Science KS4: Blended Learning Booklet

Stewards Academy

B4 – Health Matters

Name:

Form:

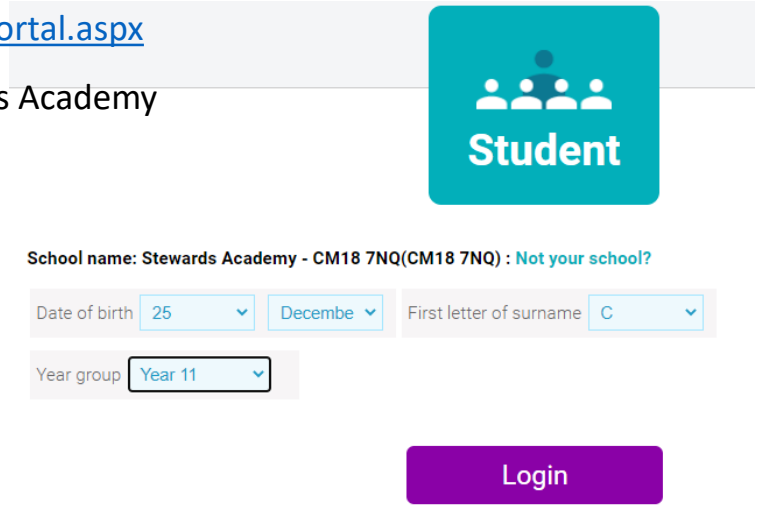
Aim to complete four lessons each week. Watch the videos and follow the four part lesson plan

All video clips are online using the ClassCharts link. Upload all work onto ClassCharts for feedback.

The online textbook has all the key information and vocabulary to help you with this unit

To log on to the online textbook:

- https://connect.collins.co.uk/school/portal.aspx
- Type in “stewards” and select Stewards Academy
- Login using your date of birth, initial of your surname and your academic year



Contents

Contents

(T) = Triple scientists only

Big Picture – Year 10 Overview

Science

Unit Test

End of Year Exams

Nest Year

IR emission and absorption (T)

Colour, lenses, images and magnification (T)

The electro-magnetic spectrum

Sound waves and seismic waves (T)

Properties of waves

UNIT P6

Unit Test

Spectroscopy and other instrumental methods (T)

Tests for gases, metals, hydroxides and anions (T)

Pure substances and chroma-tography

Polymers and poly-merisation (T)

Waves

I will be able to describe characteristics of waves that can be measured. **I will** be able to measure reflection and refraction of waves and explain why they occur. **I will** be able to place visible light withing the electromagnetic spectrum. ***I will** be able to sound waves can reveal structures (T). **I will** be able to explain how lenses work (T)*

Hydrocarbons & Chemical analysis

I will be able to describe the properties of hydrocarbons. ***I will** be able to describe the properties of alkenes, alcohols, carboxylic acids and polymers (T).* **I will** be able to use techniques to produce and identify a pure substance. ***I will** be able to identify positive and negative ions and evaluate different analysis techniques (T).*

Meiosis and reproduction

Genetics and gene disorders

The work of Gregor Mendel (T)

Unit Test

UNIT C7 & C8

Crude oil, hydrocarbons and fractional distillation

Combustion and cracking of alkanes

Alkenes, alcohols and carboxylic acids (T)

DNA structure and protein production (T)

Genetics

I will be able to explain how we inherit our characteristics as a result of our genes which are made of DNA. **I will** be able to explain how the DNA is replicated and packaged in a specialised way to form the sex cells. ***I will** be able to describe the work by Gregor Mendel around plant genetics*

***I will** be able to explain how forces affect motion and how an* understanding of these forces can make driving safer. ***I will** be able to explain the effects of forces on levers and in creating pressure (T).* I will be able to explain the effects of forces applied to springs.

Forces

DNA, genes and the human genome

UNIT B6

Unit Test

Forces and energy in springs

Moments, levers and pressure (T)

Momentum and road safety

Mass and Weight

Forces, speed and acceleration

UNIT P5

Energy Changes & Reaction Rates

I will be able to describe, explain and represent energy changes in chemical reactions and link them to bond energies and the particle theory. ***I will** be able to explain how dells produce a voltage and how fuel cells work (T).* **I will** be able to measure and calculate the rate of a reaction and describe factors that can affect rate. ***I will** be able to apply Le Chatelier's principle to reactions in equilibrium (T).*

Unit Test

Exo and endo thermic reactions

Reaction profiles

Cells, batteries and fuels cells (T)

