



# ASSIST

AUSTRALIAN SCHOOL SCIENCE  
INFORMATION SUPPORT FOR  
TEACHERS AND TECHNICIANS

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## Van de Graaff generator and electronic medical devices

Posted by Anonymous on Wed, 2016-02-17 12:13

Van de Graaff generator and electronic medical devices: The Science ASSIST Standard Operating Procedure for demonstrating the Van de Graaff generator has in its safety notes to ensure that anyone who has an electronic insulin pump should not be in the vicinity of the generator.

We have a teacher who has had a pump for about 5 years and frequently operates the VDG so far without incident. Do you have any more information about the risks involved, the type of pumps involved, the make of pump, anything that could make it safe for him?

Should hearing aids also be included in the electronic equipment that could be affected by a Van de Graaff generator?

### Voting:



No votes yet

### Year Level:

9

10

Senior Secondary

### Laboratory Technicians:

Laboratory Technicians

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# Hearing Aids- Van der Graaff generator

Submitted by sat on 19 February 2016

Answer updated 18 January 2023

The Standard Operating Procedure for demonstrating the Van de Graaff generator has a number of safety notes including the first one which states:

- Ensure that any person, who may be pregnant, has a heart condition, metal plates, a pacemaker, cochlear implant(s), electronic insulin pump or similar electronic device is not in the vicinity of the Van de Graaff generator.

This is a general safety instruction, as the risk of anyone in these situations being affected by the static electrical discharge is high. The Institute of Physics in partnership with the Nuffield Foundation has a good article on Van de Graaff generator safety see:

<https://spark.iop.org/van-de-graaff-generator-safety>

The spark from the Van de Graaff generator causes radio signals, these signals can be picked up by any metal piece resulting in a possible induced electric current. It is this current that could cause damage to any electronic equipment or pump.

In relation to your teacher with an insulin pump who operates the Van de Graaff generator and has not had any issues with the pump. The answer could be a combination of the operating procedure of the pump and some degree of luck.

The insulin pump is possibly not active all the time, the majority of the time it may be sitting in standby mode. While a pacemaker has both a sensor and an electrical stimulator, either one or the other is always in operation. An arc or "static discharge" from the generator to any other object may damage it, if the pump was active while operating the Van de Graaff generator. If damage to an insulin pump occurs, it may not be immediately life threatening, unless the fault is not identified quickly enough. Damage to other devices, like a pacemaker, may have a more immediate impact.

We cannot advise on the specifics of types of insulin pumps, or ways of protecting the pump from damage, except to affirm that the Van de Graaff generator should not be operated near electronic devices like these.

Users of personal electronic devices should check with the manufacturer of their personal devices about the suitability, or otherwise, of being in close proximity to equipment like the Van de Graaff generator. We recommend that your teacher contact the manufacturer/supplier of their insulin pump to ascertain their advice in this situation.

Hearing aids, pacemakers and all other electronic medical devices should also be included in this advice.

It is recommended to keep all electronic devices away from an operating Van de Graaff generator because the sparks produced (even if only small) can damage the electronic

circuits. This applies to anything that has an electronic chip or circuit board including cell phones, cameras, watches, computers, hearing aids and USB storage devices.

The Science ASSIST recommendation is that any person with sensitive electronic medical equipment stay at least 1.5-2m away from an operating VDG.

## References:

Science ASSIST. 2014. *SOP: Demonstrating the Van de Graaff generator*. Retrieved from Science ASSIST website: <https://assist.asta.edu.au/resource/2570/sop-demonstrating-van-de-graaff...>

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Lamont James. Technical Officer– Electrical Engineering, Deakin University. February 2016. Personal communication

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