



**CHAPTER 6**

# Personal Protective Equipment (PPE)

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### National Pesticide Applicator Certification Core Manual



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# Personal Protective Equipment (PPE)

This module will help you:

- ❖ Understand PPE selection
- ❖ Understand PPE care, storage, and disposal

# Required PPE is determined by...

- ❖ The **toxicity** of the pesticide
- ❖ The **formulation** of the pesticide
- ❖ The **activity you are performing**
  - ❖ Measuring, mixing and loading
  - ❖ Applying
  - ❖ Maintenance operations

# Read the label!!

- ❖ Follow directions for PPE
  - ❖ Handlers
  - ❖ Applicators
  - ❖ Early entry workers
- ❖ *Minimum* requirements are given – can wear more



# Chemical-resistant Materials

- ❖ Read the label
  - ❖ What clothing is specifically required



## PERSONAL PROTECTIVE EQUIPMENT (PPE)

Some materials that are Chemical-resistant to this product are listed below. If you want more options, follow the instructions for category F on an EPA chemical resistance category selection chart.

Applicators and other handlers must wear: A) Long-sleeved shirt; B) Long pants; C) Chemical-resistant gloves such as Barrier Laminate, Butyl Rubber, Nitrile Rubber or Viton; D) Shoes plus socks.

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

# Chemical-Resistant Clothing

- ❖ Prevents most chemicals from reaching the skin
- ❖ PVC plastic, rubber, non-woven coated fabrics



Rubber



Nitrile



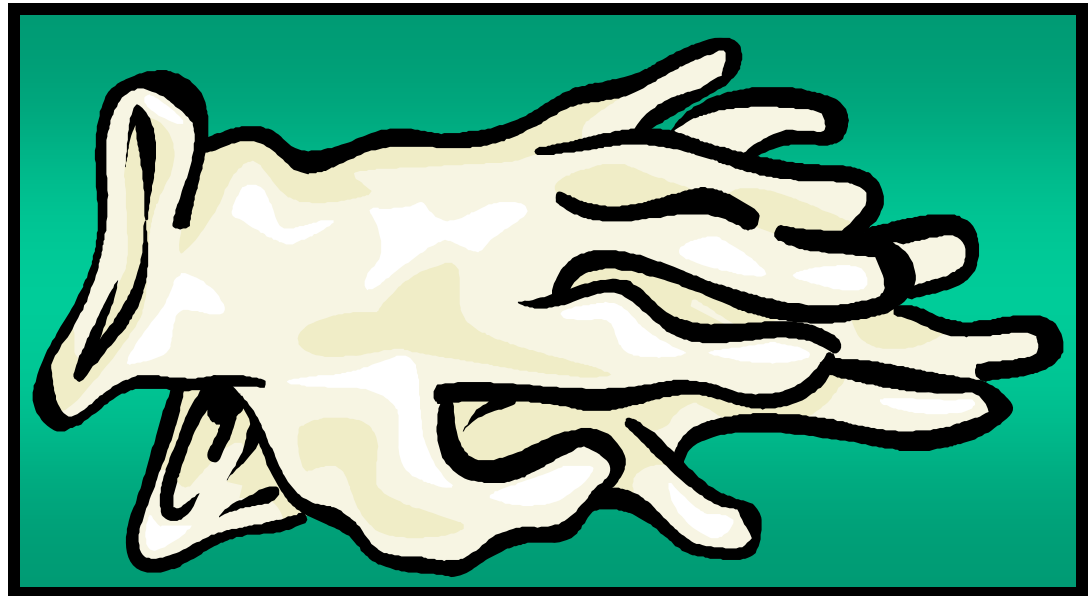
PVC



Barrier  
Laminate

# Chemical-resistant Materials

- ❖ Watch for signs of wearing and degrading:
  - ❖ color change
  - ❖ spongy
  - ❖ swollen
  - ❖ jelly-like
  - ❖ cracked
  - ❖ brittle



**Cotton, Denim, Leather:**  
Not recommended for most pesticide  
applications!





# Personal Protective Equipment (PPE)

- ❖ Minimum:
- ❖ Long-sleeved shirt
- ❖ Long trousers or coveralls
- ❖ Gloves
- ❖ Shoes plus socks
- ❖ Hat

**Protect Yourself!**



# Coveralls

- ❖ Wear loosely over clothing
- ❖ Zippers should be covered
- ❖ Two-piece: top should extend well below the waist and remain untucked



# Chemical-resistant Suits

- ❖ Offers the most protection
- ❖ Wears out with chemical contact over time
- ❖ Made of rubber or plastic
- ❖ May be too warm
- ❖ Drink plenty of water!
- ❖ Take frequent breaks!



