List of pre-activities for students

Depending on your students' confidence with science curriculum, you may wish to provide some context and background before each lesson. These are not essential for the lesson, but may help to put the lesson material in context.

Unit 1

- **Lesson 1 – Organs and Tissues of the Immune System**
  - Review basic human anatomy. Numerous websites provide the level of detail needed. Students will benefit most if the focus is on the lymphatic system.
- **Lesson 2 – The Innate Immune System**
  - Instruct students on how to create concept maps. You may already have a preferred method to create concept maps. Alternatively, students can explore various approaches and tools.
  - Review calculation of percentages and averages. These operations should be routine for students. Struggling students would benefit most from a review of the relevant calculations.
- **Lesson 3 – The Adaptive Immune System**
  - Discuss feedback systems, comparing positive and negative feedback with everyday examples. Feedback systems are essential to maintaining homeostasis, including the immune system.

Unit 2

- **Lesson 1 – Development of Disease**
  - Discuss various common diseases including causes, prevention and treatment. You can take various approaches here including a historical perspective (which is relevant to Lesson 4). Students will benefit from direct comparisons such as the causes of specific diseases (bacteria, viruses, microbes, genetics), as well as how such diseases differ in their prevention and treatment.
  - Review the basic principles and processes of biological evolution. A solid grasp of the key principles of biological evolution is vital to understanding concepts such as immunity and resistance. In particular, students should understand the process of natural selection, genetic variation and inheritance.
  - Review basic calculations of probability. These operations should be routine for students. Struggling students would benefit most from a review of the relevant calculations.

- **Lesson 2 – Influenza and HIV**
  - Review basic concepts of transcription and translation, as well as nucleic acid structure and replication. Knowledge of these molecular processes will help students understand viral replication, which in turn is key to understanding how the infection and reproduction cycles of influenza viruses and HIV.
  - Discuss with students existing knowledge of influenza and HIV, which they might be more familiar with as 'flu" and AIDS.
- **Lesson 3 – Development of Vaccines**
  - Review basic genetic terms, including gene, DNA, RNA, chromosome, genome, protein and nucleus. These are assumed to be prior knowledge so they are not included in the lesson glossary.
  - Practice creating scatterplots using desktop or online chart software. Students can use spreadsheet applications such as Google Spreadsheets, Numbers (Mac) or Excel (Microsoft Office).
- **Lesson 4 – History of Vaccine Research**
  - Review the basic methods and principles of scientific research. In particular, students may benefit from exploring the Understanding Science flowchart developed at UC Berkeley: http://undsci.berkeley.edu/article/scienceflowchart
  - Encourage students to research the backgrounds of well-known scientists. For example, this may include reading a famous scientist's biography.
  - Students can explore the College of Physicians of Philadelphia History of Vaccines Timeline for key events in the development of vaccines: http://www.historyofvaccines.org/timeline?timeline_categories%5b%5d=56
- **Lesson 5 – Understanding Vaccine Safety**
  - Check for understanding of the basic principles of vaccines including immunology, innate versus adaptive immunity and herd immunity.
  - To develop students' risk assessment abilities, students can explore the Understanding Risk section of the History of Vaccines website:http://www.historyofvaccines.org/content/understanding-risk