



# Learning by Accident: Exploding Balloons

## ««« Submitted by a STAO/APSO member

**Learning by Accident** is an ongoing *Crucible* feature, in which real-life lab accidents or incidents are recounted and explained. The goal is to highlight the consequence of ignoring safety rules so that science educators will be further encouraged to become knowledgeable, and to take appropriate action, in areas of safety that affect their daily activities in the science classroom. Submissions are encouraged. Anonymity will be guaranteed. Please send written descriptions to Ian Mackellar, STAO Safety Committee Past-Chair, Box 191, MAITLAND, ON K0E 1P0, or email: [ian\\_mackellar@stao.org](mailto:ian_mackellar@stao.org)

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A science teacher inflated three 30 cm (12") helium-quality balloons with gas. One balloon had oxygen, another balloon had hydrogen, and a third balloon had a combination of oxygen and hydrogen. The students were requested to predict which balloon would give the loudest "bang" when ignited.

One at a time, each balloon was attached with a string to the taps at the teacher's sink, with the balloon approximately midway between the taps and the ceiling. The teacher approached the balloon with a flame attached to the end of a one-metre ruler. Once the flame touched the balloon, the gas inside the balloon exploded. The explosion in each case was sudden and brief.

A student suffered serious ear damage as a result!!!

### **Comments from the STAO Safety Committee**

The 'Exploding Balloon' demonstration, familiar to most secondary school science teachers, illustrates the danger-

ous nature of a mixture of hydrogen and air. However, if this teacher demonstration is performed, the STAO/APSO Safety Committee strongly recommends the following precautions be taken:

- The balloons should ONLY be PARTIALLY filled to a maximum diameter of 20 cm (approx. 8") with gas.
- Windows and doors should be opened to reduce the risk of any potential damage resulting from reverberations.
- The teacher should wear appropriate ear protection.
- Students should move a safe distance of at least 5 m from the demonstration bench.
- Since loud noises result from this demonstration, students should be WARNED ahead of time to cover their ears when the balloons are ignited. Prior to igniting the H<sub>2</sub>/O<sub>2</sub> mixture this warning should be repeated!

