

# SI Microbiology - Full Discipline Demo

## Lab Safety

### Final Report - Answer Guide

|                    |                                        |
|--------------------|----------------------------------------|
| <b>Institution</b> | Science Interactive University         |
| <b>Session</b>     | SI Microbiology - Full Discipline Demo |
| <b>Course</b>      | SI Microbiology - Full Discipline Demo |
| <b>Instructor</b>  | Sales SI Demo                          |

### Test Your Knowledge

Match each term with the best description.

⚡ Fire blanket

⚡ Fire extinguisher

⚡ Fume hood

⚡ Safety Data Sheet

⚡ Spill containment kit

Tightly woven fabric used to smother and extinguish a fire

Consists of absorbent material that can be ringed around a chemical spill until the spill can be neutralized

Device used to control small fires in an emergency situation

Provides chemical, physical, health, and safety information regarding chemical reagents and supplies

Area containing an exhaust fan to expel noxious fumes from a laboratory

1

2

3

4

5

Correct answers:

- 1 Fire blanket    2 Spill containment kit    3 Fire extinguisher  
4 Safety Data Sheet    5 Fume hood

**Categorize each statement as true or false.**

|                                                                                                                              |                     |
|------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <p>⚡</p> <p>Always wear safety goggles, long shirts and pants, closed-toe shoes, and gloves when conducting experiments.</p> |                     |
| <p>⚡ Conduct experiments in a small, closed-off room with no ventilation or water.</p>                                       |                     |
| <p>⚡ Induce vomiting and drink copious amounts of water if chemicals are ingested.</p>                                       |                     |
| <p>⚡ Neutralize acid spills using sodium bicarbonate.</p>                                                                    |                     |
| <p>⚡</p> <p>Paper towels and water are a good substitute for a spill containment kit for this course.</p>                    |                     |
| <p><b>True</b></p>                                                                                                           | <p><b>False</b></p> |
| <p>1</p>                                                                                                                     | <p>2</p>            |

Correct answers:

1

Always wear safety goggles, long shirts and pants, closed-toe shoes, and gloves when conducting experiments.

Neutralize acid spills using sodium bicarbonate.

Paper towels and water are a good substitute for a spill containment kit for this course.

2

Conduct experiments in a small, closed-off room with no ventilation or water.

Induce vomiting and drink copious amounts of water if chemicals are ingested.

## Exploration

**Your laboratory kit may contain \_\_\_\_.**

- ☐ small items that can be choking hazards
- ☐ chemicals that can cause burns
- ☐ sharp objects that can cause cuts
- ☐ All of the above

✓

**Eating, drinking, or smoking during an experiment is never allowed.**

- ☐ True
- ☐ False

✓

**At home, a \_\_\_\_ is the best substitute for a laboratory safety shower.**

- ☐ watering can
- ☐ bottle of water
- ☐ kitchen faucet
- ☐ bathroom shower

✓

**A Safety Data Sheet contains information about first-aid procedures, required protective equipment, and health effects.**

- ☐ True
- ☐ False

✓

**To test the smell of a substance, partially fill your lungs with air and, while standing slightly back from the fumes, use your hand to waft the odors gently toward your nose.**

- ☐ True
- ☐ False

✓

## Exercise 1

**Which safety items are you currently lacking in your planned work area? What is your plan for acquiring these items before using your kit?**

**What location have you selected for conducting science experiments in your home? What, if any changes do you plan to make to the location before using your kit?**

**Data Table 1: Lab Safety Equipment Alternatives**  
(SAMPLE ANSWER BELOW)

| Item                  | Function                                                                                                     | Substitution                                                        |
|-----------------------|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| Fire extinguisher     | Device used to control small fires in an emergency situation                                                 | No Substitute                                                       |
| Spill containment kit | Consists of absorbent material that can be ringed around a chemical spill until the spill can be neutralized | Paper towles, kitty litter or sand                                  |
| Eyewash station       | Sink with two faucets directed at eyes                                                                       | Shower or sink                                                      |
| Safety goggles        | Eye protection                                                                                               | No Substitute                                                       |
| Laboratory shower     | Shower head in the lab                                                                                       | Shower or sink                                                      |
| Fume hood             | Area containing an exhaust fan to expel noxious fumes from a laboratory                                      | Open doors or windows, microwave or exhaust hood that vents outside |
| First aid kit         | Kit containing bandages and other supplies                                                                   | No Substitute                                                       |

