

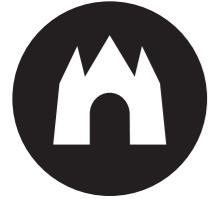


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## BioHack Academy Biosafety



# Importance of safety

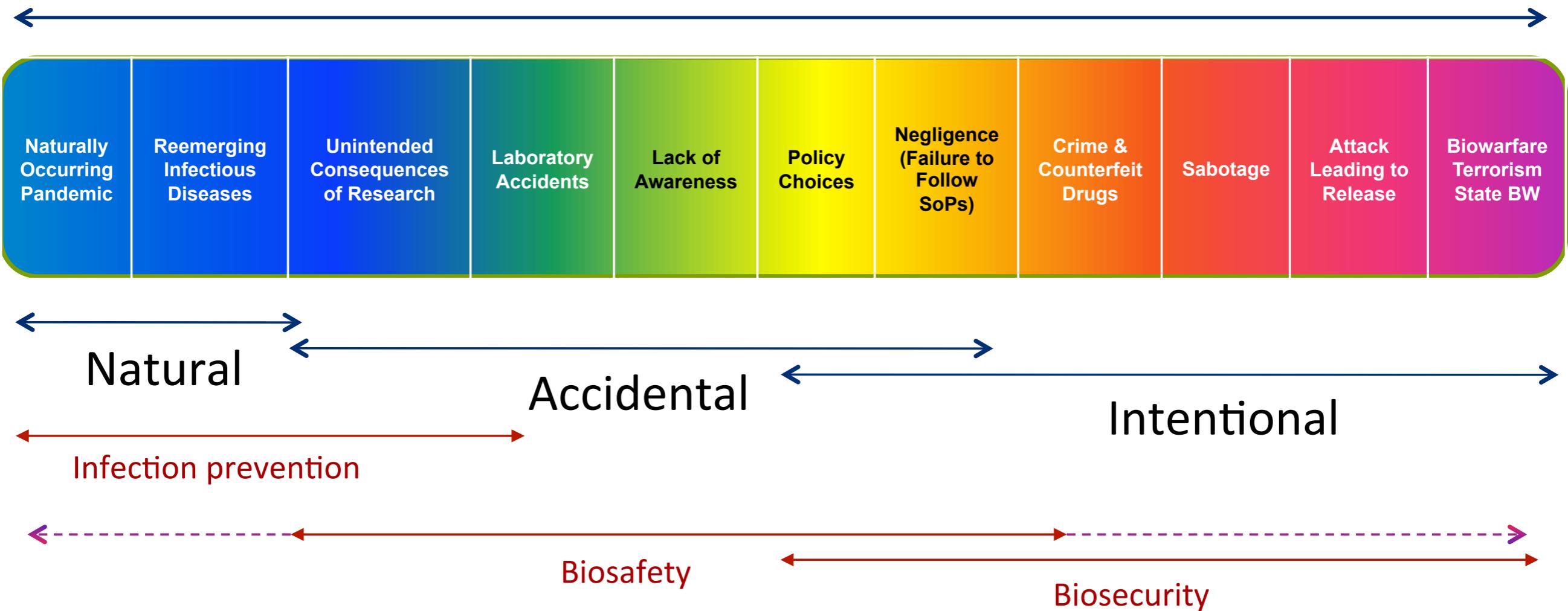
Safe procedures protect:

1. The environment
2. Your colleagues
3. Yourself



# Spectrum of Risk

Biological risks can be seen as a spectrum:

