



Developed with Fran Kamp, MS, RN, CHSE, Innovation Academy, FCS STEM Magnet High School, GA

# Learning to use personal protective equipment (PPE)

Volume 4 | Gr. 9–12

**Time required:**  
Approximately 90 minutes



## Standards

### ETS1.A

Defining and delimiting engineering problems: Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them.

### ETS1.C

Optimizing the design solution: Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (HS-ETS1-2)

### S-IC.6

Evaluate reports based on data.

### ELA-Literacy.RST.9-10.1

Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

### ELA-Literacy.RST.9-10.3

Follow precisely a complex multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

## Materials list

- PPE Trainer Classroom Kit ([NE40277](#))
- PPE quiz on **pp. 6–7**
- Where does it go? activity on **pp. 10–12**
- Coagulant Blood ([800-226](#))
- Glo Germ Kit ([WA28160](#))

## Objectives

*Students will...*

- Recognize how the personal safety of the healthcare worker is improved through appropriate use of personal protective equipment (PPE)
- Compare the different types of PPE and identify when each is appropriate
- Demonstrate how to don and doff PPE appropriately
- Differentiate the types of medical waste and the correct way to dispose of them

# Directions

## Donning and doffing PPE

1. Start the lesson by reviewing the objectives. Then define personal protective equipment (PPE) for students.

- Personal protective equipment is special clothing or equipment you wear to create a barrier between you and germs. This barrier reduces the chance of touching, being exposed to, and spreading germs. It helps prevent the spread of germs in the hospital and protects people and healthcare workers from infections.
- PPE includes gloves, gowns or aprons, masks, goggles or face shields, head coverings, and shoe coverings.



2. Reproduce the quiz on **pp. 6–7** or create an online quiz using the questions to determine students' knowledge base. You can deliver the quiz again at the end of the lesson to determine what students have learned.
3. Next, discuss standard precautions when working in healthcare:
  - Standard Precautions (previously Universal Precaution): When you care for any patient, you are to assume that an infectious agent could be present and use PPE accordingly.
  - Gloves should be used when touching blood or any body fluids or nonintact skin or mucus membranes.
  - Surgical or procedure masks and eye protection should be worn, as well as a face shield to protect mucous membranes of the eyes, nose, and mouth during activities that may generate splashes or sprays of blood, body fluids, secretions, or excretions.
  - Gowns should be used when contact of clothing with the patient's body fluids, secretions or excretions is anticipated.
4. Then, ask students the following question: If you could only have one item of PPE to treat a day's worth of patients in the emergency room, which item would you choose and why? **Note:** This should lead to a lively discussion and, hopefully, students will realize that all items are important.

5. Then, lead a discussion around key points of masks, gloves, and gowns and how to choose the proper PPE.

### Masks

- Some masks have a see-through plastic part that covers your eyes.
- A surgical mask helps stop germs in your nose and mouth from spreading. It can also keep you from breathing in some germs.
- A special respiratory mask (respirator) forms a tight seal around your nose and mouth. It may be needed so that you do not breathe in small germs like tuberculosis bacteria or measles or chickenpox viruses.

### Gowns

- These are often used during surgery to protect you and the patient.
- They protect you when you work with bodily fluids.
- Visitors wear gowns if they are visiting a person who is in isolation due to an illness that can be easily spread.
- You may need special PPE when handling some cancer drugs. This equipment is called cytotoxic PPE. You may need to wear a gown with long sleeves and elastic cuffs. This gown should keep liquids from touching your skin.

## Gloves

- Right-size gloves are important. Gloves should fit the user’s hands comfortably – they should not be too loose or too tight. They also should not tear or damage easily.
- Gloves can be sterile or clean. They can be powdered or unpowdered. They can be made from vinyl, latex, nitrile, or other materials. It is important to know if you have a latex allergy or allergy to the powder.

## Other

- You may also need to wear shoe covers, head cover, goggles, or special gloves.

## Choosing the right PPE

- PPE should be selected based primarily on the hazards identified during the assessment (type of exposure anticipated) or the category of isolation the patient is in.
- Comfort and appropriate fit are important.
- PPE must be durable. Gloves are sometimes worn for several hours and need to stand up to the task.

