

## To Whom It May Concern:

We are pleased to be given the opportunity to present demonstrations of the Texas A&M University at Qatar's Science and Engineering Road Show for your school. This is an educational event sponsored by TAMUQ and Qatar Petrochemical Company (QAPCO) Q.S.C that is intended to encourage interest in science and engineering, as well as to entertain.

The program will consist of demonstrations of chemistry, physics, and engineering using props and gear created to install a sense of wonder in your students. The demos will be explained to educate the underlying principles of the experiments. Students will have the opportunity to interact with some demonstrations for a hands-on approach.

The show will be conducted in English with supplemental Arabic, if possible. Presenters have years of expertise in performing demonstrations for school age children.

## Safety

We at Texas A&M at Qatar take the safety of all students, teachers, and spectators very seriously. As such, we have crafted our demonstrations to follow the guidelines set forth by the American Chemical Society (ACS) Division of Chemical Education for public science demonstrations. The guidelines were created based on current best practices and provide a checklist of key issues for demonstrators to assure that science demonstrations are conducted safely and without incident. A summary of these guidelines are attached to this document.

As per the guidelines, project safety analyses (PSAs) for each demonstration were created, reviewed, and approved by Texas A&M at Qatar's environmental, health, and safety coordinators. These documents include a risk assessment of all demonstrations along with steps taken to mitigate and ameliorate any undue risk. A PDF these PSAs can be provided via email. Please note that not all demonstrations listed in the PSAs will be performed at any one show.

The use of any toxic, flammable, or hazardous substances have been kept to a bare minimum, and will always be under the control of the presenters; including any waste products. Texas A&M at Qatar will provide the Safety Data Sheets (SDSs) for all chemicals used during the demonstrations. SDS's provide summaries of chemical properties, hazards, safe handling, and emergency control procedures. This can be a large document, so a PDF can be emailed.

No open flames will be used during these demonstrations. Some demonstrations will involve the assistance of members of the audience, but any materials handled will be non-toxic, under strict supervision, and appropriate personal protective equipment (PPE) will be provided at all times. A plastic tarp or sheeting will also be used in case of spills. Spill kits and fire extinguishers will be provided and kept on-hand by the Road Show presenters. The presenters will always wear cotton jeans, cotton shirts, closed-toed shoes, laboratory coats, and eye protection when needed during the demonstrations.

## School Requirements

The Road Show does require the assistance from members of your school to provide a safe and controlled environment to entertain your students. Below is a list of requirements needed:

- > A site visit at least one week prior to the performance will be required to ensure the staging area or demonstration space meet safety criteria.
- > Minimum of four meters separation between staging area and students.
- > Staging area should be able to accommodate two (2x) two-meter folding tables with nearby electrical outlets, plus one additional small folding table.
- > Require access to staging area a minimum of 1.5 hours prior to demonstration start, with at least 30 minutes to prep between shows.
- > Area must have access to fire exits and remain clear of obstructions.
- > Area must have access to a water source, such as a bathroom sink.
- > Students should be controlled by teachers or administrations and not allowed to enter the staging area. Students and spectators should also not be directly on the right or left of the staging area.
- > The shows should be performed in your auditorium or large assembly area in order to maximize the number of students, as long as safety measures and safety exits are kept clear. Our recommended maximum capacity for one show would be between 150-200 students.
- > Access to a loading/unloading area with access to staging area.
- > If members of the audience wish to be included as a potential participant, they must be wearing closed-toed shoes, all jewelry on the hands will be asked to be removed, and gutras or shaylas may be asked to be tucked into the appropriate attire.

## Media

During presentations, photographs and videography may be taken by Texas A&M at Qatar representatives. Prior to the performance, any individuals who may be photographed or videotaped need to have a signed release form from Texas A&M at Qatar. Students require this form to be signed by their parents or guardians. Any one not wishing to appear in photographs or videos should be seated away from the staging area.

Texas A&M University at Qatar looks forward to entertaining and educating your students.