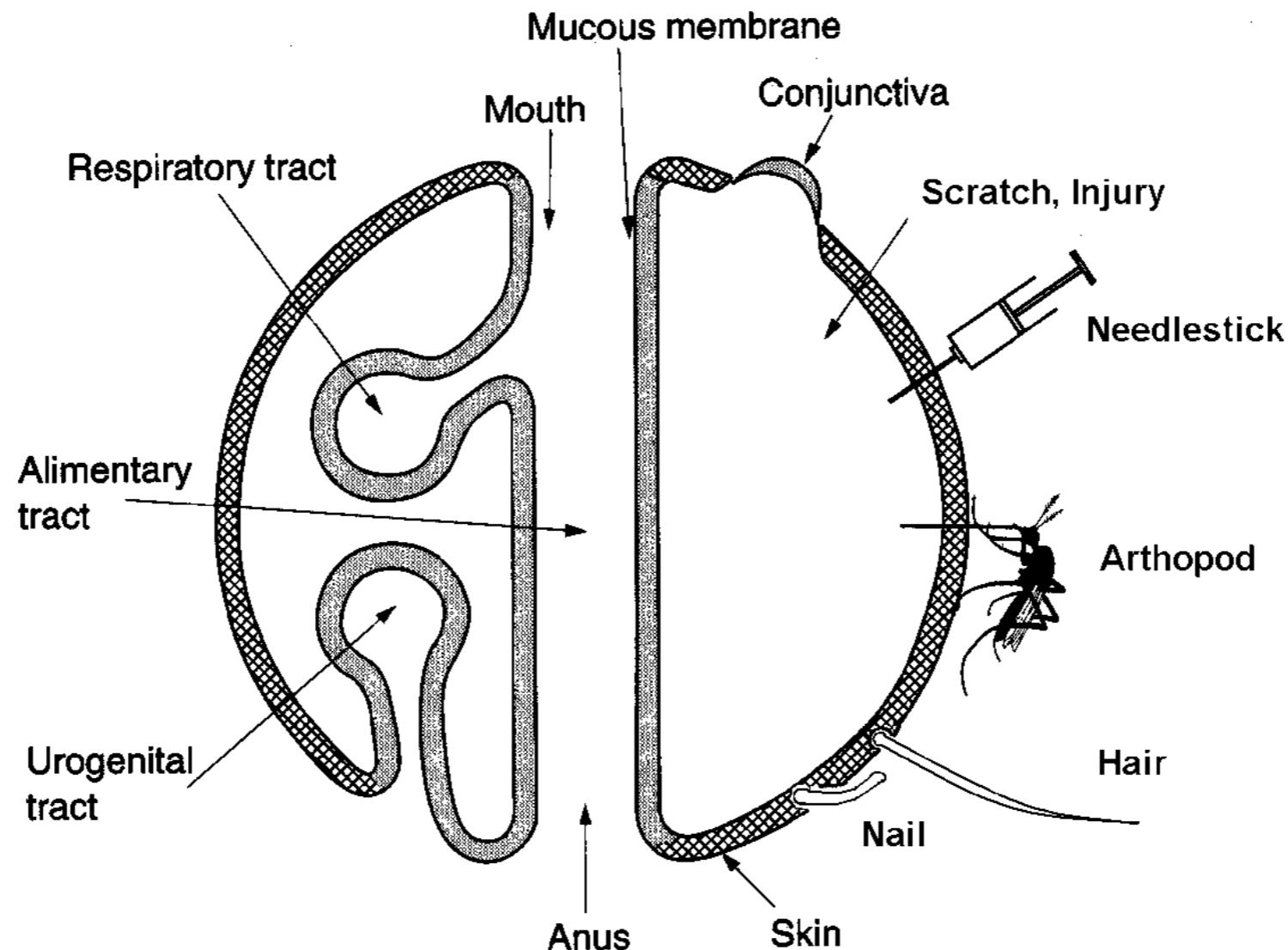


By courtesy of Tim Trevan, ICLS



# Ways of infection

Exposure, sources and routes of infection 41



*Figure 2.1 Routes of infection: the body's portals of entry of microbes. (From Mims, 1982, by permission of Academic Press)*



# Aerosols





# Please note

- Only non-pathogenic microbes are used in the Academy
- Wash your hands before and after experimenting
- Do not eat or drink next to the microbes





# Contamination in the lab

- Bio safety level number indicates the level of regulations that are in place to prevent contamination.
- Types of organisms allowed per level:
  - 1) Well characterized non pathogenic organisms to humans
  - 2) Micro organisms with high infection doses, and known cures
  - 3) Micro organisms with low infection doses, and known cures
  - 4) Micro organisms with extremely low infection doses, severe disease and no cure