## Exercise 2

**Identify three potential hazards in your planned work area for performing Science Interactive experiments and describe the safe practices associated with each potential hazard.**

**Describe how you plan to secure your work area and lab kit from children and pets.**

**Data Table 2: Lab Safety Interactive**  
(SAMPLE ANSWER BELOW)

|    | Safety Hazard                                                                                   | Correct lab safety procedure                                                                                                                        |
|----|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | There is a bag on the floor of the lab causing a tripping hazard.                               | All walkways and floor space in the lab area should be clear.                                                                                       |
| 2  | The scientist in this picture does not have their long hair and beard tied up.                  | All loose and long hair should be tied up to avoid flames, chemicals and microorganisms used in experiments.                                        |
| 3  | A chemical has been spilled and left unattended on the lab floor.                               | All chemical spills should be cleaned up immediately using proper neutralizing and disposal techniques.                                             |
| 4  | Papers have been left under an open flame.                                                      | When an open flame is being used the workspace should be cleared of flammable materials.                                                            |
| 5  | A drink is sitting on the lab bench next to a computer.                                         | There should not be any food or drink in the lab.                                                                                                   |
| 6  | A container of flammable liquid has spilled and been left on the lab bench next to open flames. | When open flames are in use all flammable chemicals should be removed from the lab space to a safe area.                                            |
| 7  | A broken test tube has been left unattended on the lab bench.                                   | All broken glass should be swept up and disposed of in a place/container that is safe and will prevent others from accidentally harming themselves. |
| 8  | A scientist is eating a sandwich over their experiment in the lab.                              | Food and drinks should not be brought into the lab space.                                                                                           |
| 9  | An open flame has been left unattended.                                                         | Experiments and open flames should never be left unattended.                                                                                        |
| 10 | A scientist is holding a cat in the lab space.                                                  | All experiments should be performed in a space away from pets and children.                                                                         |
| 11 | A scientist is directly smelling a chemical from an Erlenmeyer flask.                           | Proper wafting technique should be used at all times when determining odor of a chemical or solution.                                               |
|    |                                                                                                 |                                                                                                                                                     |

|    |                                                                        |                                                             |
|----|------------------------------------------------------------------------|-------------------------------------------------------------|
| 12 | A scientist is performing an experiment without proper eye protection. | PPE should be worn in the lab while performing experiments. |
|----|------------------------------------------------------------------------|-------------------------------------------------------------|

## Exercise 3

**Describe three sources for SDS related to chemicals provided in Science Interactive lab kits.**

**How can you determine the proper disposal protocols for remaining chemicals in your kit?**

**Data Table 3: Sodium Hydroxide SDS information**  
(SAMPLE ANSWER BELOW)

| Items                        | SDS Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Physical State               | Odorless liquid                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Route of Exposure & Symptoms | Inhalation, eye contact, skin contact, ingestion: may cause eye redness, tearing, and burns, skin redness and burns, coughing, and burns to the GI and respiratory tracts, nausea, vomiting, and diarrhea                                                                                                                                                                                                                                                                                                                  |
| Protective Equipment         | Safety goggles or face shield, rubber or neoprene gloves, long-sleeved shirt, and if respiratory irritation occurs then respirator should be worn.                                                                                                                                                                                                                                                                                                                                                                         |
| First Aid Procedures         | Call poison control center immediately for treatment advice. Eye Contact - Hold eye open and rinse slowly and gently with water for 15-20 minutes, remove contact lenses after the first 5 minutes and continue rinsing. Skin Contact - Take off contaminated clothing and rinse skin with water for 15-20 minutes. Inhalation - Move to fresh air and call doctor if breathing is affected. Ingestion - sip a glassful of water if able to swallow. Do not induce vomiting unless told to do so by poison control center. |
| Fire-fighting Measures       | Use extinguishing methods appropriate to local circumstances and surrounding environment. Do not use water spray to fight fire.                                                                                                                                                                                                                                                                                                                                                                                            |
| Chemical Reactivity          | Reactive with other household chemicals including toilet bowl cleaners, rust removers, acids, or products containing ammonia to produce hazardous irritating gases, such as chlorine and chlorinated compounds.                                                                                                                                                                                                                                                                                                            |
| Safe Storage                 | Store away from children and pets, reclose cap tightly, store in upright, cool, dry area away from direct sunlight.                                                                                                                                                                                                                                                                                                                                                                                                        |
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

