student</b>		<b>Instructor</b>	
<p>THIS IS TO CERTIFY that I have received instructions on safety precautions in my Photovoltaics class.</p>		<p>THIS IS TO CERTIFY that</p>	
<p>The teacher demonstrated to me how to use tools, equipment and chemicals safely and correctly. I will observe all safety precautions. If ever in doubt regarding any operations, I will obtain the necessary information from my teacher.</p>		<p>_____</p> <p style="text-align: center;">(name of student)</p> <p>has been given safety instructions in my class.</p> <p>I demonstrated the proper use of tools, equipment and chemicals in the class and this student passed this written safety test with 100% accuracy.</p>	
<p>_____</p> <p>(Student Signature)</p>	<p>_____</p> <p>(Date)</p>	<p>_____</p> <p>(Teacher Signature)</p>	<p>_____</p> <p>(Date)</p>