Microscale Chemistry

Posted by Anonymous on Fri, 2019-05-24 14:25

Microscale Chemistry: Can you provide some information on microscale chemistry please?

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Year Level:
7
8
9
10
Senior Secondary
Laboratory Technicians:
Laboratory Technicians

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Answer by labsupport on question Microscale Chemistry

Submitted by sat on 24 May 2019

Answer reviewed 17 February 2023

Microscale chemistry is the scaling down in size of practical chemistry. Microscale activities require using smaller quantities or volumes of chemicals and also simpler equipment, such as spotting plates, multiwell (culture) plates, laminated grid sheets, and smaller test tubes. Drops rather than millilitres of reagents and a few grains rather than a few grams of a solid chemical are generally used. Sometimes it may mean working in a drop of water on an acetate sheet. The chemical waste for these activities is not significant and most can be wiped up with paper towel or tissue and disposed of in the general waste.

Many procedures require some dexterity, so it may be necessary to start with some simple activities first and a skills assessment of the students might be required.

Science ASSIST recommends the use of microscale techniques in chemistry where applicable and outcomes are not compromised. Microscale chemistry has the benefits of quicker reaction times and:

- Reduced materials
- Reduced costs
- Reduced risk - there is less contact with hazardous chemicals
- Reduced chemical waste
- Reduced preparation and clean-up time
- Reduced reliance on traditional glassware.
- Reduced storage requirements.

About microscale chemistry:

- ‘Microscale chemistry’, Education in chemistry website, https://edu.rsc.org/eicredir/feature/microscale-chemistry/2020192.article
- ‘Microscale Chemistry from the UK’, Microchemuk website, https://microchemuk.weebly.com/4-about-microscale.html
- ‘Microscale chemistry revisited’, Education in chemistry website, https://edu.rsc.org/eicredir/feature/microscale-chemistry-revisited/2020...
- ‘What is Small-Scale Chemistry?’ National Small-Scale Chemistry Center website, http://www.smallscalechemistry.colostate.edu/what_is_ssc.html
- ‘Why Small-Scale Chemistry?’ ’ National Small-Scale Chemistry Center website, http://www.smallscalechemistry.colostate.edu/why_ssc.html

Examples of microscale chemistry activities:

Royal Society of Chemistry:

Royal Society of Chemistry. (nd) *Microscale chemistry*, Retrieved (17 February 2023) from the Royal Society of Chemistry website: https://edu.rsc.org/resources/collections/microscale-chemistry

UK STEM Learning Centre:

STEM learning, (nd), *Microscale chemistry*, Retrieved (17 February 2023) from the STEM Learning website: https://www.stem.org.uk/resources/elibrary/resource/26501/microscale-chemistry This has a number of activities from the Royal Society of Chemistry and requires the user to create a free account to access resources.

Worley, Bob, CLEAPSS Advisor:

Youtube videos, https://www.youtube.com/channel/UCPotDWzaKehdDRW5TI71PPw/videos. This has several examples of microscale chemistry, many of which, Bob presented at CONASTA 67 in Sydney 2018. In particular view the microscale version of elephant's toothpaste, i.e., Mouse's toothpaste with an interesting addition using a glowing splint; and many examples of microscale chemistry in a drop of water.

Other examples of micro and small scale chemistry activities

Buthelezi, Thandi; Dingrando, Laurel; Hainen, Nicholas; Wistrom, Cheryl and Dinah Zike. nd. *Chemistry small-scale laboratory manual – Student Edition.* McGraw Hill Glencoe: New York. EPDF website https://epdf.pub/queue/chemistry-small-scale-laboratory-manual.html (Accessed May 2019)

Mattson, Bruce and Michael P. Anderson. 2017. *Microscale Gas Chemistry*, 2017 Web Version, Retrieved from Creighton University website: http://mattson.creighton.edu/Microscale_Gas_Chemistry.html

Note: Science ASSIST has not trialled these activities and the onus is upon the school to determine the suitability of the activity and to conduct their own risk assessment and implement relevant safety procedures.