Measuring rates of reaction

Factors affecting rates of reaction

Catalysts and collision theory

Reversible reactions and energy changes

Factors affecting equilibrium

UNIT C5 & C6

I will be able to explain how conditions in the body, processes and organ systems are coordinated and controlled. **I will** be able to describe how hormones control sexual development and human reproduction, *as well as how hormones enable plants to respond to stimuli (T)*

Homeostasis

Unit Test

Plant hormones (T)

Human reproduction and IVF

The endocrine system and the kidneys (T)

The nervous system *and the eye (T)*

Homeostasis

UNIT B5

Unit Test

Nuclear fission and fusion (T)

I will be able to reconise an atomic isotope and explain how one isotope can turn into another through three different forms of radioactive decay. **I will** be able to represent radioactive decay using a nuclear equation.

Atomic structure

Hazards and uses of radiation

Titration (T)

Electrolysis

Oxidation and reduction)

Unit Test

UNIT P4

Atomic structure

Radioactive decay

Nuclear equations

Neutralisation

Chemical changes

I will be able to describe why some metals are more reactive than others, **I will** be able to describe how neutralization occurs and how salts are formed. **I will** be able to explain how some metals are extracted by electrolysis rather than oxidation

I will be able to describe how lifestyle choices can affect the risk of catching a non-communicable disease. **I will** be able to explain how communicable diseases are spread and how we can control their spread. ***I will** be able to describe how plants are affected by and protected from disease causing organisms (T).*

Health

Metal reactivity

UNIT C4

Unit Test

Plant diseases & defenses (T)

Protecting the body

Malaria

Pathogens

Health and disease

UNIT B4

Year 10

ZOOM IN...

MY LEARNING JOURNEY:

Subject: Health matters Year: 10 Unit: B4

UP NEXT

Energy Changes

- Homeostasis
- Nervous system
- Endocrine system
- Diabetes
- Reprodution
- Contaception

CAREERS

- Doctor
- Nurse
- Horticulturalist

AIMS

This unit will provide an opportunity for students to learn about the differences between communicable and non-communicable disease. They will investigate risk factors linked to health and will then look at the different pathogens and some of the diseases they cause. It looks how the human body and plants defend themselves from infection. Students will learn about the immune system and how vaccinations are used to prevent the spread of disease. They will then find out more about how drugs are developed and why clinical trials are needed.

DEVELOPING COURAGE

C Vaccines are key to protecting us from harmful pathogens

O To learn about how the body is adapted to protect itself against diisease

U Understand how the cells in our immune system work together to protect us

R Learning the symptoms of the different exemplar diseases and the pathogens that cause them

A The importance of the drug discovery process

G Learning that by looking after our own health we look after the health of others

E Understanding how our body works to protect us from disease

PREVIOUS LEARNING

Pupils will have some knowledge of how health can be affected by drugs, such as alcohol and nicotine, and disease. They should know that bacteria are single celled organisms and that some be useful but some cause disease. They will have investigated the basics of some organ systems in animals (digestive, circulatory and respiratory) and plants (xylem and phloem).

WHAT WE KNOW/ REMEMBER

- .....
- .....
- .....
- .....
- .....

RECOMMENDED READING

1. All About Vaccines: Volume 1 by Bridget Gongol,
2. Keeping Fit (Healthy for Life) by Anna Claybourne,
3. Self-esteem and Mental Health (Healthy for Life) by Anna Claybourne,
4. Fever by Sonia Shah

PERSONAL OBJECTIVES

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Lesson 1 B4.1- Learning about Health

Connection

Have a look at the topic overview and the B4 zoom in.

Populate what you know and your personal objectives.

Activation

LI: Recall the differences between health and disease. Evaluate data about lifestyle and health

1. Make a note of the title and the LI
2. https://www.youtube.com/watch?v=EKEWk4oWmjY
3. Read pages 130-131
4. Define the key words: Communicable, immune system, mental health.

Demonstration

Attempt questions 1-7.
In 15 mins answer as many questions as you can.
Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:
Green questions to GCSE Level 3
Blue questions to GCSE Level 6
Purple questions to GCSE Level 9

Consolidation

Complete and self assess the relevant past paper question for this topic - From the B4 DIP file

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Answers: B4.1 – Learning about health

Connection

1 NA
2 NA
3 NA

Demonstration

1 Health is the physical and mental well-being of an individual

2 •disease •diet•stress•life situations.

3 Communicable: e.g. measles; HIV etc. Non-communicable: e.g. cancer; cardiovascular disease etc.

4 Moving home, family death, divorce etc., cause stress which causes depression, high blood pressure, risk of obesity, heart disease etc.

