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| **Unit** | COVID-19 Unit: Lesson 4 | | | | **Driving Question** | “What are the different types of vaccines?” | |
| **Date** |  | | **Time** |  | **Class** |  | |
| **Real life scenario (context)** | | | | | | | |
| Tiffany’s grandma has now taken the Pfizer vaccine. Tiffany’s dad, who is a healthcare professional, has been offered the Oxford-AstraZeneca vaccine. James asks Tiffany what the difference is between the two vaccines…will they work the same way against COVID-19? | | | | | | | |
| **Learning Outcomes** | | | | | | | |
| 1. Distinguish between different types of vaccines with named examples for COVID-19 e.g. mRNA vaccines (e.g. Pfizer) and viral vector vaccines (e.g. Oxford-Astro-Zeneca)  2. Consider the pros and cons are different types of vaccines (looking at effectiveness level, use for different demographics, cost, ease of storage etc). | | | | | | | |
| **NGSS links / NYAS STEM Education Framework (key skills and competencies developed)** | | | | | | | |
| A.1.4 Communication  A.1.5 Collaboration  B.3 Real-world Application | | | | | | | |
| **Plan of activities** | | | | | | | |
| Time | | Teacher Activity | | Learner activity | | | Resources / other info |
| *Prior to session: -* | | *Are there spare activities for those who finish early?* | | *Can this be done remotely and in person? Are there alternative approaches?*  *Differentiation?* | | | *What resources are needed to be inclusive to all students?* |
| **5 mins**  Intro and recap | | Introduce the LOs of the lesson and do a recap of the basic principle of how vaccines work. | | Students read the scenario to set the context then read the quick recap exercise. Students can write down (a) and (b) or submit (at the same time) in a chat box if lesson done virtually. | | | PPT  Answers to recap:  A – immune, B – pathogen,  C- antigen |
| **10 mins**  Solicit what students have heard about COVID-19 vaccines and keyword check | | Using the pictures on slide 4 as stimulus, ask students what they have heard about COVID-19 and the different vaccines. Go through keywords on slide 5. | | Students share what they know already and what they may have heard about COVID-19 vaccines.  Students will check their understanding of the keywords (DNA, RNA, adjuvants, and replicate) with the teacher before starting the research task. | | | Students should be reminded of lesson 1 and the R.E.A.L questions and the five Ws and one H questions where sharing what they’ve seen/heard about COVID-19 vaccines.  Particularly important to distinguish between DNA and RNA given the misinformation out there about COVID-19 vaccines that students may have heard. |
| **15 mins**  Research task | | Students are divided up into 5 groups (or students can each be given a number corresponding to the vaccine ‘type’ on slide 6) and do research. Emphasise that everyone in the group has to play a part – they all need to be ‘experts’ of their category as they’ll have to teach their peers later on! | | Students fill in the research worksheet in groups. Students will use the critical thinking skills developed in lesson 1 to identify reliable sources of information to fill in their sheet. | | | ‘Types of COVID-19 Vaccines’ worksheet.  Tips: Emphasise to students that as well as research skills (and they should remember the critical thinking skills from lesson 1), students are also practising teamwork skills (so groups should be encourage to sub-divide the tasks and to ‘peer-check’ one another too). |
| **15 mins**  Peer teaching | | Teacher will now create mixed groups where there is at least one expert (from each vaccine category) in each new group. If this is done virtually, breakout rooms can be ‘pre-arranged’ (during the previous task) so that this mixing is assured. Teachers can then hop between groups/breakout rooms. | | Students will take their completed worksheets and in the new mixed groups, teach their peers. This works better in person but can still work virtually with breakout rooms. By the end of the 15 minutes, each student should have a complete worksheet. | | | Students should be encouraged to use the time efficiently e.g. 2-3 minutes per vaccine type! Again emphasise teamwork, coordination and communication skills here.  NOTE: Student who finish their research task/peer teaching task early can be encouraged to find out more about the specific COVID-19 vaccines e.g. [The Pfizer vaccine](https://www.nytimes.com/interactive/2020/health/pfizer-biontech-covid-19-vaccine.html), the [Moderna vaccine](https://www.nytimes.com/interactive/2020/health/moderna-covid-19-vaccine.html), the [Oxford-AstraZeneca vaccine](https://www.nytimes.com/interactive/2020/health/oxford-astrazeneca-covid-19-vaccine.html) (and [here](https://www.theweek.co.uk/951659/oxford-scientists-how-we-developed-covid-vaccine-record-time)). |
| **10 mins**  Class discussion about why we need different types of vaccines | | Teacher uses slide 9 to draw out the pros and cons students have discovered (cost per dose, logistical ease of transportation etc) and also the factors that may impact how different people’s immune system responds to the vaccine. The key point about slide 9 and 10 is to emphasise why it’s important to develop lots of different type of vaccines. | | In this class discussion, students can participate by offering their pros/cons (hands up) or just by typing into the chat box as the teacher discusses and checks for understanding. | | | On slide 10, brainstorm about factors before revealing the slide (the main point being, as well as a ‘increasing the supply’ reason, it’s also important to develop lots of different vaccines as some may work better on certain demographics than others). |
| **5 mins**  Plenary | | Teacher asks every student to fill in an exit ticket to check for understanding. | | Every student re-reads the scenario and writes down (and hands in) or sends via email (if virtual class) their ‘exit ticket’. | | |  |
| **Total time = 60 mins** | |  | |  | | |  |
| **Preparation for next lesson (teacher self-reflection) Gather student feedback to**  **incorporate into your next session** | | | | | | | |
| Which aspects of the lesson went well?  Which aspects could be improved upon?  What misunderstandings still need to be cleared up?  Actions for the future: | | | | | | | |