6. After this discussion, students will learn the correct order of donning and doffing PPE. Print and share these handouts from the [Centers for Disease Control and Prevention](https://www.cdc.gov) website for each student. Hold a discussion on the proper order of donning and doffing PPE.
7. Next, divide the class into teams and play PPE Order Up. Reproduce the PPE Order-up Game on **p. 5**, and cut each step apart into individual slips of paper. There are 11 steps on this list, so you will need teams of 11. You can remove or combine steps if you have fewer team members. How to play:
  - There is **NO** talking during this game.
  - One captain per team will receive the slips of paper with the steps on them.
  - When the teacher says go, the captain will give one slip of paper to each team member, and then team members must place themselves in the proper order using nonverbal communication only.
  - As soon as a team is in the proper order, the team captain should yell “freeze.”
  - All teams will “freeze” at this point. The teacher should check to see if the team is really in the correct order.
  - The first team to get all team members in the correct order wins.
8. Next, have students practice donning and doffing PPE while a peer reviews them using the PPE checklist on **p. 13** (you can have another student act as the patient or just pretend they are walking into a patient room). Students should film each other and submit a final recording. Allow students to practice and record as many times as they want until they feel they have done it correctly.
9. Extension activity: Have students don PPE and dip their hands in a bowl of simulated coagulant blood and scrape off the excess. They should then try to doff their PPE without spreading “germs.”

Or have them dip their hands in the Glo Germ liquid from the kit and then take off their gloves to see how much contaminant stays on them when they take off their gloves. You can also use the Glo Germ Kit to show students how much time and effort it takes to properly wash their hands to rid themselves of germs.

## Disposing of medical waste

10. Start by talking about the types of hazardous waste in a medical facility, including soiled laundry, under pads, used tissues, urine specimen cups, patient gowns, syringes, used dressings, etc.
11. Then, talk about the cost differences for hazardous waste (many healthcare providers want to put everything in the red biohazard bag, which is more expensive to dispose of).
  - \$0.02 to \$0.06 per pound for solid waste
  - \$0.30 to \$1.25 per pound for biohazardous/infectious waste (red bag)
  - \$1.00 to \$6.00 per pound for hazardous waste

12. Then, talk about the most common ways to dispose of medical waste.
  - Incineration
  - Thermal treatment, such as microwave technologies
  - Steam sterilization, such as autoclaving
  
13. Discuss how to handle contaminated laundry, or laundry that has been soiled with blood or other potentially infectious materials or may contain sharps.
  - Handle laundry as little as possible.
  - Bag or containerize soiled laundry at the location where it was used.
  - Place and transport contaminated laundry in bags or labeled or color-coded containers.
  - Wear gloves and other appropriate PPE when handling soiled linens.
  - Do not allow soiled laundry to touch your skin or clothing.
  
14. Next, have students to the activity sheet “Where does it go?” on **pp. 10–12**.
  
15. Give the quiz a second time to evaluate student progress.

### Optional extension activity

Divide the class into groups. Provide a list of diseases that require isolation precautions and have students dress in appropriate PPE.

Have them find the other group that is using the same PPE precautions. Have the groups present why their two diseases require the same precautions.

If you have patient rooms, set up different simulation rooms with signs on the doors requiring different components of PPE. See if students can determine what disease the patient might have in each room. Or write a disease requiring specific isolation precautions on an index card and place it in the room with the admission paperwork. Then, have students set up the room and isolation cart according to the necessary isolation.

# PPE order-up game

Directions: Cut slips apart.

|  |   |
|--|---|
| <b>Wash hands using antiseptic soap</b>  | <b>Discard gloves in biohazard container</b>  |
| <b>Slip arms into the sleeves of a gown, being careful to touch only the inside of the gown</b>                    | <b>Untie gown ties at neck and waist</b>  |
| <b>Secure gown at neck and back of waist, covering clothing completely</b>   | <b>Remove gown by pulling down from the neck and slipping hands back into gown sleeve, touching only the inside of the gown</b> |
| <b>Don mask</b>  | <b>Fold the gown down over the arms inside-out and discard in biohazard container</b>   |
| <b>Don sterile gloves</b>  | <b>Remove mask, touching only the ties, and discard in the biohazard receptacle</b>   |
| <b>Remove gloves by folding them down and turning them inside out, avoiding touching the outside of the gloves</b> |   |

# PPE quiz

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

Directions: Circle the correct answer.