|                               |                                                                                                                                                                  |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safe Disposal                 | Dispose in accordance with federal, state, and local regulations. Do not contaminate food or feed by disposal of this product.                                   |
| Environmental/<br>Ecotoxicity | Very toxic to aquatic life with long lasting effects. Do not allow product to enter groundwater, storm drains, lakes, or streams.                                |
| Spill Cleanup<br>Procedures   | Absorb and containerize. Wash residual down to sanitary sewer after contacting sanitary treatment facility to determine ability to process washed-down material. |

## Exercise 4

Data Table 4: Part 1 and Part 2 of the Safety Contract  
(SAMPLE ANSWER BELOW)

| Part                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Agreement                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <b>Part 1:</b> It is impossible to control students' use of Science Interactive products, related kits, and students' work environments. The author(s) of Science Interactive digital content, the instructors and institutions that adopt it, and Science Interactive, Inc. - the publisher and producer of Science Interactive- authorize the use of these educational products only on the express condition that the purchasers and users accept full and complete responsibility for all and any liability related to their use of same. Please review this document several times until you are certain you understand and will fully abide by its terms. | I agree:Student initials |
| <b>Part 2:</b> I am a responsible adult who has read, understands, and agrees to fully abide by all safety precautions prescribed in Science Interactive labs for laboratory work and for the use of Science Interactive kits. Accordingly, I recognize the inherent hazards associated with science experimentation; I will always experiment in a safe and prudent manner; and I unconditionally accept full and complete responsibility for any and all liability related to my purchase and/or use of a science Science Interactive kit or any other science products or materials provided by Science Interactive, INC.                                    | I agree:Student initials |

## Competency Review

**Chemicals in a lab kit may potentially cause \_\_\_\_ if mishandled or consumed.**

- ☐ burns
- ☐ serious illness
- ☐ death
- ☒ All of the above

✓

**When conducting experiments that include vigorous exercise, consult a physician first or ask a partner to assist in participating if you are unable to do so.**

- ☒ True
- ☐ False

✓

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**The \_\_\_\_ should be contacted immediately if you or anyone accidentally consumes or comes in contact with a potentially toxic substance.**

☒ National Chemical Toxicity Center

☐ National Poison Control Center



☐ American Poison Chemical Society

☐ American Toxic Chemical Center

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**When working with acids, always \_\_\_\_ to avoid chemical splattering.**

☐ add acid to water



☐ add water to acid

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**Acid spills can be neutralized by adding \_\_\_\_.**

☐ water

☒ baking soda



☐ more acid

☐ distilled water

☐ All of the above

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**A \_\_\_\_ can be used to douse a fire.**

☐ fire extinguisher

☐ safety shower

☐ fire blanket

☐ fire blanket and fire extinguisher

☒ All of the above



**Normal eyeglasses may be worn to substitute for safety goggles.**

- ☐ True
- ☒ False

✓

**A \_\_\_\_ expels noxious fumes from a laboratory.**

- ☐ fire blanket
- ☒ fume hood
- ☐ spill containment kit
- ☐ All of the above

✓

**A sink faucet or hand-held shower wand are appropriate substitutes for an eyewash station.**

- ☒ True
- ☐ False

✓

**A Safety Data Sheet provides basic information about \_\_\_\_.**

- ☐ health effects
- ☐ toxicity
- ☐ physical data
- ☐ safe disposal
- ☐ health effects and toxicity
- ☒ All of the above

✓

**What action(s) should you take if you accidentally break an empty test tube during an experiment?**

- ☐ Dispose of the glass in the trash can.
- ☒ Dispose of the glass in a protective container, and then place it in the trash can.
- ☐ Pick up the glass and throw it away.
- ☐ Place the broken glass in the sink.

✓

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## Extension Questions

**1. A student taking an online lab course is only able to perform their Science Interactive kit experiments in their workplace, an office building. Apply your knowledge of lab safety and proper workspace characteristics to suggest a location within the office for the student to conduct their experiments.**

(SAMPLE ANSWER BELOW)

Student answers may vary, however, this is a good question to check in and make sure students do not have concerns about lab safety and their home or non-traditional lab space.