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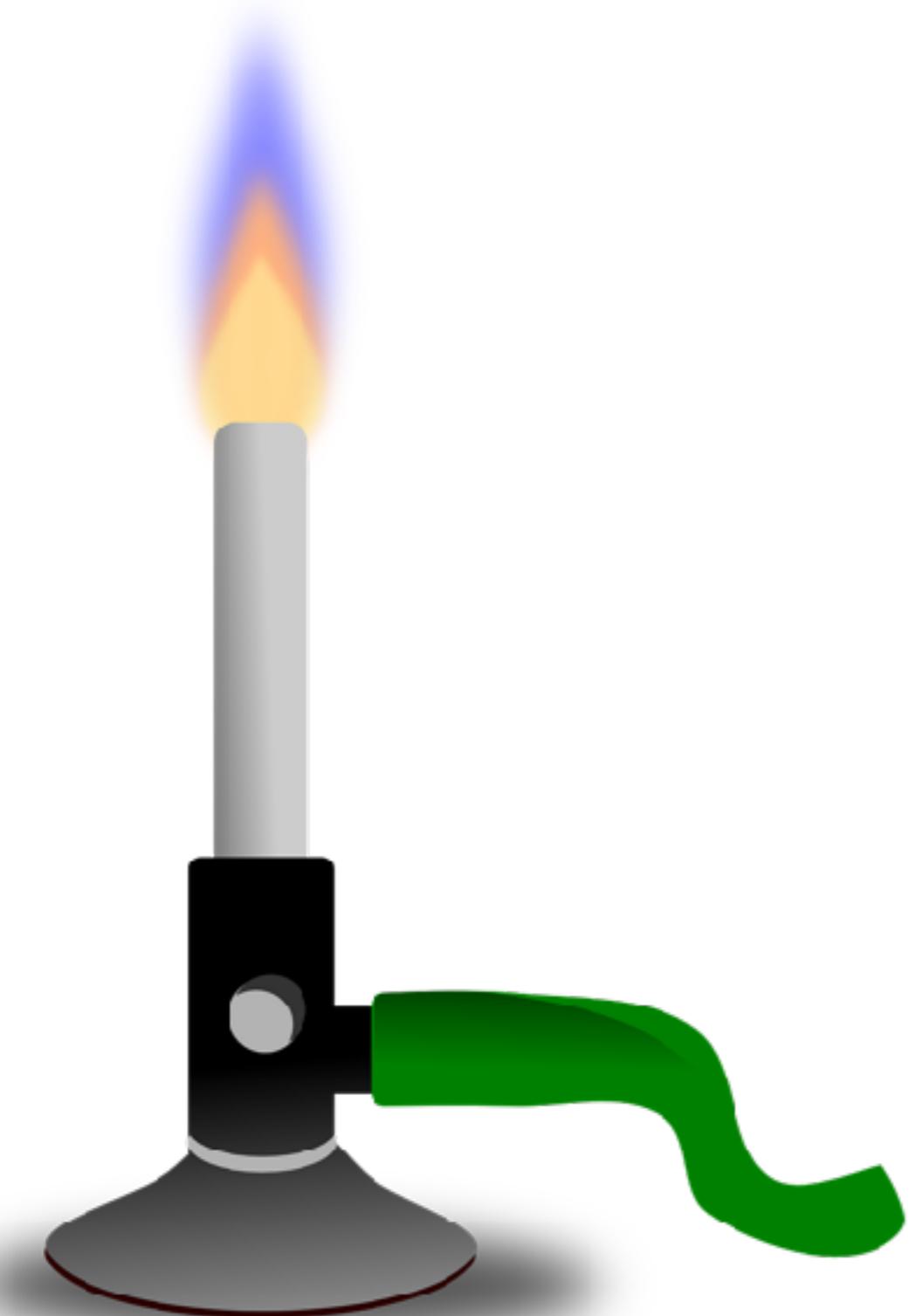
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# Personal Protection

