YEAR 12 BIOLOGY 2014

STUDENT INFORMATION

HUTT VALLEY HIGH SCHOOL

Teaching Staff:

Mrs Anglesey room B8
Mr Edwards (HOD) room B12
Mrs Inglis room B10
Miss Meehan room B11

Year 12 Biology Blog: http://12biohvhs.blogspot.com/

Prerequisite: Level 1 Biology or Level 1 Science, or at discretion of the HOD

Key concepts/big ideas in Biology:

All organisms share a common set of essential life processes
Because of their shared evolutionary history, all organisms share a common set of essential life processes (movement, respiration, sensitivity, growth, reproduction, excretion, and nutrition) and use the same genetic system to maintain continuity.

Organisms interact with each other and with their environment
Living systems are organised and regulate themselves at the cell, organism, and ecosystem levels. Each of these dynamic systems maintains stability in response to a changing environment and their responses impact in turn upon the environment.

Species arise, change, and become extinct over time
Evolution results in diverse adaptations to ensure survival. This diversity allows organisms to occupy different niches within an ecosystem.

Genetics maintain continuity plus allow for change
The inherited sequence of DNA underlies an organism's phenotype such as shape or blood type. Heritable mutations allow evolution or genetic change over time.

Leads to: Level 3 Biology

Course Costs: Approximately $25 field trip transport costs and entry fees.
$25 for SciPad work book.

ASSESSMENT

NB: Full details of policies and procedures for the management of NCEA and assessments can be found in the Hutt Valley High School NCEA Information handbook.

NCEA Biology LEVEL 2
ASSESSMENT SCHEDULE 2014

- These are the 2 **internal standards** and 3 **external standards** for this subject
  This is an NCEA Endorsed Course: You can get Endorsement if you get 14 credits or higher at Merit level (Endorsed with Merit) or 14 credits at Excellence level (Endorsed with Excellence)

Standard Number	Version	Standard Name / Description (internal or external)	Credit Value	Literacy Standard	Numeracy Standard	Is Resubmission offered with this standard?	Term and week of assessment
91158	*1*	*Biol 2.6 Investigate a pattern in an ecological community with supervision Internal*	*4*	*Yes*	*No*	*Limited*	*On-going write up week 11 term one*
91153	1	*Biol 2.1 Carry out a practical investigation in a biological context with supervision Internal*	4	*No*	*Yes*	*Limited*	*Week four and five term two in class and afterschool*
91156	1	*Biol 2.4 Demonstrate understanding of life processes at the cellular level External*	4	*Yes*	*No*	*No*	*End of year exams*
91159	1	*Biol 2.7 Demonstrate understanding of gene expression External*	4	*Yes*	*No*	*No*	*End of year exams*
91157	1	*Biol 2.5 Demonsrate understanding of genetic variation and change External*	4	*Yes*	*No*	*No*	*End of year exams*

ACHIEVEMENT STANDARDS

Details of each standard are given below. Read these carefully as they outline the content that you will be assessed on.

Biology 2.1- AS 91153
Carry out a practical investigation in a biology context, with supervision

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
● Carry out a practical investigation in a biology context, with supervision.	● Carry out an in-depth practical investigation in a biology context, with supervision.	● Carry out a comprehensive practical investigation in a biology context, with supervision.

Explanatory Notes (edited)

1. *Carry out a practical investigation* involves:
   - developing a statement of the purpose written as a hypothesis linked to a scientific concept or idea
   - using a method that describes:
     - for a fair test: a range for the independent variable, the measurement of the dependent variable and the control of some other key variables
     - for a pattern seeking or modelling activity: the data that will be collected, range of data/samples, and consideration of some other key factors
   - collecting, recording, and processing data relevant to the purpose of the investigation
   - interpreting and reporting on the findings
   - reaching a conclusion based on the student's processed data which is relevant to the purpose of the investigation
   - identifying and including relevant findings from another source.