1. **Which agency developed standard precautions?**
  - a. OSHA
  - b. ADA
  - c. Congress
  - d. CDC
2. **What is the best way to prevent the spread of infection?**
  - a. Dispose of waste in the appropriate container
  - b. Use personal protective equipment
  - c. Avoid patient contact
  - d. Wash your hands frequently
3. **When should hands be washed when you will be wearing personal protective equipment?**
  - a. Before donning equipment
  - b. Before donning equipment and after removing equipment
  - c. Every five minutes or when your hands sweat
  - d. After removing equipment
4. **How long can a single pair of gloves be used?**
  - a. Until a glove tears
  - b. Until a glove looks visibly contaminated
  - c. During care for a couple of patients
  - d. During care for one patient
5. **Which of the following is true about face masks?**
  - a. They should be put on after donning gloves
  - b. They can be reused after they have been disinfected
  - c. They cannot be reused
  - d. They do not have to be changed if they get wet
6. **Which of the following is an example of a safer medical device?**
  - a. Sterile gauze
  - b. Self-sheathing needle
  - c. A tuberculosis needle
  - d. A glucose monitoring device
7. **Where should a disposable gown be placed after use?**
  - a. In a trash can
  - b. In the linen closet
  - c. In a biohazardous linens bag
  - d. In a biohazardous waste container
8. **Which of the following is true?**
  - a. Hospital-based infections are not a major cause of death
  - b. All bodily fluids should be considered infectious
  - c. Spills should be cleaned with pure bleach
  - d. Recap a needle using a two-handed method
9. **The string and elastic bands of masks and eyewear are considered\_\_\_\_\_?**
  - a. Contaminated
  - b. Clean
  - c. Biohazardous
  - d. Sterile
10. **What type of PPE should you use when helping a patient with a small cut that is not bleeding?**
  - a. Mask and eyewear
  - b. Gloves
  - c. Gloves and a gown
  - d. Mask, eyewear, and a gown
11. **When should gowns be worn?**
  - a. When you are wearing gloves
  - b. When contact with blood or bodily fluid is likely
  - c. When the patient is HIV positive
  - d. When you are bathing a patient
12. **When should hands be washed when you will be wearing gloves?**
  - a. No need to wash hands when wearing gloves
  - b. Before donning gloves
  - c. After removing gloves
  - d. Before and after wearing gloves
13. **What color is used to mark biohazardous waste containers?**
  - a. Red or orange
  - b. Green
  - c. Yellow
  - d. Blue
14. **When should gloves be donned when you are wearing additional PPE?**
  - a. Before donning a gown
  - b. Before donning a mask
  - c. Before donning eyewear
  - d. After donning a gown, mask, and eyewear
15. **How is a used sharp disposed of?**
  - a. Drop the entire sharp into a sharps container
  - b. Wrap the sharp in gauze and place in a biohazardous container
  - c. Rinse the sharp in water and place in a biohazardous container
  - d. Recap or break any needles and drop them into a sharps container

- 16. What should a healthcare worker do with bed sheets that are soaked with blood?**
- Place them in a trash bag and send to incinerator
  - Place them in a biohazardous linens bag
  - Double-bag them, put them in a biohazardous trash bag
  - Place them in a biohazardous trash bag
- 17. James has just finished a procedure with a patient. What should he do with the disposable gown?**
- Hang it in the gowns closet
  - Dispose of it in a biohazardous waste container
  - Throw it in a trash can
  - Continue wearing it until it gets dirty or wet
- 18. How are contaminated gloves removed?**
- Wash the gloves before removing them
  - Pull on the fingertips and ease the gloves off the hand
  - Turn the gloves inside out while removing and then wash them
  - Turn inside out while removing and do not touch skin
- 19. What type of PPE should you wear when helping a patient who has been shot in the thigh?**
- Gloves
  - Gloves, mask, eyewear, and a gown
  - Mask, eyewear, and a gown
  - Gloves and a gown
- 20. When should standard precautions be used?**
- For all patients, regardless of their illness
  - When you are using pure bleach to clean a spill
  - When you will be touching a patient's skin
  - When patients are vomiting or coughing
- 21. How can you tell whether a trash container is for regular or biohazardous material?**
- It all ends up in the same container eventually
  - There is only one biohazardous container
  - A regular waste container uses a yellow bag
  - A biohazardous container with a red bag marked properly
- 22. Which patients should be considered infectious?**
- All patients should be considered infectious
  - Patient with a cough and fever
  - Pediatric and elderly patients
  - Homeless and addicted patients
- 23. What can you use as a barrier between you and bloodborne pathogens?**
- Personal protective equipment
  - Patient drape
  - Alcohol hand sanitizer
  - Uniform
- 24. Why is it important for healthcare workers to wear PPE?**
- Standard precautions require it
  - For protection from pathogens
  - For protection from blood and bodily fluid
  - All of the above
- 25. What should be done after a spill is wiped up with a cloth?**
- Avoid using the area for 24 hours
  - Disinfect the area with bleach solution
  - Open a window to air out the room
  - Use soap and water to kill pathogens
- 26. How should rescue breaths be given to a patient during CPR?**
- Cover the patient's mouth and nose with your mouth
  - Cover the patient's mouth with your mouth
  - Wipe the patient's mouth and then breathe into the nose
  - Use a CPR shield
- 27. Which of the following precautions is NOT considered a sharp?**
- Probe covers
  - Surgical blades
  - Razors
  - Needles
- 28. How should a blood-soaked piece of gauze be disposed of?**
- Red biohazardous waste bag
  - Infectious linens bag
  - Black trash bag
  - Puncture-proof sharps container

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

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  - Infectious linens bag
  - Black trash bag
  - Puncture-proof sharps container

Where does it go?