# Chemical-Resistant Aprons

- ❖ Use when:
  - ❖ mixing and loading
  - ❖ cleaning equipment
- ❖ From neck to knees
- ❖ **WARNING:** aprons can get caught in machinery!



# Use Gloves!

- ❖ Especially during mixing & loading
- ❖ Unlined and waterproof
- ❖ Check for holes
- ❖ If spraying overhead, tuck sleeves inside gloves...



... and fold the cuffs up

**What is wrong with these gloves?**



**Lining can absorb pesticide!**

**NEVER** use cotton gloves when  
applying pesticides...  
*unless the label requires them*



**Gloves reduce dermal exposure by 99% when mixing, loading, and applying**



**Exception:** Methyl bromide and other fumigant gases can become trapped inside gloves and cause burns





# No gloves??



Fluorescent dye shows how much pesticide can get on the hands while handling it

**What is wrong with this picture?**



**Wear long-sleeved shirts!**

# Check the label

to determine if you need specific chemical-resistant gloves, and what kind

## **Personal Protective Equipment:**

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category C on an EPA chemical resistance category selection chart.

**Applicators and other handlers must wear:** Long-sleeved shirt and long pants; Chemical-resistant gloves; such as Barrier Laminate or Butyl Rubber, or Nitrile Rubber or Neoprene Rubber or Polyvinyl Chloride or Viton; Shoes plus socks; Protective eyewear when mixing or loading, when performing maintenance or repairs (such as repairing/replacing hoses, cleaning, replacing or unplugging nozzles) on contaminated equipment or equipment containing residual carbofuran, or when cleaning the equipment or vehicle containing, or contaminated with carbofuran. For exposure in enclosed areas: A respirator with either an organic vapor-removing cartridge with a prefilter approved for pesticides (MSHA/NIOSH approval number prefix TC-23C), or a canister approved for pesticides (MSHA/NIOSH approval number prefix TC-14G), or a NIOSH approved respirator with an organic vapor (OV) cartridge or canister with any R, P or HE prefilter; For exposures outdoors: Dust/mist filtering respirator (MSHA/NIOSH approval number prefix TC-21C), or a NIOSH approved respirator with any R,P or HE filter.

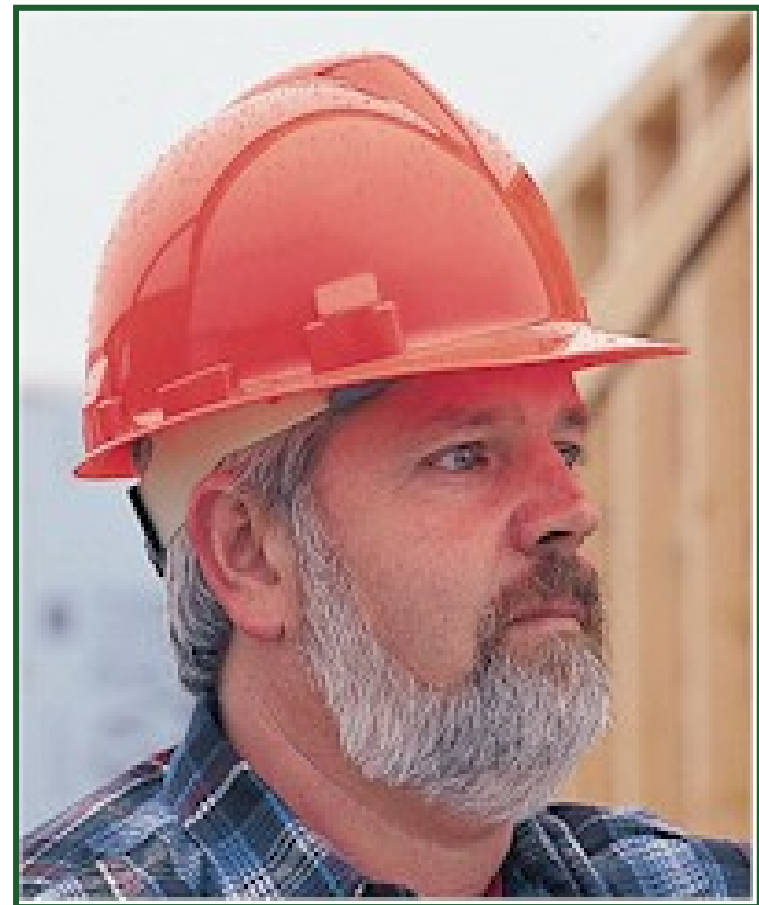
# Footwear

- ❖ No sandals!
- ❖ Consider wearing unlined, rubber boots... even if not required
- ❖ Hang pant legs **outside** the boots!



