Name: _____ **Date:** _____

Answer Key: Escape the Lab: 8th Grade Tactical Safety Protocol Quiz

Evaluate complex chemical interactions and emergency response logic in this high-stakes formative assessment for advanced learners.

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1. When neutralizing a concentrated acid spill on a stone tabletop, why is it scientifically critical to use a weak base like sodium bicarbonate rather than a strong base like sodium hydroxide?

Answer: B) The reaction between a strong acid and a strong base is highly exothermic and can cause splattering.

Strong acid-base neutralizations release significant thermal energy (enthalpy of neutralization), which can boil the liquid and spray corrosive material.

2. If a student's clothing catches fire, the most effective immediate action is to move quickly toward the nearest safety shower to extinguish the flames.

Answer: B) False

Running provides oxygen to the fire; the 'Stop, Drop, and Roll' method is safer as it smothers the flames immediately without spreading them.

3. When diluting a concentrated acid for an experiment, the 8th grade safety protocol requires you to _____.

Answer: B) Pour the acid into the water slowly

Always Add Acid (AAA). Adding acid to water allows the large volume of water to absorb the heat generated, preventing the acid from splashing out.

4. You notice a small star-shaped crack (star crack) at the base of a Pyrex beaker before beginning a high-heat distillation. What is the most likely outcome if you proceed?

Answer: B) Thermal stress will cause the crack to propagate, leading to catastrophic failure of the vessel.

Thermal expansion creates internal stress; existing fractures act as stress concentrators, causing the glass to shatter when heated.

5. The GHS (Globally Harmonized System) pictogram featuring a flame over a circle specifically identifies a substance as a(n) _____.

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Answer: C) Oxidizing agent

The 'flame over circle' symbol represents oxidizers, which can provide oxygen to a fire and make it much more intense or difficult to extinguish.

6. Safety data sheets (SDS) are only required for chemicals that are classified as highly toxic or radioactive.

Answer: B) False

An SDS must be maintained for every chemical in the lab, including seemingly benign substances like vinegar or salt, to ensure proper handling info is available.

7. While using a centrifuge to separate a blood-analog suspension, the machine begins to vibrate violently and emit a rhythmic thumping sound. What is the correct analytical conclusion?

Answer: B) The mechanical load is unbalanced, causing a shift in the center of mass.

Centrifuges must be balanced with equal masses opposite each other; an imbalance at high speeds creates dangerous kinetic energy shifts.

8. If an unknown chemical splash makes contact with your eyes, the minimum recommended duration for continuous irrigation at the eyewash station is _____.

Answer: C) 15 minutes

Safety standards (ANSI) require at least 15 minutes of flushing to ensure the chemical is fully diluted and removed from the ocular tissue.

9. A fume hood is designed to protect the user from biological pathogens and should be used as a primary sterile environment for cell culture.

Answer: B) False

Fume hoods protect against chemical vapors by pulling air away. Biological safety cabinets (BSCs) are used for sterile work and pathogen protection.

10. Why is it prohibited to wear contact lenses during experiments involving volatile organic compounds (VOCs), even if wearing safety goggles?

Answer: B) Capillary action can trap vapors between the lens and the cornea, causing prolonged exposure.

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Chemical vapors can become trapped behind the lens, concentrating the substance against the eye and making it difficult to wash out in an emergency.