## Where does it go? (cont.)

Directions: Cut slips apart and place them in the correct disposal container.

|   |   |
|---|---|
| <b>IV bags and tubing</b>                                   | <b>gloves with blood</b>                |
| <b>swabs used to collect blood or bodily fluid specimen</b> | <b>gloves</b>                           |
| <b>eye drops</b>  | <b>used needles</b>                     |
| <b>beverage container</b>                                   | <b>dressings</b>                        |
| <b>IV bags/tubing with residual medicine</b>                | <b>used urine specimen cup</b>          |
| <b>soaked bloody dressing</b>                               | <b>wrappers</b>                         |
| <b>underpads</b>  | <b>partially used vials of medicine</b> |
| <b>razors</b>   | <b>empty medication vials</b>           |
| <b>used tissue</b>  | <b>patient gown with blood</b>          |
| <b>paper towels used to clean up blood or bodily fluids</b> | <b>lancets</b>                          |
| <b>tongue depressor</b>                                     | <b>urinary catheter/foley bag</b>       |

**Regular trash** — IV bags and tubing, empty medication vials, dressings, underpads, used tissue, gloves, wrappers, tongue depressor, beverage container

**Biohazard Bag** — soaked bloody dressing, urinary catheter/foley bag, gloves with blood, used urine specimen cup, swabs used to collect blood or bodily fluid specimen, paper towels used to clean up blood or bodily fluids, patient gown with blood

**Sharps container** — used needles, lancets, razors

**Pharmaceutical waste** — eye drops, partially used vials of medicine, IV bags/tubing with residual medicine

# PPE procedure checklist

| PPE procedure checklist   | Pass                     | Repeat                   | Comments |
|---|--------------------------|--------------------------|----------|
| 1. Find a partner as directed by your teacher.  | <input type="checkbox"/> | <input type="checkbox"/> |          |
| 2. Decide which person wants to record and which person wants to demonstrate first.   | <input type="checkbox"/> | <input type="checkbox"/> |          |
| 3. Wash your hands using the proper technique.  | <input type="checkbox"/> | <input type="checkbox"/> |          |
| 4. Unfold your gown and put it on with the opening to the back. Tie the gown securely at neck and waist.  | <input type="checkbox"/> | <input type="checkbox"/> |          |
| 5. Put on a mask, covering your nose, mouth and chin. Secure elastic bands or ties. Pinch the metal strip.  | <input type="checkbox"/> | <input type="checkbox"/> |          |
| 6. Put on gloves, extending them over the cuffs of the gown. Interlace your fingers so that the gloves fit correctly. (At this point, you would continue with patient care as appropriate.)   | <input type="checkbox"/> | <input type="checkbox"/> |          |
| 7. Proceed with doffing:<br>Grasp the outside of one glove with the opposite gloved hand and peel off, turning the glove inside out as you pull it off. Hold the removed glove in the remaining gloved hand.  | <input type="checkbox"/> | <input type="checkbox"/> |          |
| 8. Slide the fingers of the ungloved hand under the remaining glove at the wrist, being sure not to touch the outer surface of the glove.   | <input type="checkbox"/> | <input type="checkbox"/> |          |
| 9. Peel off the glove over the first glove, containing the one glove inside the other. Discard appropriately.   | <input type="checkbox"/> | <input type="checkbox"/> |          |
| 10. Gown: Unfasten ties. Allow the gown to fall away from your shoulders. Touching only the inside of the gown, pull it away from your body. Keep your hands on the inner surface of the gown as you pull it down off your arms. Turn the gown inside out as you remove it. Fold or roll it into a bundle and discard it appropriately (you will reuse this one to practice). | <input type="checkbox"/> | <input type="checkbox"/> |          |
| 11. Mask: Grasp neck ties or elastic and remove. Do not touch the front of the mask. Discard appropriately (keep for further practice).   | <input type="checkbox"/> | <input type="checkbox"/> |          |
| 12. Wash your hands.  | <input type="checkbox"/> | <input type="checkbox"/> |          |
| 13. When working with a partner, switch roles.  | <input type="checkbox"/> | <input type="checkbox"/> |          |