Regards,

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## Guidelines for Public Demonstrations by the American Chemical Society (ACS) Division of Chemical Education

### Before the Demonstration

1. Always follow a tested, written procedure that includes comprehensive safety precautions. Plan the demonstration at the smallest scale possible for the location and viewers.
2. Review the safety precautions which will help you identify the potential hazards involved in the demonstration and understand the risks due to exposure and/or improper handling of a chemical, process, or procedure. Effective safety precautions provide easy-to-follow instructions to minimize risk and prevent unplanned incidents that could result in injury or property damage.
3. If a written procedure is not available, or safety precautions are not clear, perform an independent hazard and risk assessment to identify the possible hazards and evaluate the risks. In the risk assessment, consider the pedagogical value compared to the risk. Write the demonstration procedure with appropriate safety precautions to protect against the hazards and reduce risk. Refer to these guidelines as you write the demonstration procedure, and retain the procedure on file for future use.
4. Always practice a demonstration before presenting it before students or an audience for the first time.
5. Ensure that all demonstrations are appropriate for the room being used and the available safety equipment. Keep all exit paths clear. Check the ventilation in the demonstration area to ensure that participants and audience members will not be exposed to harmful quantities of toxic gases or chemical vapors. The use of a fume hood is required for any demonstration that uses or produces a substance with a TLV less than 50 ppm (check the SDS for the TLVs of all chemicals).
6. Consult current Safety Data Sheets (SDS) and review the safe handling information for all chemicals used in the demonstration.
7. Prepare and follow a safety checklist for all combustion demonstrations involving the use of a flammable liquid. Dispense only the amount of the liquid required BEFORE beginning the demonstration. Cap the solvent bottle and REMOVE it from the demonstration area before applying the ignition source. NEVER add more flammable liquid to a combustion demonstration once it is underway.
8. Ensure that observers will be a safe distance (10 feet or more) or are protected by a physical barrier, such as a polycarbonate shield, from the demonstration area when working with flammable, corrosive or toxic substances. In a small setting such as a classroom or lab, all participants and observers must wear appropriate eye protection at all times.
9. Ensure there is an appropriate fire extinguisher on hand whenever the slightest possibility of fire exists and that you have the knowledge, experience and training to use it properly in the event of an emergency.
10. Keep a spill kit nearby to contain, absorb, and neutralize any spilled chemicals.
11. Plan for appropriate handling or disposal of reaction byproducts or excess chemicals in accordance with institutional policies.

## During the Demonstration

1. Wear appropriate personal protective equipment (PPE) for the level of risk as determined by the assessment, such as chemical splash goggles, chemical-resistant gloves, and a lab coat, to protect against the hazards. Active participants must also wear appropriate PPE.
2. Provide safety shield protection whenever there is the slightest possibility that a container, its fragments or the contents could be propelled with sufficient force to cause exposure and/or personal injury.
3. Warn members of the audience to cover their ears if a loud noise is anticipated.
4. Participants and spectators must not taste any food or non-food substances used in the demonstration.
5. Do not perform demonstrations in which parts of the human body will be placed in danger (such as placing dry ice in the mouth or dipping hands into a hazardous liquid).

## Special Notes for Outreach or Public Demonstrations

1. Ensure proper packaging and secondary containment for the safe transport of all chemicals to and from off-site locations. Materials of Trade (MOT) exceptions to Department of Transportation requirements allow for the transport of certain hazardous materials without a license or shipping papers provided certain guidelines are met. There are strict limits on the amounts of material, depending on the hazard. Visit the links below for more information about hazard classes, packaging requirements, and restrictions on the amounts of chemicals.  
[https://hazmatonline.phmsa.dot.gov/services/publication\\_documents/MOTS05.pdf](https://hazmatonline.phmsa.dot.gov/services/publication_documents/MOTS05.pdf)
2. Notify security and/or administrators that you will be performing demonstrations. If public space will be used for demonstrations involving fire, contact the local fire department to determine if the demonstrations meet local fire and building use codes.
3. Provide a written demonstration procedure, including comprehensive safety precautions and risk assessments, whenever the audience will be encouraged to conduct the demonstration at another time.

[http://www.acs.org/content/dam/acsorg/about/governance/committees/chemicalsafety/safetypractice\\_s/transporting-chemicals.pdf](http://www.acs.org/content/dam/acsorg/about/governance/committees/chemicalsafety/safetypractice_s/transporting-chemicals.pdf)