Quiz Answers About Science History, Fields, Cause & Effect

These questions & answers demonstrate a wide array of general science knowledge about science history, fields, and the idea of cause & effect in terms of science exploration.

QUESTION (HISTORY):

You are describing smallpox to someone who has never heard of the disease. Describe how the disease was eradicated, including (1) the symptoms associated with Smallpox (why it was so bad), (2) what variolation (inoculation) was, (3) how Edward Jenner developed a vaccine, and (4) how the disease was finally eliminated in the 1970s.

ANSWER:

1.

Smallpox used to be one of the most prevalent and deadly diseases on earth which was characterized by about **a week of flu-like symptoms followed by the formation of puss-filled bumps across one's skin called "poxes"**. Smallpox had a particularly high fatality rate but even if one survived the disease they would be left with tremendous scaring and other complications like a potential loss of sight.

Additionally, smallpox was a **highly infectious disease which would spread via respiratory transmission.**

2.

One method people would use to try and guard against the smallpox disease was "variolation" where people would purposefully infect themselves with the small amounts of disease through collected puss from a person's scars in order to build immunity. Sometimes this would work if the strain was somewhat weak but could also result in just infecting the person with smallpox.

3.

Edward Jenner developed a vaccine for smallpox by inoculating people with a similar but much less deadly virus called "cow-pox" which milk maids would often acquire.

4.

Vaccines for smallpox continued to develop and become more widely available as time went on with various instances of innovation (like using bifurcated needles to easily vaccinate people).

Unfortunately, in many regions of the world without the proper healthcare infrastructure distributing the vaccine was challenging.

As such the World Health Organization ended up declaring "war" on the smallpox virus and would lobby for funding from governments in order to distribute the vaccine across the globe. The efforts of the WHO and their dedicated volunteers is mainly the reason why in 1978 the smallpox was finally eradicated (minus the one case of the lab scientist who accidentally infected themselves.

QUESTION (HISTORY, PATTERNS):

Explain why polio has not been eliminated yet and add your own opinion on whether these issues may impact COVID-19 if a vaccine becomes available.

ANSWER:

On balance, Polio cases worldwide has decreased to only a few hundred cases per year. However, it is still not fully eradicated.

Specifically, Polio still poses a threat in the countries of Afghanistan, Pakistan and Nigeria where a variety of geopolitical factors have made distributing the polio vaccine difficult and, in some cases, dangerous.

In terms of the issues facing a potential COVID-19 virus, in my opinion it is probable that the trend of less advantaged countries seeing the short-end of the metaphorical vaccine stick is one which will probably continue in the case of a COVID vaccine.

Assuming a vaccine does eventually get developed it probably will take a long, long time for enough vaccines to be distributed for the entire population. Especially if it just comes down to the WHO being the only entity saddled with somehow distributing vaccines to ~171 countries each which would be competing for first access.

Furthermore, it remains to be seen if an effective COVID-19 vaccine will ever materialize if issues preventing the formation of other vaccines against viruses with high antigenic variation also apply to COVID-19 (e.g. why we need a new flu vaccine each year).

QUESTION (CAUSE & EFFECT):

Describe each of the three steps of science discovery using a real-world example from your life experiences. For example, it could be a medical situation, learning how to garden, or a travel adventure.

ANSWER:

One real-life example of science discovery happened to me in sixth grade during a science-project when my sunflower plants tragically perished overnight.

1. Exploration: Upon noticing that my sunflower plants had wilted away I began trying to understand why they did so by retracing my steps.

2. Description: I noted that the plants had received adequate sunlight and a lot of water. Although I did add a large amount of salt to the water mostly because I wanted to see what would happen to the plants.

3. Explanation: I concluded that since I had used salt-water to water the plants that had probably killed the plants as each sunflower, I salted would swiftly die the next day. Apparently, the fact that salt and plants don't really work well together is well-known, but this was news to sixth grade me. I later learned in history that the ancient Romans would allegedly salt their opponents' lands to prevent them from returning a geopolitical rival after conquering them.