 Diseases

Stage 5 Living world

Outcomes

Values and attitudes

SC5-1VA appreciates the importance of science in their lives and the role of scientific inquiry in increasing understanding of the world around them

SC5-2VA shows a willingness to engage in finding solutions to science-related personal, social and global issues, including shaping sustainable futures

Working scientifically

SC5-7WS processes, analyses and evaluates data from first-hand investigations and secondary sources to develop evidence-based arguments and conclusions

* WS7.1 Students process data and information by:

a. selecting and using a variety of methods to organise data and information including diagrams, tables, models, spreadsheets and databases

b. selecting and extracting information from tables, flow diagrams, other texts, audiovisual resources and graphs, including histograms and column, sector or line graphs

c. accessing data and information by using a range of appropriate digital technologies

d. applying numerical procedures and mathematical concepts and using digital technologies, where appropriate

e. identifying data which supports or discounts a question or hypothesis being investigated or a proposed solution to a problem

f. describing specific ways to improve the quality of the data (ACSIS171, ACSIS205)

* WS7.2 Students analyse data and information by:

a. analysing patterns and trends, including identifying inconsistencies in data and information (ACSIS169, ACSIS203)

b. describing relationships between variables (ACSIS169, ACSIS203)

c. assessing the validity and reliability of first-hand data

d. using knowledge of scientific concepts to draw conclusions that are consistent with evidence (ACSIS170, ACSIS204)

e. synthesising data and information to develop evidence-based arguments

f. evaluating conclusions and evidence, including identifying sources of uncertainty and possible alternative explanations (ACSIS171, ACSIS205)

g. critically analysing the validity of information from secondary sources (ACSIS172, ACSIS206)

SC5-9WS presents science ideas and evidence for a particular purpose and to a specific audience, using appropriate scientific language, conventions and representations

* WS9 Students communicate by:

a. selecting and using in presentations, for different purposes and contexts, appropriate text types including discussions, explanations, expositions, procedures, recounts or reports

b. selecting and constructing an appropriate table, type of diagram, table or graph (histogram or sector, column or line graph) to present information and show relationships clearly and succinctly using digital technologies as appropriate

c. using appropriate units for physical quantities and symbols to express relationships, including mathematical ones Numeracy icon

d. proposing ideas that demonstrate coherence and logical progression

e. presenting scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations for specific audiences (ACSIS174, ACSIS208)

Knowledge and understanding

SC5-14LW analyses interactions between components and processes within biological systems

* LW1 Multicellular organisms rely on coordinated and interdependent internal systems to respond to changes in their environment. (ACSSU175)

Students:

c. outline some responses of the human body to infectious and non-infectious diseases

e. discuss, using examples, how the values and needs of contemporary society can influence the focus of scientific research, eg the occurrence of diseases affecting animals and plants, an epidemic or pandemic disease in humans or lifestyle related non-infectious diseases in humans

Learning across the curriculum

Cross-curriculum priorities

Aboriginal and Torres Strait Islander histories and cultures Decorative

Asia and Australia's engagement with Asia Decorative

Sustainability Decorative

General capabilities

Critical and creative thinking Decorative

Ethical understanding Decorative

Information and communication technology capability Decorative

Intercultural understanding Decorative

Literacy Decorative

Numeracy Decorative

Personal and social capability Decorative

Other areas of learning

Civics and citizenship Decorative

Difference and diversity Decorative

Work and enterprise Decorative

Teacher notes

This task is written to engage students in health and disease using the context of the Olympic Games. The task may be amended to include another scenario which is contextual, such as any sporting event or large event which brings together many people.

The 2016 Olympics in Rio de Janeiro gained a lot of attention in media and various aspects of it were debated in the community.

This assessment task allows students to develop an understanding of infectious diseases, including the human body’s response to infectious diseases. They will explore and evaluate the importance of disease treatment and prevention with a specific focus on vaccination programs. They will gain an understanding of epidemiology and analyse data to develop cause-and-effect relationships and suitable intervention programs.

The assessment task is designed to be introduced after students gain knowledge and understanding about infectious diseases and defence systems. The lesson ideas are designed to be implemented before students engage in the task.

The assessment is intended to be formative and allows for teachers and students to provide feedback.

Prior knowledge or teaching

* What are infectious diseases and how are they caused?
* Does the body naturally defend itself against diseases?
* What can we do to boost immunity?

Content indicators

* Define the term pathogen
* List examples of pathogens including bacteria, fungus, virus, parasites
* Define infectious disease
* Describe the cause, symptoms, treatment and prevention of one infectious
* Identify vaccination programs as a method of disease control and prevention
* Evaluate the effectiveness of vaccination programs in preventing and controlling disease
* Identify and describe components of the first line of defence as skin, mucous membranes, cilia and chemical barriers
* Identify and describe components of the second line of defence as the inflammation response and phagocytosis
* Identify and describe components of the third line of defence as B-cells, T-cells and antibodies/antigens

Introduction

Introductory activities

* Engage with the following video from [ABC splash](http://splash.abc.net.au/home#!/media/526633/dengue-fever-an-unwanted-souvenir) or similar stimulus material.
* Discuss the implications of global travelling with respect to disease. This can be a teacher led task and can involve stimulus material, brainstorming or group work.
* Create a glossary of key terms that may be used during the lesson and subsequent lessons.