   Carry out an in-depth practical investigation involves:
   - using a method that describes:
     - for a fair test: a valid range for the independent variable, the valid measurement of the dependent variable and the control of other key variables with consideration of factors such as sampling bias and sources of errors
     - for a pattern seeking or modelling activity: a valid collection of data with consideration of factors such as sampling bias and sources of errors
   - collecting, recording, and processing data which enables a trend or pattern (or the absence of a trend or pattern) to be determined
   - reaching a valid conclusion based on the student's processed data which is relevant to the purpose of the investigation
   - a discussion of the biological ideas relating to the investigation that is based on the student's findings and those from other source(s).

   Carry out a comprehensive practical investigation involves justification of the choices made during the sound investigation, ie evaluating the validity of the method or reliability of the data and explaining the conclusion in terms of the biology ideas relevant to the investigation.

2. A *practical investigation* is an activity covering the complete investigation process: planning and carrying out the investigation, collecting primary data, processing and interpreting data, and reporting on the investigation. Students may make changes to their initial method as they work through the investigation.

3. It is intended that this investigation be carried out with supervision. This means that the teacher provides guidelines for the investigation such as the context for the investigation, instructions that specify the requirements for a comprehensive investigation, and broad experimental conditions such as the availability of equipment or chemicals. Students then develop and complete the investigation from the initial guidelines given by the teacher. Supervision may involve discussion between teachers and individual students in order to clarify the students' ideas and may also involve teachers managing the process of sharing findings.

Biology 2.4 AS- 91156
Demonstrate understanding of life processes at the cellular level

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
● Demonstrate understanding of life processes at the cellular level.	● Demonstrate in-depth understanding of life processes at the cellular level.	● Demonstrate comprehensive understanding of life processes at the cellular level.

Explanatory Notes (edited)

1. *Demonstrate understanding* involves defining, using annotated diagrams or models to describe, and describing characteristics of, or providing an account of, life processes at the cellular level.

   Demonstrate in-depth understanding involves using biological ideas to give reasons how or why life processes occur at the cellular level.

   Demonstrate comprehensive understanding involves linking biological ideas about life processes at the cellular level. The discussion of ideas may involve justifying, relating, evaluating, comparing and contrasting, analysing.

2. *Life processes at the cellular level* include:
   - photosynthesis
   - respiration
   - cell division (DNA replication and mitosis as part of the cell cycle).

3. Biological ideas, as they relate to each of the life processes at the cellular level, are selected from:
   - movement of materials (including diffusion, osmosis, active transport)
   - enzyme activity (specific names of enzymes are not required)
   - factors affecting the process
   - details of the processes only as they relate to the overall functioning of the cell (specific names of stages are not required)
   - reasons for similarities and differences between cells such as cell size and shape, and type and number of organelles present.

5 Cells include plant cells and animal cells.

Biology 2.5 AS-91157
Demonstrate understanding of genetic variation and change

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
● Demonstrate understanding of genetic variation and change.	● Demonstrate in-depth understanding of genetic variation and change.	● Demonstrate comprehensive understanding of genetic variation and change.

Explanatory Notes (edited)

1 *Demonstrate understanding* involves defining, using annotated diagrams or models to describe, and describing characteristics of, or providing an account of, genetic variation and change.

Demonstrate in-depth understanding involves providing reasons as to how or why genetic variation and change occurs.

Demonstrate comprehensive understanding involves linking biological ideas about genetic variation and change. The discussion of ideas may involve justifying, relating, evaluating, comparing and contrasting, or analysing.

2 *Genetic variation and change* involves the following concepts:
- sources of variation within a gene pool
- factors that cause changes to the allele frequency in a gene pool.

3 Biological ideas and processes relating to sources of variation within a gene pool are selected from:
- mutation as a source of new alleles
- independent assortment, segregation and crossing over during meiosis
- monohybrid inheritance to show the effect of co-dominance, incomplete dominance, lethal alleles, and multiple alleles
- dihybrid inheritance with complete dominance
- the effect of crossing over and linked genes on dihybrid inheritance.

4 Biological ideas and processes relating to factors affecting allele frequencies in a gene pool are selected from:
- natural selection
- migration
- genetic drift.

