

BIOLOGY 30
DIPLOMA EXAMINATION
SCHOOL REPORT
JUNE 2011

Case Study #2

Table 1
Biology 30
Percentage of Students Who Achieved Standards on Their Final Course Mark

Standard	Final Course Mark Representing Standard (%)	Percentage of Students Who Achieved Standard
Acceptable Standard	50	92.7
Standard of Excellence	80	34.5
Number of Students Included in Report	12357	30

Table 2
Biology 30
Percentage Distribution of A, B, C, and F, Averages, and Standard Deviations of Scores

Scores	School-Awarded Mark		Diploma Examination Mark		Final Course Mark	
	Prov.	School	Prov.	School	Prov.	School
A (80 - 100%)	41.7	56.7	32.0	26.7	34.5	50.0
B (65 - 79%)	32.6	20.0	26.5	46.7	32.1	26.7
C (50 - 64%)	21.2	23.3	23.3	20.0	26.2	23.3
F (0 - 49%)	4.5	0.0	18.1	6.7	7.3	0.0
Average Percent Score	73.7	78.0	67.9	72.6	71.2	75.6
Standard Deviation	14.2	11.7	17.2	13.3	14.8	12.2

Please refer to "Guidelines for Interpreting the Diploma Examination Detailed Reports" for suggestions about how to use this report.

$$Z = \frac{78.0 - 73.7}{14.2} = +0.30$$

$$Z = \frac{72.6 - 67.9}{13.3} = +0.30$$

$$Z = \frac{75.6 - 71.2}{12.2} = +0.30$$

BIOLOGY 30 DIPLOMA EXAMINATION
SCHOOL REPORT
JUNE 2011

Case Study #2

Table 3
Biology 30
Percentage of Students Who Achieved Standards on Their Final Course Mark, by Gender

Gender	Students		Students Who Achieved the Acceptable Standard		Students Who Achieved the Standard of Excellence		
	Province	Number	Percent of Total	Number	Percent of Gender	Number	Percent of Gender
	Male	4634	37.5	4313	93.1	1617	34.9
	Female	7723	62.5	7148	92.6	2650	34.3
School	Male	13	43.3	13	100.0	5	38.5
	Female	17	56.7	17	100.0	10	58.8

Table 4
Biology 30
Percentage Distribution of A, B, C, and F, Averages, and Standard Deviations of Scores, by Gender

Scores	School-Awarded Mark				Diploma Examination Mark				Final Course Mark			
	Province		School		Province		School		Province		School	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
A (80 - 100%)	40.7	42.3	38.5	70.6	32.8	31.6	23.1	29.4	34.9	34.3	38.5	58.8
B (65 - 79%)	31.5	33.3	30.8	11.8	27.3	26.0	30.8	58.8	31.5	32.4	23.1	29.4
C (50 - 64%)	22.7	20.3	30.8	17.6	23.7	23.1	38.5	5.9	26.7	25.9	38.5	11.8
F (0 - 49%)	5.1	4.1	0.0	0.0	16.2	19.3	7.7	5.9	6.9	7.4	0.0	0.0
Average Percent	73.1	74.1	73.5	81.5	68.6	67.5	67.9	76.2	71.2	71.1	70.9	79.1
Standard Deviation	14.5	14.0	11.1	11.2	16.7	17.4	13.4	12.4	14.8	14.9	12.0	11.6

$$Z = +0.03_z + 0.53$$

$$Z = -0.04 \quad z = +0.50$$

$$Z = -0.02$$

$$Z = +0.14$$

BIOLOGY 30 DIPLOMA EXAMINATION
SCHOOL REPORT
JUNE 2011

Case Study #2

Table 5
Biology 30
Average Raw Scores and Standard Deviations, by Item Format

Item Format	Total Marks Possible	Average Raw Score	Standard Deviation
		Prov. School	Prov. School
Multiple Choice	48	32.7	9.5
		36.0	7.3
Numerical Response	12	7.8	3.1
		7.9	2.8