# Hats & Hoods

- ❖ Liquid-proof with a wide brim
- ❖ No absorbent materials!
- ❖ Chemical-resistant hoods on jackets



# Protect your eyes when mixing concentrates or handling dusts or toxic sprays



**Eyewear should have shields on all sides!**



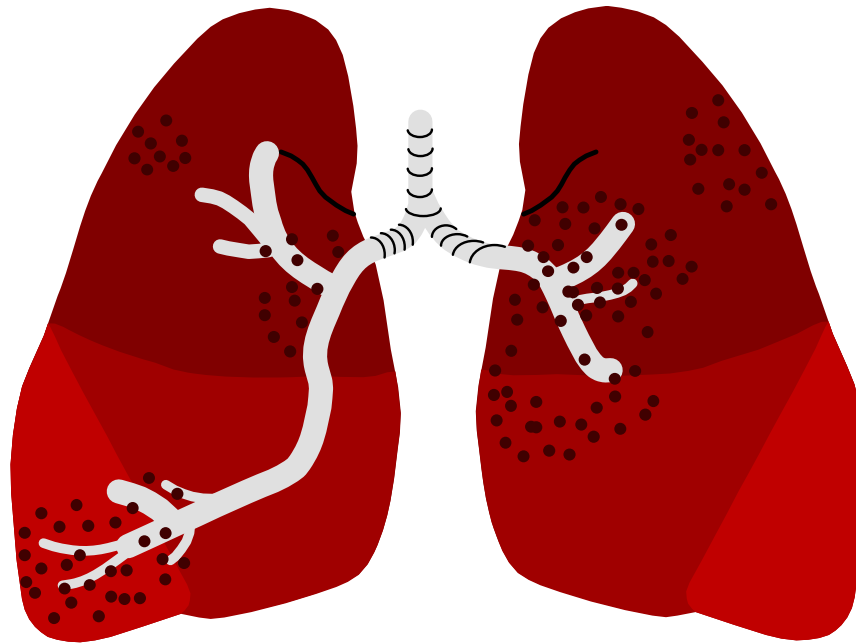
**If goggles are required, so is access to an eyewash dispenser!**



A portable eyewash is recommended for people in the field without access to a stationary eyewash