5 For example: Immune system diseases, such as AIDS, can cause an increased risk of contracting infectious diseases. Immune reactions initially caused by a pathogen can cause allergies, such as skin rashes. Severe viral respiratory infections in early childhood can trigger asthma as children grow. Severe physical ill health, for example obesity or cancer, can cause depression and other mental illnesses.

6 Any correct analysis, e.g.•Most common cancer in men is oropharynx and in females is in the cervix •Most cases of cervical cancer can be attributed to HPV (approximately 10200 out of 11300 etc.

7 For example:•Patient may get depression which affects family•Loss of earnings if it is an adult•Loss of quality time with other family members•Travelling expenses and time for treatment etc.

Lesson 2 B4.2 – Key Concept: Looking at Risk Factors

Connection

Q1. What are the 4 major causes of physical and mental ill health?

Q2. What condition could low calcium diets cause?

Q3. What mental condition can stress contribute to?

Activation

- **LI:** Describe and explain the impact of lifestyle on non-communicable disease

https://www.youtube.com/watch?v=fK1_SH3X2ek

2. Make a note of the title and the LI
3. Read pages 132-133.
4. Define the key words: Casual mechanism, risk factor.
5. Copy the graphs in figure 4.5

Consolidation

Complete and self assess the relevant past paper question for this topic - From the B4 DIP file

Demonstration

Attempt questions 1-5.
In 15 mins answer as many questions as you can.
Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:
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Blue questions to GCSE Level 6
Purple questions to GCSE Level 9

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Answers: B4.2 – The nervous system

Connection

1.Disease, diet, stress, life situations.

2. Osteoporosis.

3. Depression.

Demonstration

1 Genetics, diet/obesity and exercise
2 Not taking drugs; stop drinking alcohol; eating healthily; losing weight
3 Men: the number of cigarettes smoked per person increased from 1900 until approx. 1970 and then plateaued. Lung cancer incidences increased from 1920 and then plateaued from 1980
4 Poor lifestyle ie bad diet, lack of exercise, smoking, excessive drinking; can significantly increase the chances of developing non-communicable disease.
5 Serious health problems, possible death, damage to unborn children. Cost of cigarettes, loss of family income, depleted workforce. Financial burden of healthcare costs on local, national and global economies.

Lesson 3 B4.3 – Exploring non-communicable disease

Connection

Q1. What is a risk factor?
Q2. Name 3 lifestyle based risk factors.
Q3. Name a risk factor that can increase the chances of a person developing lung cancer.

Activation

LI: Explain risk factors for cancer and explain the differences between types of tumours

1. https://www.youtube.com/watch?v=QYWNXp36O48
2. Make a note of the title and the LI
3. Read pages 134-135
4. Define the key words: Tumour, benign, malignant, carcinogen.

Demonstration

Attempt questions 1-7.
In 15 mins answer as many questions as you can.
Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:
Green questions to GCSE Level 3
Blue questions to GCSE Level 6
Purple questions to GCSE Level 9

Consolidation

Complete and self assess the relevant past paper question for this topic - From the B4 DIP file

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Answers: B4.3 – Exploring non-communicable disease

Connection

1.Something that increases the chance of developing a disease.
2. Diet, smoking, drinking, lack of exercise, drug use, sexual habits.
3. Smoking

Demonstration

1Uncontrolled cell division
2 UV light, age, smoking
3 Benign tumours divide slowly, do not spread and are harmless.Malignant tumours divide quickly, spread and cause cancer
4 •not smoking •staying out of the sun and using sun screen •drinking alcohol in moderation• healthy diet and exercise.
5 Cigarette consumption showed an increasing trend from 1900 to early 1960s and as slowly decreased until 2000. Cancer deaths in men was always higher than women until 2000Cancer deaths in men rose rapidly from 1930 –1990 (peaked at 90) and then started to decline (to mid 70's).Cancer deaths in women rose very slightly from 1930 to mid-1960s (<500) and then then rapidly (but not as much as in men) to late 1990s and then started to slow down slightly (just over 40).
6 Because there is a time lag between when people start smoking and development of cancer. Therefore, the risks of smoking were not known immediately; it took a long time to build up evidence to prove that smoking is a causal mechanism of lung cancer.
7 Any sensible observation and justification

Lesson 4 B4.4 – Analysing and Evaluating data

Connection

Q1. What are the key differences between benign and malignant tumours?
Q2. What do we call substances or viruses that increase the risk of cancer?
Q3. Name one way a person could reduce their chances of developing cancer.

