

Argument Template

| | |
|-----------------|---|
| <p>Claim</p> | |
| <p>Evidence</p> | <p>Justification of the Evidence (Evaluation of the strength of evidence)</p> |

Argument Template Guiding Question: Should Mercury thermometers be used in science classrooms?

Claim: Mercury thermometers can be used in science classrooms as a valuable tool if all safety procedures are followed.

Evidence

Mercury is a liquid metal that expands and contracts on exposure to heat sources and is a stand component of thermometers commonly used in science labs.

Mercury expands more slowly but more consistently than alcohol thermometers. Mercury thermometers can measure higher temperatures because it does not evaporate.

Accuracy of data collection is more important in senior science classes.

Safe handling procedures are clearly outlined in MSDS sheets available in the school.

Justification of the Evidence (Evaluation of the strength of evidence)

A mercury thermometer is a tool which allows for a more accurate measurement of temperature than alcohol thermometers.

When senior science students are made aware of the safety risks associated with mercury by reading the MSDS sheet associated with mercury students will take all necessary safety precautions to avoid breakage of equipment and mercury exposure.

In the case of a breakage, proper reporting, first aid measures and the use of mercury spill kits can manage the incident without long term impacts.

Argument Template Guiding Question: Should Mercury thermometers be used in science classrooms?

Claim: Mercury thermometers should not be used in science classrooms because of the potential risks associated with exposure and spill clean up if a thermometer is broken.

Evidence

Glassware is broken in the science classroom on a regular basis and a thermometer is a fragile glass devise.

Not all students follow lab safety procedures or are careful with lab equipment.

Mercury is rated as an extreme health hazard rating. It is slightly corrosive. It can cause immediate poisoning that affects the nervous system and respiratory system at high concentrations and long term health issues because it bioaccumulates in animal tissues. Mercury is an element that doesn't decompose.

Mercury can be absorbed through the skin

If exposed to the air or heat it produces odorless vapors that are highly toxic if inhaled.

Steps for clean and disposal in the case of a spill up are extensive and involve evacuation of contaminated areas, special mercury spill kits, the use of protective equipment such as an aspirator and support for specialized hazardous waste disposal teams.

Justification of the Evidence (Evaluation of the strength of evidence)

Given the risk that a mercury thermometer could be accidentally broken, especially in junior science classes, exposure to mercury liquid and vapor is possible due to the spill. Any exposure to mercury is an unacceptable risk in a science classroom due to the potential acute and chronic health impacts.

If the spill is not reported students could be exposed to the substance unknowingly because it produces an odorless gas. If mercury is not cleaned up properly small amounts of mercury vapor will contaminate the classroom environment for long periods of time. If mercury is washed down the drain it can corrode pipes, contaminate waste water and be released into the local aquatic ecosystem where it will persist indefinitely.

The school does not possess the appropriate safety equipment for dealing with a mercury spill. The required evacuation would be potentially disruptive to the whole school community. The clean up would be costly due to the need to bring in an special chemical waste company to clean up the spill and test for air contamination.

There are many safer options available to measure temperature including alcohol and digital thermometers.

Bibliography

Chan, N. 2012. Comparison of Mercury and Alcohol Thermometers. Retrieved from;
<http://notions-english-disciple.blogspot.com/2012/04/comparison-of-alcohol-and-mercury.html>

EPA. 2018. Case studies about mercury clean ups in schools. Retrieved from;
<https://www.epa.gov/schools/case-studies-about-mercury-cleanups-schools>

MSDS. 1996. Mercury Metal. Aldon Corporation.