Activities to develop content knowledge

* Mind Map activity around the concept of diseases.
* Kahoot! quiz, Socrative quiz, word find, crosswords

Task

Students will work in group and engage in the focus statement and present their finding to the class.

‘Australians should/should not have gone to the Olympics in Rio in 2016’.

Collecting information

1. Student groups research and collect information for both sides of the argument. This should either be as a brainstorm or in points.
2. Groups should choose a side (either should or should not) and gather more information to substantiate their claim. Teachers could allocate sides or have all groups prepare arguments for both sides and then randomly select students.
3. Students should extend their knowledge to other scenarios of travel due to similar problem (Ebola, SARS, Bird Flu, Plague, Small pox).

Collating information

Groups must answer the following in their presentation

* Identify various types of pathogen that exist
* Describe the features of a viral disease.
* Differentiate between viral diseases and other infectious pathogens.
* Identify possible advantages/disadvantages of going to the Olympic Games.
* Describe possible dangers of visiting Rio di Janeiro during the Olympic Games.
* Discuss the effectiveness of vaccination programs in preventing and controlling disease.
* Identify immunology and the role of the immune system in maintaining health.

Presenting

Groups have free choice to present their findings to the class in any format. Discuss this format with your teacher before proceeding. In addition, groups must:

* create a brochure, health card or poster to support the focus statement
* produce a worksheet or interactive activity for students in class to record information presented

Student groups will be additionally assessed by students in their class.

Marking guideline/rubric

Teacher review

| Content | A | B | C | D | E |
| --- | --- | --- | --- | --- | --- |
| Identifies various pathogens | 4 types of pathogens have been included | 3 types of pathogens have been included | 2 types of pathogens have been included | 1 type of pathogens is included | Not submitted |
| Describes the features of a viral disease | 4 symptoms are mentioned | 3 symptoms are mentioned | 2 symptoms are mentioned | 1 symptom is mentioned | Not submitted |
| Differentiates between viral infections and other infectious pathogens | 2 or more differences are included, well explained | 2 differences are included, basic explanation | 1 difference is included, well explained | 1 difference is included, basic explanation | Not submitted |
| Identifies possible advantages/disadvantages of going to the Olympic Games | At least 4 points are included – 2 advantages and 2 disadvantages | 3 points are included which cover advantages and disadvantages | 2 points are included, 1 advantage and 1 disadvantage | 1 point is included in either advantages or disadvantages | Not submitted |
| Describes possible dangers of visiting Rio di Janeiro | 3 points thoroughly described | 3 points are described in basic terms | 2 points described or 3 stated | 1 point described or 2 stated | Not submitted |
| Discusses the effectiveness of vaccination programs in preventing and controlling disease | At least 2 points for and 2 points against are discussed | 2 points for/against and 1 point for/against | 1 point for and 1 point against | 1 point for OR 1 point against | Not submitted |
| Identifies immunology and the role of the immune system in maintaining health | Describes effectively the 2 lines of immune defence | Describes the 2 lines of defence, basic understanding | Describes 1 line of defence | Describes 1 lines of defence (some information missing) | Not submitted |
| Worksheet OR interactive activity | Activity is highly engaging with student interaction | Activity allows for student interaction | Activity allows students to fill in a worksheet, questions allow for discussion | Activity allows students to fill in a worksheet, questions are low order | Not submitted |

Peer review

The peer review aspect of this task allows for teachers to provide feedback on the presentation. The same feedback sheet may also be used by students to give other groups informal feedback.

The peer review process may also include feedback and comments from other teachers.

The purpose of the peer review is to provide feedback to groups on group work, presentation style and oral presentation skills.

| Aspect | Excellent | Good | Satisfactory |
| --- | --- | --- | --- |
| Participation | All members participate equally on group tasks.  Members always feel valued and supported. | All members participate on group tasks, but some members participate more than others.  Members mostly feel valued and supported. | One or two members only participate on group tasks (other members may be passive or silent). Members sometimes feel valued and supported. |
| Organisation | Effective and logical flow of all ideas and groups’ message is very clear. | Effective and logical flow of some ideas but groups’ overall message is clear. However, parts of message may require clarification. | Some logical flow of ideas and groups’ message may require further clarification. |
| Eye contact | Members consistently maintain eye-contact with audience (or in the case of skits/plays eye contact is always maintained with other members of the group). | Members sometimes maintain eye-contact with audience (or in the case of skits/plays eye contact is sometimes maintained with other members of the group). | Members maintain little or no eye contact. |
| Clarity | All voices well projected.  Members engage in dialogue confidently and clearly. | Some voices well projected.  Members mostly engage in dialogue but some members may require prompting. | Few (1 or 2) voices well projected.  Members engage in dialogue but most require prompting |
| Audience | Highly suitable to target audience  (consider tone, language choice and appropriate use of humour). | Mostly suited to target audience  (consider tone, language choice and appropriate use of humour). | Somewhat suitable to target audience  (consider tone, language choice and appropriate use of humour). |