Activation

LI: Translate information between graphical and numerical forms

1. Make a note of the title and the LI
2. https://www.youtube.com/watch?v=MR55mO3DK-A
3. https://www.youtube.com/watch?v=MR55mO3DK-A
4. Read pages 136 – 137.
5. Define the Key words – Bias, correlation, trend.

Consolidation

Complete and self assess the relevant past paper question for this topic - From the B4 DIP file

Demonstration

Attempt questions 1-6.
In 15 mins answer as many questions as you can.
Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:
Green questions to GCSE Level 3
Blue questions to GCSE Level 6
Purple questions to GCSE Level 9

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Answers: B4.4 – Analysing and evaluating data

Connection

1. Benign – Slow dividing, do not spread, fairly harmless. Malignant – Rapidly divide, can invade tissues, can spread around the body causing secondary tumours.
2. Carcinogens
3. Stop smoking, improve diet, more exercise, wear sun cream, avoid UV radiation.

Demonstration

1 The more cigarettes smoked the lower the average birth weight.
2 Vaccination uptake was at around 93% from 2000-2004 then dropped to 83% in 2005 and staying at around this level since Whooping cough increased slowly from 2000 – 2004 then there was a rapid rise in 2005 before falling back down to previous levels from 2007-2009
3 Smoking habits of men increased from about 750 cigarettes smoked per capita per year in 1900 to about 5000 in 1990. The incidence of lung cancer also increased in this time from below 5 per 100000 per year in 1920 to approximately 93 per 100000 in 1990.
4 The data strongly suggests that there could be a link between smoking and lung cancer as the incidence of lung cancer increased in line with the number of cigarettes smoked.
5 Increases steadily from 150 in 1940 to 600 in late 1960's then falls steadily to 150 around 2005. The female trend follows the same general pattern but is always lower than the male trend and peaks at about 300
6 Large sample taken over many years so data should be reproducible if there is no bias but there is no information about who completed the research, any personal interests etc. The trends follow the same pattern.

Lesson 5 B4.5 – Studying Pathogens

Connection

Q1. What is a correlation in data?
Q2. What do we call a data point that doesn't fit with the other data?
Q3. Define Bias.

Activation

LI: Define pathogen and explain how communicable diseases can be controlled

1. https://www.youtube.com/watch?v=WsZS4RCWpcE
2. Make a note of the title and the LI
3. Read pages 138 – 139
4. Define pathogen and protist.

Consolidation

Complete and self assess the relevant past paper question for this topic - From the B4 DIP file

Demonstration

Attempt questions 1-5.
In 15 mins answer as many questions as you can.
Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:
Green questions to GCSE Level 3
Blue questions to GCSE Level 6
Purple questions to GCSE Level 9

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher

Answers: B4.5 –Studying Pathogens.

Connection

1. An association between two sets of random data.

2. An outlier
3. When a data set is inaccurate or unrepresentative; it contains systematic errors.

Demonstration

1 Any correct examples e.g. rose black spot fungus, Salmonella, malaria protist, measles virus

2 Direct contact, by water or through the air

3 They release toxins. Effects can be reduced by taking painkillers, having vaccinations etc.

4 Spread can be prevented by:•simple hygiene: covering mouth when coughing, using a handkerchief when sneezing and washing hands after using the toilet •isolation of infected individuals •destroying vectors, e.g. killing mosquitoes with insecticides •vaccination.

5 •reducing the risk of contact with infected animals –hard to monitor and control as bats fly around •wearing protective clothing –effective in hospitals but too expensive to provide for all unaffected individuals due to cost •washing hands frequently – everyone can do this but must have education programmes to ensure people know the importance of this •isolation of infected people –can be difficult if people do not report cases •safe burials of the dead –can enforce for reported cases but may go against local customs •travel restrictions –difficult to do but is possible especially air travel to and from countries with epidemics.

Lesson 6 B4.6 – Learning about Viral Diseases

Connection

Q1. What are the 4 types of pathogen?
Q2. Provide an example of each.
Q3. Name a way we can reduce the spread of pathogens.

Activation

LI: Describe the symptoms, transmission and control of some viral diseases. Explain how some viral diseases spread.

1. https://www.youtube.com/watch?v=K5zFxfbmC1M
2. Make a note of the title and the LI
3. Read pages 140-141
4. Define the key words: antiretroviral drug, vaccination.
5. Draw the diagram Figure 4.19.

Demonstration

Attempt questions 1-7.
In 15 mins answer as many questions as you can.
Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:
Green questions to GCSE Level 3
Blue questions to GCSE Level 6
Purple questions to GCSE Level 9

Consolidation

Complete and self assess the relevant past paper question for this topic - From the B4 DIP file

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher