NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

Level 1, 2003

Science: Describe uses and effects of micro-organisms and the transfer of genetic information (90188)

National Statistics

Assessment Report

Assessment Schedule

Science: Describe uses and effects of micro-organisms and the transfer of genetic information (90188)

National Statistics

Number of Results	Percentage achieved			
	Not Achieved	Achieved	Merit	Excellence
27,263	43.1%	39.4%	13.0%	4.5%

Assessment Report

General Comments

Every candidate for a National Certificate of Educational Achievement examination paper is expected to:

- read the question and do what the question asks
- allow adequate time to complete answers
- be accurate: check and/or proofread
- use appropriate technical terms
- bring the correct equipment
- write and/or draw clearly
- use pen if work is to be eligible for reconsideration.

The overall level of achievement improved noticeably in 2003 when compared with the previous year. It was encouraging to note an increase in the number of candidates who attempted all parts of questions across the whole paper, rather than just the micro-organisms questions or the genetics questions. There were few candidates who limited their answers to a rewrite of the question, or who did not look for keywords in the questions. Most candidates attempted to justify or give detail to their answers.

Candidates need to identify and follow the instructions given in the question. For example Question 4 required a discussion of the relationship between chromosomes, genes and alleles but many students simply listed their individual properties.

Scientific language and technical terms should be used where applicable. For example, use ‘increase in temperature’ rather than ‘warm’, ‘increase in growth rate, or reproductive rate’ rather than ‘grows best’, or saprophytes ‘feed off’ rather than ‘living off’ dead material.

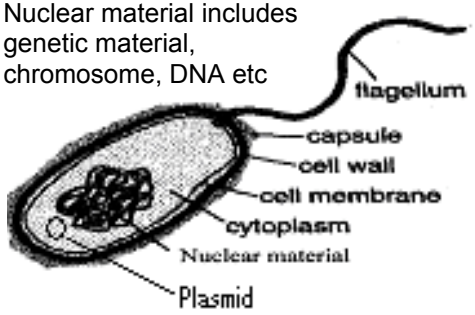
The ability to link ideas is necessary to gain Achievement with Merit or Achievement with Excellence. It was apparent in Question 1(d) where many candidates knew the facts but were unable to write concise answers; they were unable to show the links between the conditions given and the way yeast makes bread rise. In Question 5 many candidates could state that selective breeding involved two parents and that cloning involved only one parent, but were unable to progress further.

Assessment Schedule

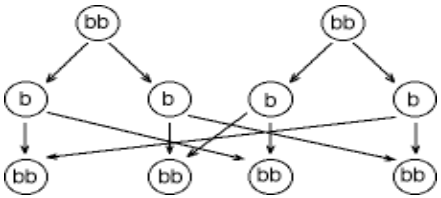
Science: Describe uses and effects of micro-organisms and the transfer of genetic information (90188)

Evidence Statement

Page	Question	Evidence contributing to Achievement *Describe*	Evidence contributing to Achievement with Merit *Explain (how and why)*	Evidence contributing to Achievement with Excellence *Link ideas (compare and contrast)*
2	One (a)	Description of extracellular digestion. Eg • release of enzymes • digestion of materials • absorption of nutrients / food • extra-cellular digestion.		
2	One (b)	Description of fungal spore dispersal Eg • dispersal of spores • release of spores into air / wind	Explanation relating to fungal reproduction Eg • release of spores / seeds into air **:** spread by air to new area / dispersal	
2	One (c)	Saprophyte **/** not pathogen.	Explanation of saprophyte feeding Eg • feeds on dead / waste material • soil contains dead / waste material • not feeding on living material	
3	One (d)	Yeast needs food/warmth/moisture	Any **<u>two</u>** of the following. Yeast • needs food : sugar / milk • needs moisture : water / milk • needs warmth : speed up R / G / R • produces CO_2 : helps bread rise	Yeast produces CO_2 **:** helps bread rise **:** Any **<u>two</u>** of the following. Yeast • needs food : sugar / milk • needs moisture : water / milk • needs warmth : speed up R / G / R

