

# Villiers School – IBDP Subject Brief

## Group 4 – Sciences

### Chemistry (HL or SL)



#### **Description and Aims**

The course consists of a core foundation of essential chemical concepts, including quantitative chemistry, atomic structure and the periodic table, bonding theory, chemical kinetics, energetics and equilibria, theories of acids and bases, redox chemistry, introductory organic chemistry and instrumental analysis. In many instances these topics are illustrated with examples drawn from environmental, industrial, medicinal and biological chemistry.

The theory is illustrated with a wide range of experimental work designed to train students in a variety of core chemistry laboratory skills as well as proper experimental design, data collection and processing. The five approaches to learning (developing thinking skills, social skills, communication skills, self-management skills and research skills) along with the six approaches to teaching (teaching that is inquiry-based, conceptually focused, contextualized, collaborative, differentiated and informed by assessment) encompass the key values and principles that underpin IB pedagogy. [2014 IBDP Chemistry subject guide, p.4]

Through studying Biology, Chemistry or Physics, students should become aware of how scientists work and communicate with each other. While the scientific method may take on a wide variety of forms, it is the emphasis on a practical approach through experimental work that characterises these subjects.

The aims enable students, through the overarching theme of the nature of science, to:

- appreciate scientific study and creativity within a global context through stimulating and challenging opportunities
- acquire a body of knowledge, methods and techniques that characterise science and technology
- apply and use a body of knowledge, methods and techniques that characterise science and technology
- develop an ability to analyse, evaluate and synthesise scientific information
- develop a critical awareness of the need for, and the value of, effective collaboration and communication during scientific activities
- develop experimental and investigative scientific skills including the use of current technologies
- develop and apply 21st-century communication skills in the study of science
- become critically aware, as global citizens, of the ethical implications of using science and technology
- develop an appreciation of the possibilities and limitations of science and technology
- develop an understanding of the relationships between scientific disciplines and their influence on other areas of knowledge.



## **Topics covered**

### Core topics

- Stoichiometric relationships
- Atomic structure
- Periodicity
- Chemical bonding and structure
- Energetics/thermochemistry
- Chemical kinetics
- Equilibrium
- Acids and bases
- Redox processes
- Organic chemistry
- Measurement and data processing
- Additional topics at higher level
- Atomic structure
- The periodic table—the transition metals
- Chemical bonding and structure
- Energetics/thermochemistry
- Chemical kinetics
- Equilibrium
- Acids and bases
- Redox processes
- Organic chemistry
- Measurement and analysis

### Options

- Materials
- Biochemistry
- Energy
- Medicinal chemistry

## **Practical Scheme of Work**

Prescribed and other practical activities are completed throughout the two-year DP to aid in understanding and develop an appreciation for the scientific method.

The individual investigation is carried out by students on a topic of their choosing, it includes both a practical and write up and accounts for 20% of the students' final grade.

The group 4 project is a collaborative activity where students from Biology, Physics and Chemistry classes within the school work together. It allows for concepts and perceptions from across disciplines to be shared while appreciating the environmental, social and ethical implications of science and technology. It can be practically or theoretically based and aims to develop an understanding of the relationships between scientific disciplines and their influence on other areas. The emphasis is on interdisciplinary cooperation and the scientific processes.



## ***External Assessment***

(Weighting 80%)

Paper 1

HL - 40 multiple choice questions (1 hour)

SL - 30 multiple choice questions (45 minutes)

Paper 2

Data based, short answer and extended response questions

HL (2 hours 15 minutes)

SL (1 hour 15 minutes)

Paper 3

Data based, short answer and extended response questions

HL (1 hour 15 minutes)

SL (1 hour)

## ***Internal Assessment***

(Weighting 20%)

Investigation and write-up (6-12 pages)

SL or HL (10 hours)