PRESENTER'S GUIDE

"<u>LABORATORY HOODS</u>"

Part of the Laboratory Safety Series

Quality Safety and Health Products, for Today... and Tomorrow

OUTLINE OF MAJOR PROGRAM POINTS

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The following outline summarizes the major points of information presented in the program. The outline can be used to review the program before conducting a classroom session, as well as in preparing to lead a class discussion about the program.

- **Many of the materials we work with give off hazardous contaminants.**
  - Fumes.
  - Mists.
  - Vapors.
  - Particulates.
  - Aerosols.

- **To minimize exposure to these materials we must take special precautions.**
  - This often means working within a "hood".

- **We can look at how hoods function by using the "chemical exhaust hood" as an example. They:**
  - Prevent contaminants within the hood from entering the "breathing zone".
  - Create a protective barrier by pulling air into and through the hood.

- **The hood's "inward" airflow keeps hazards from escaping.**
  - Captured contaminants are filtered, diluted and exhausted through a duct system.

- **Hoods can also provide protection from "physical" threats**.

- **The <u>sash</u> protects workers from hazards such as:**
  - Chemical splashes.
  - Sprays.
  - Fires.
  - Minor explosions.

- **You should pull the sash down as far as possible when you are working.**
  - But keep it at a comfortable level.

- **When working within a hood, personal protective equipment is still required. This can include:**
  - Safety eyewear.
  - Lab coats.
  - Gloves.
  - Other protection if necessary.

- **To make sure that they are operating safely, hoods are thoroughly tested in several situations.**
  - When they are first installed.
  - Whenever a change is made in the lab's ventilation system.
  - Periodically throughout the year.

- **There are specific steps to follow to determine if a hood is operating correctly.**

- **Air circulation around the hood ("crossdraft") should be checked first.**
  - Measure it six inches from the front of the hood.
  - It should not be greater than 20 linear feet per minute.

- **Next, a smoke tube should be used to make sure airflow within the hood is correct.**
  - Smoke should head for the ventilation ducts.

- **The rate of air coming through the face of the hood ("face velocity") should be measured next. To do this:**
  - Open the sash.
  - Use instruments such as "anemometers" or "velometers" to get measurements.
  - <u>Don't</u> use sheets of tissue or other paper as a substitute.

- **Measuring this "face velocity" requires great precision.**
  - The hood face is divided into a grid pattern.
  - The air velocity is measured in each quadrant.
  - Values for specific points can vary +/- 25%.
  - But no measurement should be below 60 feet per minute.

- **The face velocity is also compared to the crossdraft.**
  - The crossdraft should never be greater than 20% of the face velocity.

- **If problems are apparent, several things will need to be checked or adjusted, including:**
  - Interior hood baffles.
  - Laboratory ventilation systems.

- **Checking for turbulence within a hood is also important.**
  - Use "smoke patterns" for this purpose.

- **If excessive turbulence is seen (or smoke is not captured) a number of things should be checked, including the:**
  - Location of equipment within the hood.
  - Hood's face velocity.
  - Location of air-input ports.
  - Physical location of the hood itself.
  - Volume of air coming into the hood.

- **If you suspect a hood isn't performing properly, talk to your supervisor about possible retesting.**

- **Laboratory hoods must also be used correctly to be effective.**
  - Maintain proper airflow within the hood.
  - Perform experiments at least six inches inside the hood.
  - Elevate equipment (especially large pieces) if necessary.

- **Hoods should not be used as storage cabinets.**
  - Overloading restricts the airflow.
  - This can result in dangerous build-up of hazardous vapors.
  - Chemicals stored in hoods can make an emergency or fire worse.
  - If you are not actively working with a material in the hood, put it away.

- **You should take steps to prevent contaminated air in hoods from entering the laboratory**.
  - Keep the sash closed as much as possible.
  - Pay attention to air monitors.

- **Checking face velocity of a hood regularly is important.**
  - Average velocities range from 80-100 linear feet per minute.
  - Higher velocities of about 125 linear feet per minute may be required for some experiments.
  - However, higher velocities can create turbulence and should not exceed 150 linear feet per minute.

- **It is also important to exercise caution <u>around</u> hoods.**
  - The airflow must not be disturbed.
  - Even velocities of 100 linear feet per minute can be overcome by rapid movements in front of the hood.

- **Solid objects should be kept from entering a hood's exhaust ducts, so they don't:**
  - Lodge in a duct or fan.
  - Adversely affect airflow.

- **Never place your head inside an exhaust hood.**
  - This disrupts airflow.
  - You risk being overcome by potentially hazardous fumes/vapors.
  - If a hood needs adjusting, consult your supervisor.

- **"Biohazard hoods" are different from exhaust hoods.**
  - They are designed to capture exotic and infectious particulates.
  - Most often they are used with clinical specimens or body fluids.

- **The main feature of biohazard hoods is their filtering system.**
  - It captures and removes hazardous aerosols before they can be recirculated or exhausted.
  - The most effective filtering system is the "high efficiency particulate air" (HEPA) filter.

- **HEPA filters have unique characteristics. They:**
  - Are disposable, dry-type filters.
  - Are constructed of "boron silicate" microfibers.
  - Can capture particles as small as 0.3 of a micron with 99.9% success rates.

- **Remember, HEPA filters do not guard against hazardous gases.**
  - If the substances you are working with give off both particle and gases, talk to your supervisor about the proper hood to use.

- **There are other specialized hoods for work involving specific materials, including:**
  - Perchloric acids.
  - Radioisotopes.

- **"Perchloric acid hoods" have unique characteristics and uses.**
  - They incorporate a "wash-down" capability.
  - This prevents dangerous build-up of reactive residues.
  - But never use these hoods with organic materials (it can cause explosive reactions).

- **A "radioisotope hood" should be used when working with radioactive material. It:**
  - Is impermeable to such materials.
  - Will minimize dangerous exposure.

- **No matter what sort of hood you are using, and what precautions you take, things can still go wrong.**
  - It is important to be prepared for accidents.
  - Spills need to be dealt with immediately.
  - Follow your facility's cleanup procedures.
  - Soak up spills with absorbent materials.
  - Dispose of resulting residues properly.

- **Small fires can also occur in hoods.**
  - If possible, put out fires with extinguishers or through suffocation.
  - If they are uncontrollable, close the sash and evacuate the area.
  - Sound alarms and call for assistance, if needed.

- **Ventilation failures can also occur with hoods. They:**
  - Can be caused by malfunctions in electrical lines.
  - May result in the release of harmful fumes, vapors or particles.

- **So you need to know your facility's Emergency Plan.**
  - It will help prepare you for equipment failure or other problems.
  - Consult your supervisor to obtain a copy.

*** * * SUMMARY * * ***

- **Remember to be careful when using laboratory hoods.**

- **Hoods are used because materials are hazardous.**

- **Maximize your hood's ventilation.**

- **Keep experiments six inches inside the hood.**

- **Keep hood sashes down as far as possible.**

- **You will be safe if you choose the right hood for the job. But you must work with the hood correctly.**