

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

## Answer Key: Protocol Perfection: Professional Lab Practices for 7th Grade

Hazard analysis, neutralization math, and secondary containment protocols—analyze 10 high-stakes scenarios to refine safe scientific inquiry skills.

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**1. A fellow student accidentally knocks over a graduated cylinder containing an unknown aqueous solution. What is your most critical first response to ensure group safety?**

**Answer:** B) Immediately alert the instructor and evacuate the splash zone.

Safety protocols dictate that alerting the supervisor and ensuring person-to-person safety takes precedence over cleanup, especially with unidentified substances.

**2. When diluting a concentrated acid, it is scientifically safer to pour the acid into the water rather than the water into the acid.**

**Answer:** A) True

Adding acid to water (AA) allows the water to absorb the heat generated; reversing it can cause the acid to boil and splash violently.

**3. If a bunsen burner flame turns a flickering yellow 'safety' color and begins to 'strike back' at the base, you should immediately \_\_\_.**

**Answer:** C) Close the main gas source valve entirely.

Extinguishing the gas source is the only way to stop a 'strike back,' which occurs when the gas burns inside the barrel, potentially melting the equipment.

**4. When utilizing a centrifuge to separate biological samples, what must be done to prevent mechanical failure and potential debris spray?**

**Answer:** B) Place tubes of equal mass directly opposite each other to maintain balance.

Centrifuges rotate at high speeds; an unbalanced load creates vibrations that can shatter tubes or damage the motor.

**5. Safety Data Sheets (SDS) are only necessary for professional chemical plants and are not required for middle school science classrooms.**

**Answer:** B) False

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OSHA regulations require SDS for every chemical in a building to provide critical information on flammability, reactivity, and first aid regardless of the setting.

**6. Before heating a test tube over an open flame, the most important directional safety precaution is to \_\_\_\_.**

**Answer:** A) Point the opening away from yourself and all other people.

Heating can cause sudden 'bumping' or eruptions of liquid; pointing the tube away prevents chemical burns to the face or skin.

**7. You notice a small crack in a beaker you intend to use for an exothermic reaction. Why is it vital to dispose of this beaker immediately?**

**Answer:** C) Thermal stress from the reaction can cause the beaker to shatter completely.

Weakened glass cannot handle the expansion and contraction caused by temperature changes, leading to catastrophic structural failure.

**8. If a chemical splashes into your eye, you must flush it at the eyewash station for a minimum of 15 to 20 minutes.**

**Answer:** A) True

Extended flushing is required to ensure the chemical is fully diluted and removed from the crevices of the eye and surrounding tissue.

**9. When working with volatile organic compounds (VOCs) that produce irritating vapors, the experiment must be conducted in/under a \_\_\_\_.**

**Answer:** B) Functional laboratory fume hood.

Fume hoods use controlled airflow to draw toxic or irritating gases away from the user's breathing zone and exhaust them safely.

**10. Why is it considered a safety hazard to wear contact lenses during a chemistry lab involving liquid reagents?**

**Answer:** B) They can trap corrosive vapors or liquids against the cornea, preventing effective flushing.

Capillary action can pull chemicals behind the lens, making it nearly impossible to wash the eye out adequately during an emergency.