Biology 2.6 AS 91158
Investigate a pattern in an ecological community, with supervision

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
● Investigate a pattern in an ecological community, with supervision.	● Investigate in-depth a pattern in an ecological community, with supervision	● Comprehensively investigate a pattern in an ecological community, with supervision.

Explanatory Notes

1 *Investigat*e involves describing observations or findings, and using those findings to identify the pattern (or absence of a pattern) in an ecological community, relating this pattern to an environmental factor, and describing how the environmental factor might affect chosen species within the community.

Investigate in-depth involves providing a reason for how or why the biology of one of the chosen species relates to the pattern (or absence of a pattern). The biology relates to structural,

behavioural or physiological adaptations of the organism. Behavioural or physiological adaptations of the organism relate to the environmental factor and an interrelationship with an organism of another species (eg competition, predation, or mutualism).

Investigate comprehensively involves using an environmental factor and the biology of interrelated organisms of different species to explain the pattern (or absence of a pattern). The explanation may involve elaborating, applying, justifying, relating, evaluating, comparing and contrasting, and analysing.

2 Investigation involves analysing, and interpreting information about the ecosystem. The information may come from direct observations, collection of field data, tables, graphs, resource sheets, photographs, videos, websites, and/or reference texts.

3 A community pattern may include: succession, zonation, stratification, or another distribution pattern in response to an environmental factor.

4 Environmental factors likely to affect patterns in a community include abiotic and/or biotic factors.

5 Biology of the organisms refers to any adaptations of organisms that relate to the pattern being investigated and may include interrelationships such as competition, predation, or mutualism.

6 Assessment against this standard may be based on a stand-alone or an individual investigation that can contribute findings to a larger group or class investigation. In a group or class investigation, individual findings may be discussed and individual students may interpret their own findings in the light of other students' investigations and findings. Findings from outside the group or class such as published information or historical findings relevant to the investigation may also be used.

7 It is intended that this investigation be carried out with supervision. This means that the teacher provides guidelines for the investigation such as the context for the investigation, instructions that specify the requirements for a comprehensive investigation, and broad conditions such as the availability of equipment and/or resource material. Students then develop and complete the investigation from the initial guidelines given by the teacher. Supervision may involve discussion between teachers and individual students in order to clarify the students' ideas and may also involve teachers managing the process of sharing findings.

Biology 2.7 AS-91159
Demonstrate understanding of gene expression

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
● Demonstrate understanding of gene expression.	● Demonstrate in-depth understanding of gene expression.	● Demonstrate comprehensive understanding of gene expression.

Explanatory Notes

1. *Demonstrate understanding* involves defining, using annotated diagrams or models to explain, and giving characteristics of, or an account of, gene expression.

Demonstrate in-depth understanding involves providing a reason as to how or why biological ideas and processes affect gene expression.

Demonstrate comprehensive understanding involves linking biological ideas and processes about gene expression. The explanation may involve justifying, relating, evaluating, comparing and contrasting, or analysing.

2. *Gene expression* involves a selection from the following biological ideas and processes:
   - nucleic acid structure and nature of the genetic code
   - significance of proteins
   - protein synthesis
   - the determination of phenotype via metabolic pathways
   - effect of environment on genotype through mutations
   - effect of environment on expression of phenotype.

3. Biological ideas and processes relating to nucleic acid structure and nature of the genetic code are selected from:
   - molecular components and their role in carrying the genetic code: nucleotide monomers, deoxyribose and/or ribose sugar, phosphate, nitrogenous bases, complementary base pairing resulting in coding and template strand
   - nature of the genetic code including triplets, codons and anticodons
   - redundancy due to degeneracy within the code.

4. Biological ideas and processes relating to the significance of proteins are selected from:
   - proteins as the products of gene expression: DNA ☾ mRNA ☾ polypeptide or protein
   - identification of one gene ☾ one polypeptide relationship
   - significance of proteins is limited to their structural and catalytic role in living things.
5. Biological ideas and processes relating to protein synthesis are selected from:
   - the role of DNA sequence in determining the structure of a protein and how that protein is produced (transcription and translation)
   - the role of enzymes in controlling the process (specific names of enzymes are not required).