Equipment for protection yourself



# Working sterile





# Personal Protection

These items are recommended in the lab





# Wash your hands!

Remember, before and after experiments:

- Wash your hands
- Even after wearing gloves



Arlington County - CC-BY-SA-2.0



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# Chemicals



# Label everything

- Use labels on everything!!
- You are the only one who knows what is in the container
- Labels must consist of:
  - Content
  - Date
  - Name



# Global Harmonized System Labels

Familiarize yourself with the meaning of these symbols:



Explosive



Flammable



Oxidizing



Skin  
Irritation



Pollution



Corrosive

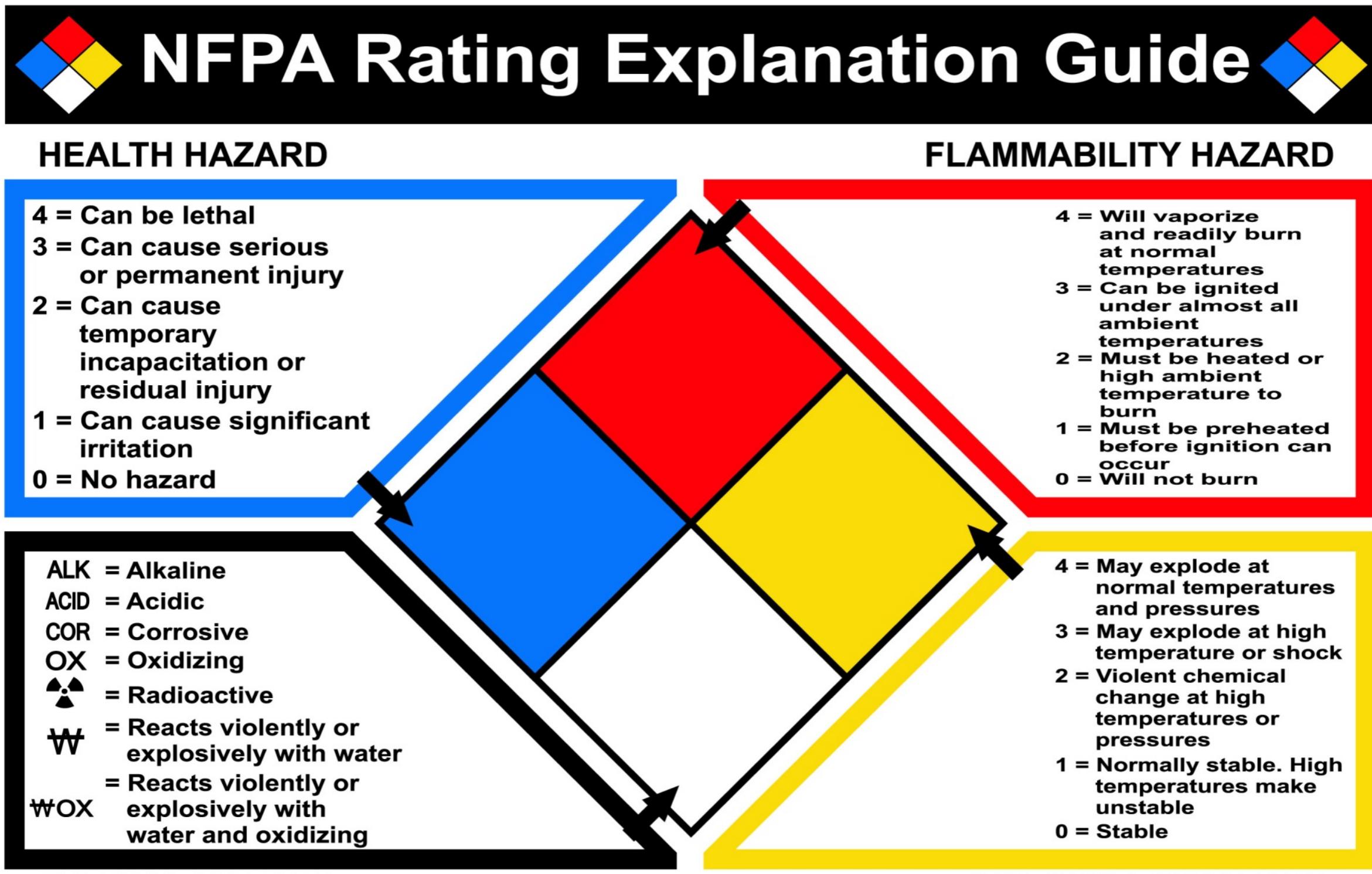


Compressed



# NFPA safety diamond

NFPA diamonds are often used as well





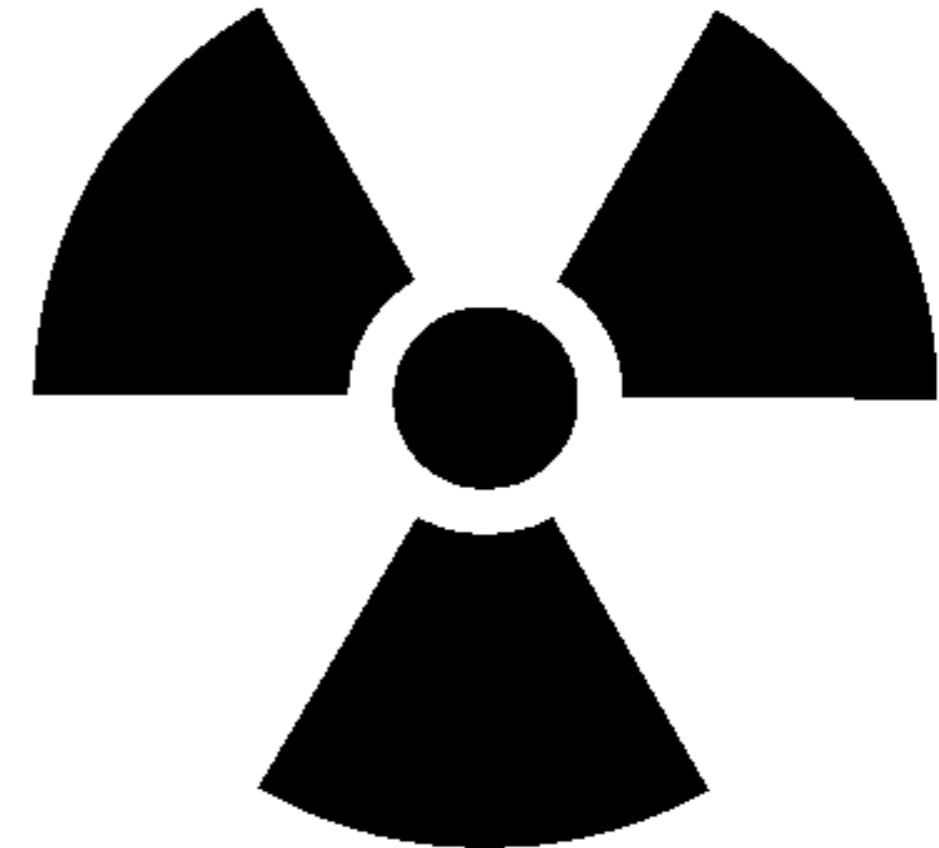
# Special labels

Do not bring anything with such label to the lab

**BIOHAZARD**



**DANGER**



**RADIOACTIVE  
MATERIAL**



# MSDS

- Material Safety Data Sheets come with every chemical and contain information about all safety aspects such as:
  - Procedures for safe handling
  - Physical Data
    - Melting point
    - Boiling point
    - Toxicity
    - Reactivity
  - Storage
  - First aid procedure
- Read the MSDS before you use any chemical!