# Respirators

**Prevent pesticide exposure  
through the respiratory system**



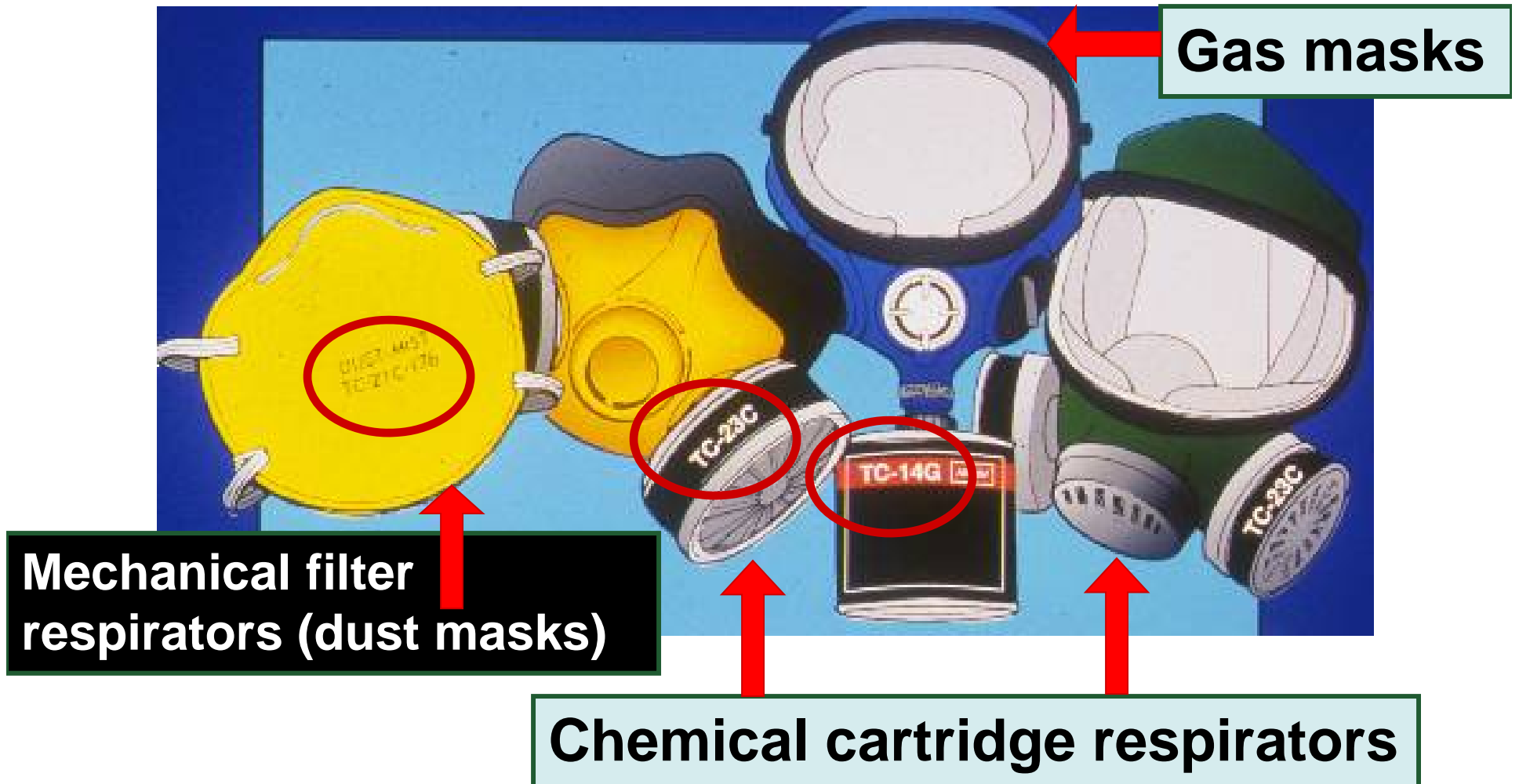


# When should a respirator be used?

- ❖ When the label requires it
- ❖ When exposed to spray mist
- ❖ When working in confined spaces
- ❖ When using dusts, gases, vapors, or fumigants



# Air-purifying



# Chemical cartridge and canister respirators

- ❖ Both half-face mask and full-face mask styles
- ❖ Get cartridges that are right for the chemicals you are using!



# Air-Supplying

- ❖ Use an air-supplying respirator when
  - ❖ oxygen level is low
  - ❖ when applying fumigants in enclosed areas such as grain bins
- ❖ Self-contained breathing apparatus



# Which type of respirator is this?

Air-purifying or air-supplying?



# Always select equipment approved by:

- ❖ National Institute of Occupational Safety and Health (NIOSH)
- ❖ Make sure the cartridge or filter is rated for the pesticide you are using
- ❖ Read the label



# Use and Care of Respirators

- ❖ Fit-check and make sure it works before every use
- ❖ MUST have tight seal!
- ❖ Make sure valves are in proper working order
- ❖ Replace filters
  - ❖ Taste, smell, breathe
  - ❖ State regulations
  - ❖ Manufacturer recommendations



# Fit test your respirators...

- ❖ Physician check up
- ❖ Prior to initial use
- ❖ Whenever a different facepiece is used
- ❖ *At least every year thereafter*
- ❖ States may have regulations





# Qualitative Fit Test



Wand with irritant is placed inside area with respiratory user

- ❖ With the respirator on, the wearer is exposed to an odorant, irritant, or taste agent
- ❖ The wearer then breathes, moves head from side to side, up and down, grimaces, bends at the waist, and talks
- ❖ The wearer reports any noticeable odor or taste agent that leaks into the mask

# Quantitative Fit Test



- ❖ A special instrument compares the dust particle concentration in the surrounding air with the concentration inside the respirator
- ❖ The ratio of these concentrations is called the **fit factor**
- ❖ Wearer performs same movements as in the qualitative test, and the device continues to measure the concentration of particles

# Fit check before each use!

## ❖ Positive pressure check:

Put hand over exhalation valve and exhale gently. If there is pressure in the mask, it's a good fit



# Fit check before each use!

- ❖ **Negative pressure check:**  
Cover cartridges with hands, inhale gently, and hold breath for 10 seconds. If the facepiece exhibits no leakage, the respirator fits properly
- ❖ **Facial hair does not allow a respirator to seal!**



- ❖ After each use, remove filters and wash the facepiece



- ❖ Store in a tightly-sealed bag in a clean, dry location, **not the pesticide storage areas**

# Get to Fresh Air Immediately if...

- ❖ You smell or taste contaminants
- ❖ Your eyes, nose or throat become irritated
- ❖ Your breathing becomes difficult
- ❖ The air you are breathing becomes uncomfortably warm
- ❖ You become nauseous or dizzy