6. Biological ideas and processes relating to the determination of phenotype via metabolic pathways are selected from:
   - biochemical reactions are catalysed by specific enzymes and every enzyme is coded for by a specific gene(s)
   - biochemical reactions do not occur in isolation but form part of a chain reaction so that the product of one becomes the substrate of another step in metabolism
   - phenotype is determined by the presence, absence, or amount of specific metabolic products.

7. Biological ideas and processes relating to the effect of the environment on genotype through mutations are selected from:
   - mutagens (specific mutagens are recognised but their effect at molecular level is not required)
   - the potential effect on genotype and phenotype of gene mutations at the gene level.

8. Biological ideas and processes relating to the effect of environment on expression of phenotype involve ways that environmental factors may change phenotype without changing genotype.

TEACHING ORDER 2014

	Topics	Assessment
Term 1	Biology 2.6 Ecology Investigate a pattern in an ecological community (on-going class and homework) Biology 2.4 Cells Demonstrate understanding of life processes at the cellular level (from middle of term one)	Internal assessment write up week 11 term one Common test at end of topic, practice exam and final external exam
Term 2	Biology 2.4 Cells Demonstrate understanding of life processes at the cellular level (continued) Biology 2.1 Practical Carry out a practical investigation in a biological context with supervision (one week during Cells topic wk 4/5 term 2) Biology 2.7 Demonstrate understanding of gene expression (middle of term two to middle of term three)	Internal assessment practical activity and write up week three term two Common test at end of topic, practice exam and final external exam
Term 3	Biology 2.7 Demonstrate understanding of gene expression (continued) Biology 2.5 Demonstrate understanding of genetic variation and change (middle of term three)	School Exams term three Common test at end of topic and final external exam
Term 4	Biology 2.5 Demonstrate understanding of genetic variation and change (continued) Prepare for final exams NCEA exams	Friday 22 November 2014 am

OTHER INFORMATION

Internally Assessed Achievement Standards Bio 2.1 and Bio 2.6

The deadlines for these internally assessed Achievement Standards are set well in advance. If a student knows they will be away on the day that work is due they must hand it in before they go. If a student is ill on the day that work is due, they can hand the work in as soon as they are better, providing it is accompanied by a medical certificate. Occasionally a student may be given an extension to complete their work e.g. for extended absences from school prior to the due date, this must be discussed with and approved by HOD Biology and your class teacher prior to the date the work is due. Please refer to the School NCEA guide for full details regarding assessment conditions.

1 A resubmission opportunity will only be offered where a teacher judges that a mistake has been made by the student, **which the student should be capable of discovering and correcting themselves**. There will be no reassessment opportunities for internal assessments.

Externally Assessed Achievement Standards Bio 2.4, 2.5, and 2.7

1 Formative assessments (tests) will held at the end of each topic and in the school exams.
2 Always refer to the Explanatory notes when revising for these standards.

Retaining Student's Work

All scripts for internal assessments will be retained to be available for moderation.

Homework and Attendance

To succeed in the level two biology course it is essential to both **attend all classes** and also augment the work done in class with **study at home**. The best students will always review work done in class and extend their knowledge by reading and viewing internet resources relating to the topics even when no formal homework is set.
By developing a personal interest in Biology you will find the subject more interesting and that will make the subject much easier.

On the net

Our Year 12 Biology Blog, (Address: **http://12biohvhs.blogspot.com/**) has links to some great internet sites that are relevant to our course. Please become a "follower" for notification when the blog is updated. Whenever you have no formal homework set use the blog as a starting point for your studies.
Please check you have an active school computer account and can access your school gmail and google docs. Many teachers are using google docs as part of their lessons. If you have a small device that connects to our Wi Fi you are encouraged to use these with our electronic text books and relevant internet sites

Message from the Head of Biology

Thank you for choosing Biology in 2014. I would like you to enjoy this course and succeed to the best of your ability. In previous years we have organised study classes and revision opportunities during the year. Students who have participated in these classes have often performed very well in the final examinations and I would recommend that you get involved If you are keen to do well.
I you have any suggestions for improving the course or any concerns about the course please feel free to contact me in person or via email richard.edwards@hvhs.school.nz