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# Waste Disposal



# Waste disposal

- Think of how to dispose of things before you bring it into the lab



# Biological Waste

You are responsible for killing anything you grow:

- Kill off any culture with 10% hypochlorite bleach
  - Incubate for 24h before disposal
- Clean any used surface and object with 70% ethanol (red capped bottles)
- Autoclave for 20 minutes





# Broken glassware

- Do NOT dispose in the normal trash bin
- Special “broken glass” container
- Use broom to clean up, because you can easily cut yourself





# Chemical waste

- Check what is allowed to store in the lab with the labmanager
- Check what is allowed to go down the sink with the labmanager
- Do NOT mix / bomb guide:
  - Concentrated Acids and Bases
  - Oxidizers and Flammables
  - Water reactive substances and aqueous solutions
  - Cyanides and acids => cyanide gas
  - Bleach and acids => chloride gas
- Search for reactivity on the internet!
- Read the MSDS before using a chemical!



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# BioHacker Ethics

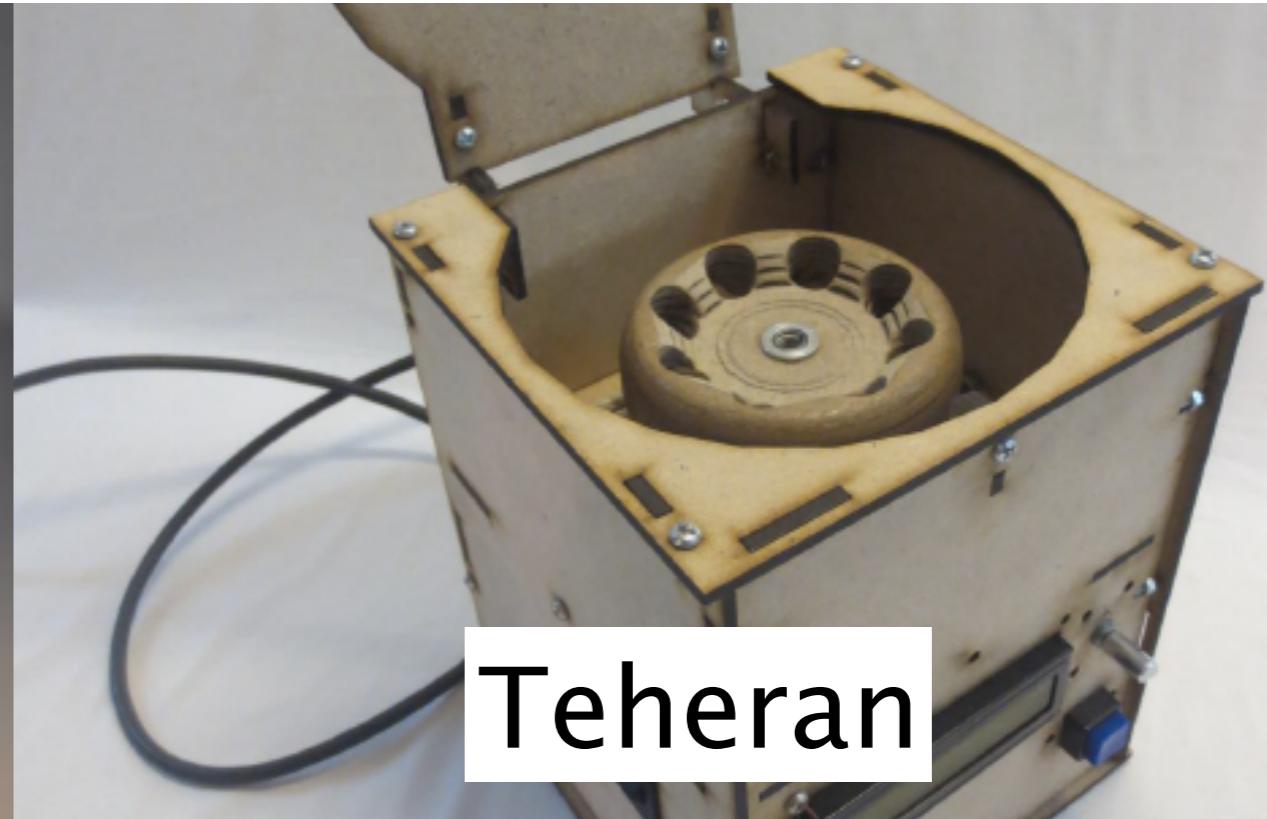


# Responsibility?

Amsterdam



Teheran



Barcelona



Unknown hacker





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