


SIMULATING A VIRAL PANDEMIC

https://upload.wikimedia.org/wikipedia/commons/thumb/c/c0/Biohazard_symbol.svg/520px-Biohazard_symbol.svg.png

1

- national non-profit
- 50+ universities
- provide engaging, evidence-based STEM programs at no cost to educators or youth



2

Royal Bay Secondary, November 1st

- two Life Science 11 Classes



https://en.wikipedia.org/wiki/Royal_Bay_Secondary_School#/media/File:Royal_Bay_SS_01.jpg

3

Viral Pandemic Workshop

- developed by Jovian Tsang, LTS volunteer
- learning objectives:
 - *demonstrate understanding of form and function of viruses and vaccines*
 - *use simulation to model spread of virus through closed population*
 - *gain appreciation for complexity of vaccine design & scientific collaboration*

4

Simulation Activity #1: Viral Spread in a Closed Population

- all students receive test-tube
 - 24/25 contain water
 - 1/25 contains NaOH (“patient zero”)
- three rounds of reciprocal exchange
- test for infection

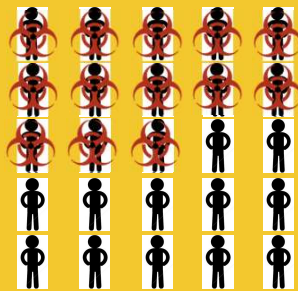


<https://p7.hiclipart.com/preview/827/749/197/laboratory-experiment-test-tubes-chemistry-computer-icons-laboratory.jpg>

5

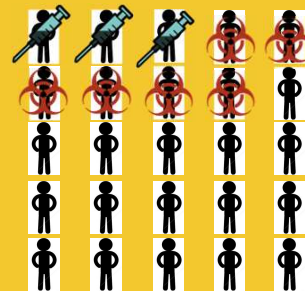
Simulation Activity #1: Viral Spread in a Closed Population

No Vaccine



~50% infected

12% Vaccinated



~25% infected

6



World Health Organization

SIMULATION ACTIVITY #2: GLOBAL PANDEMIC

<https://www.un.org/youthenvoy/wp-content/uploads/2014/09/WHO.jpg>

7

Simulation Activity #2: Global Pandemic

- Roleplay WHO emergency conference on WWZ Virus
- Epidemiology, virus characteristics, symptoms
- Immersive learning



[https://en.wikipedia.org/wiki/Rhabdoviridae#/media/File:Vesicular_stomatitis_virus_\(VSV\)_EM_18_lores.jpg](https://en.wikipedia.org/wiki/Rhabdoviridae#/media/File:Vesicular_stomatitis_virus_(VSV)_EM_18_lores.jpg)

8

Simulation Activity #2: Global Pandemic

- student groups select their WHO member country

- WHO package:

- 1. *Research finding*



Aluminum salts cause rapid mutation in live-attenuated WWZ viral vaccine, unsafe

- 2. *Plane Ticket*



- 3. *Virus design template*

[https://en.wikipedia.org/wiki/Rhabdoviridae#/media/File:Vesicular_stomatitis_virus_\(VSV\)_EM_18_lores.jpg](https://en.wikipedia.org/wiki/Rhabdoviridae#/media/File:Vesicular_stomatitis_virus_(VSV)_EM_18_lores.jpg)

9

Simulation Activity #2: Global Pandemic

- students have 10 minutes to design a functional vaccine

- choice to either...

- *fly to other lab & exchange research*
- *publish their research*
- *keep research private*

- different outcomes in Block 1 vs. Block 2

[https://en.wikipedia.org/wiki/Rhabdoviridae#/media/File:Vesicular_stomatitis_virus_\(VSV\)_EM_18_lores.jpg](https://en.wikipedia.org/wiki/Rhabdoviridae#/media/File:Vesicular_stomatitis_virus_(VSV)_EM_18_lores.jpg)

10

Simulation & Student Engagement

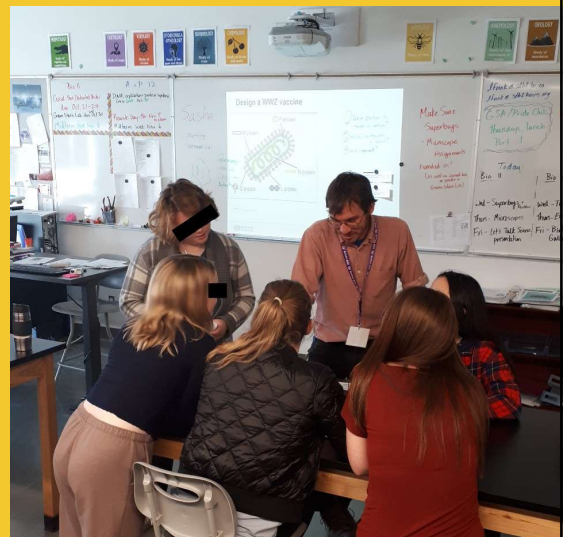
- Constructivism in STEM (Matthews, 2002)
- multimodal
- Huang *et al.* (2010) – epidemiology simulations enhance learning by framing it in within the context of real-world problem solving
- interaction flexibility

[https://en.wikipedia.org/wiki/Rhabdoviridae#/media/File:Vesicular_stomatitis_virus_\(VSV\)_EM_18_lores.jpg](https://en.wikipedia.org/wiki/Rhabdoviridae#/media/File:Vesicular_stomatitis_virus_(VSV)_EM_18_lores.jpg)

11

Simulation & Student Engagement

- high level of student engagement (laughter, choice, role play)
- acquisition of key concepts (herd immunity, vaccine components, importance of collaboration in science)



12

Thank you!

Questions?

13

References:

- Huang, C.-Y., Tsai, Y.-S., & Wen, T.-H. (2010). Simulations for epidemiology and public health education. *Journal of Simulation*, 4(1), 68–80.
<https://doi.org/10.1057/jos.2009.13>
- Matthews, M. R. (2002). Constructivism and science education: A further appraisal. *Journal of Science Education and Technology*, 11(2), 121-134.

14