Page	Question	Evidence contributing to Achievement *Describe*	Evidence contributing to Achievement with Merit *Explain (how and why)*	Evidence contributing to Achievement with Excellence *Link ideas (compare and contrast)*
4	Two (a)	Nuclear material includes genetic material, chromosome, DNA etc  Diagram must correctly show **nuclear materia**l plus **two other cell parts.**		
4	Two (b)	Description of incubation as growth in ideal conditions. • Grow better / best / faster • Incubator provides warmth / best conditions	Explanation of incubation involving raised temperature / controlled temperature **:** to increase the rate of reproduction / growth of the bacteria.	
5	Two (c)	Descriptions relating to life processes of bacteria or viruses. • Bacteria feed / respire / respond / grow / excrete / MRSGREN. • Viruses do not carry out all life processes / need living / host cells to reproduce	Explanations relating to differences between life processes of bacteria and viruses. • Bacteria feed / respire / respond / grow / excrete / MRSGREN : because they are living organisms • Viruses do not carry out all life processes / need living / host cells to reproduce : because they are non living • bacteria reproduce by binary fission / split in two : viruses use other living cells	Discussion relating to **<u>one</u>** difference between life processes of bacteria and viruses. Eg • detailed discussion of extracellular bacterial feeding : non feeding of viruses • bacteria <u>cell</u> : non-cellular viral structure • **detailed** discussion of viral reproduction (involving other cells) compared with bacterial reproduction (binary fission)

Page	Question	Evidence contributing to Achievement *Describe*	Evidence contributing to Achievement with Merit *Explain (how and why)*	Evidence contributing to Achievement with Excellence *Link ideas (compare and contrast)*
6	Three (a)	Description of purpose of mitosis Eg • cells for growth / repair / new body cells • maintain chromosome number / identical cells		
6	Three (b)	Description of meiosis Eg • meiosis halves the number of chromosomes • gametes / sperm / eggs / sex cells produced	Explanation of fewer chromosomes Eg • two divisions / a division : halves number • meiosis halves the number of chromosomes **:** to produce gametes etc. • so that the number of chromosomes does not double when the gametes fuse.	
7	Four (a)	Description of relationship between chromosomes, genes, alleles Eg • chromosomes are made of genes • genes are made of alleles / alleles are different forms of a gene	Explanation of relationship Eg • gene – codes for a characteristic / determines the appearance of a trait • alleles – different forms of a gene : that give different traits / characteristics.	Discussion of the relationships between all three, maybe with a diagram or example Eg • Chromosomes are made of genes : • alleles are different forms of a gene : • a gene / allele codes for / determines / has instructions for : a trait / characteristic

Page	Question	Evidence contributing to Achievement *Describe*	Evidence contributing to Achievement with Merit *Explain (how and why)*	Evidence contributing to Achievement with Excellence *Link ideas (compare and contrast)*
8	Four (b) (i)	Black colour B : yellow colour b / black any upper case letter : yellow matching lower case letter		
8	Four (b) (ii)			
8	Four (c)	Description of part of cross Eg • male must be Bb / heterozygous • female must be bb / homozygous recessive • black offspring Bb / heterozygous • correct Punnett square	Explanation of 50% black Eg • parent is Bb / heterozygous : parent is bb / homozygous recessive : cross showing 50% Bb 50% bb • correct Punnett square : 50% Bb / 50% heterozygous	
9	Five	Descriptions relating to selective breeding and / or cloning Eg • two parents **:** selective breeding / mating • single parent **:** cloning / making copies / same genetic information	Explanations relating to selective breeding and / or cloning Eg • continue breeding until **<u>only</u>** curled-ear / homozygous cats born • insert genetic material into cell to develop an embryo	Discussion outlines similarities and differences between selective breeding and cloning techniques eg • continue breeding until only curled-ear / homozygous cats born **:** insert genetic material into cell to develop an embryo

Judgement Statement

Judgement statements (formerly referred to as sufficiency statements) help students understand how their overall results for each standard were arrived at.

	Achievement	Achievement with Merit	Achievement with Excellence
Criterion One (Q1 and Q2)	*Describe biological ideas relating to how humans use and are affected by micro-organisms* 4 Achievement	*Explain biological ideas relating to helpful and harmful micro-organisms* 5 Achievement ***plus*** 3 Merit	*Apply biological ideas relating to helpful and harmful micro-organisms* Merit ***plus*** 1 Excellence
Criterion Two (Q3, Q4 and Q5)	*Describe biological ideas relating to transfer of genetic information* 4 Achievement	*Explain biological ideas relating to transfer of genetic information* 5 Achievement ***plus*** 2 Merit	*Apply biological ideas relating to transfer of genetic information* Merit ***plus*** 1 Excellence
Judgement	Evidence of description answers relating to micro-organisms and transfer of genetic information.	Evidence of explanation answers relating to micro-organisms and transfer of genetic information.	Evidence of discussion answers relating to micro-organisms and transfer of genetic information.