# Clean Up!

- ❖ Discard disposables and worn-out items!
- ❖ Wash at the end of each day, including gloves and all PPE
- ❖ Launder pesticide clothing



# Separate from family clothing

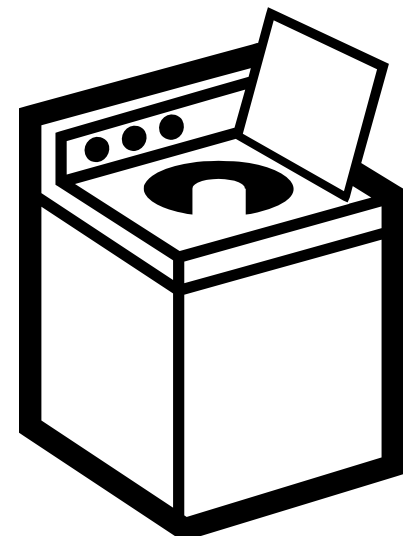


**Wash contaminated clothing  
in hot water with detergent**

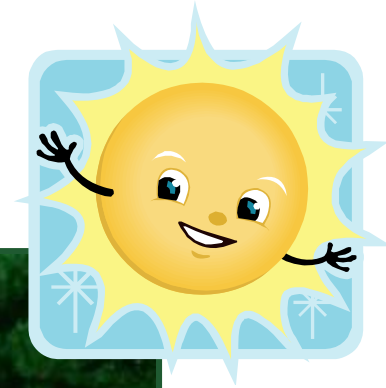


# Laundering Pesticide Contaminated Clothing

- ❖ Use heavy-duty liquid detergent for ECs
- ❖ Use 2 cycles for moderate to heavy contamination
- ❖ Rinse the washer with an “empty load”



# Line dry clothing if possible!



**Keep all PPE  
separate from  
pesticides in  
storage!!**



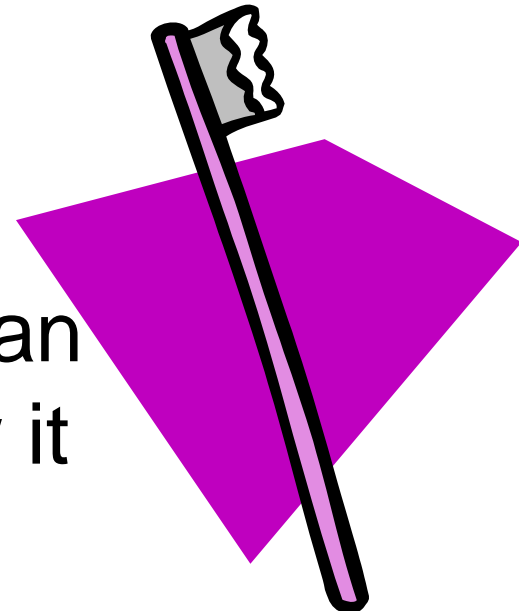
# PPE Use

- ❖ Wear adequate PPE
  - ❖ When mixing
  - ❖ When applying
  - ❖ When doing equipment maintenance



# PPE Use

- ❖ If a nozzle becomes plugged during an application...
  - ❖ **Do not** remove your PPE!
  - ❖ Use an old toothbrush to clean the nozzle. **Never** try to blow it out with your mouth



# Summary

- ❖ Use PPE
- ❖ Use chemical-resistant PPE if necessary
- ❖ Wear, clean, store, & dispose of PPE properly
- ❖ Use eyewear & respirator according to the label
- ❖ Fit test respirators yearly and fit check them before every use
- ❖ Follow the label instructions -- and then some!



## CHAPTER 6

Q1. Who must legally follow Personal Protective Equipment instructions on the pesticide label?

1. applicators
2. mixers/loaders
3. early-entry agricultural workers
4. hand-picking harvest crew

A. 1 only

B. 1 and 2 only

C. 1, 2, and 3 only

D. 1, 2, 3, and 4



## CHAPTER 6

Q2. A pesticide label may require a respirator be worn for personal protection when handling the pesticide product. Which of the following are types of air-purifying respirators?

1. Chemical cartridge respirators
2. Gas masks
3. Self-contained breathing apparatus
4. Supplied-air respirators

A. 1 and 2 only

C. 3 and 4 only

B. 2 and 3 only

D. 2 and 4 only





## CHAPTER 6

Q3. Where does most pesticide exposure occur for pesticide handlers?

- A. Eyes
- B. Hands
- C. Forearms
- D. Feet

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