$$Z = \frac{36.0 - 31.7}{9.5} = +0.35$$

$$Z = \frac{7.9 - 7.8}{3.1} = +0.03$$

BIOLOGY 30 DIPLOMA EXAMINATION
SCHOOL REPORT
JUNE 2011

Case Study #2

Table 6
Biology 30
Raw Score Results, by Reporting Category

Reporting Category	Total Marks Possible	Average Raw Score Prov.	Standard Deviation	
			Prov.	School
Nervous and Endocrine Systems (A1/A2)	15	10.4	3.3	2.8
Reproductive Systems and Hormones (B1/B2)	9	6.2	2.2	2.1
Differentiation and Development (B3)	4	2.6	1.2	1.0
Cell Division and Genetics (C1/C2)	17	11.4	4.0	3.4
Molecular Biology (C3)	6	3.6	1.8	1.5
Population and Community Dynamics (D1/D2/D3)	9	6.3	2.0	1.6

$$Z = \frac{11.9 - 10.4}{3.3}$$

$$= +0.45$$

$$Z = +0.32$$

$$Z = -0.25$$

$$Z = +0.35$$

$$Z = 0.00$$

$$Z = 0.00$$

BIOLOGY 30 DIPLOMA EXAMINATION
SCHOOL REPORT
JUNE 2011

Case Study #2

Table 7 - 1
Biology 30
Results, Blueprint Classifications, and Item Descriptions, by Item

Item #	% Correct Prov. Sch.	Knowledge	Skills	STS	Item Description
1	76.9 80.0	A1.1k	A1.3s		Given a graph of changes in the membrane potential of a neuron, identify the region of the graph that represents a certain process.
2	60.9 76.7	A1.2k	A1.2s		Given a diagram of the brain and a description of how a lifestyle factor affects certain neurons in the brain, identify the brain structure that stimulates these neurons.
3	69.6 83.3	A1.1k			Given a description of how a lifestyle factor affects certain neurons in the brain, evaluate information to predict a feature of the affected neurons.
NR1	80.5 90.0	A1.2k			Given some symptoms of a neurological disorder, match each of the symptoms with the region of the brain associated with the symptom.
4	66.3 83.3	A1.2k			Given a description of a group of receptor channels, predict the type of neuron stimulated by the channels and the division of the nervous system in which the stimulated neurons are located.
5	57.3 66.7	A1.3k	A1.2s		Given an illustration of a pathway of a reflex arc and information about a man's response to stimulation, identify the location of damage in the reflex arc.
6	82.4 90.0	A1.4k			Given a description of an inherited eye disorder, predict the first structure of the eye that will function abnormally in a person with the disorder.
7	67.6 90.0	A1.5k		STS	Given a description of how a particular chemical damages a whale's ear, identify the ear structure that is affected by exposure to the chemical (A1.2sts).
8	83.4 86.7	A1.1k			Given information about a particular condition, evaluate the mechanism by which the condition could lead to impaired neuron function.
9	49.7 53.3	A2.3k			Given information about a particular condition, predict the hormone that must be secreted in higher-than-normal amounts to restore homeostasis.

Note: The reporting categories **Knowledge (k)**; **Skills (s)**; and **Science, technology and society (sts)** refer to curricular outcomes only. Items in each reporting category cover a range of cognitive levels.

**BIOLOGY 30 DIPLOMA EXAMINATION
SCHOOL REPORT
JUNE 2011**

Case Study #2

**Table 7 - 2
Biology 30
Results, Blueprint Classifications, and Item Descriptions, by Item**

Item #	% Correct Prov. Sch.	Knowledge	Skills	STS	Item Description
10	74.9 83.3	A2.1k			Given information about seasonal fluctuations of a particular hormone in an animal, identify two endocrine glands that are affected.
11	56.6 70.0	A2.1k			Given a diagram of some glands in the endocrine system, identify the gland that secretes a particular hormone and describe the physiological effect of the hormone.
12	70.1 90.0	A2.6k		STS	Given a description of a procedure performed to treat a hormonal deficiency, evaluate the effect of the procedure on blood glucose metabolism (A2.2sts).
NR2	65.5 66.7	A2.2k			Given a list of some events in the endocrine system, determine the order of the events that would restore homeostasis when the levels of a specified hormone are lower than normal.
13	77.7 83.3	A2.5k			Given information about a structural feature of a particular endocrine gland, infer a hormone that would have its secretion affected by the structural feature.
NR3	54.1 50.0	B1.2k	B1.2s		Given a diagram of the male reproductive system, match four numbered structures with the corresponding names.
14	64.7 76.7	B1.3k	B1.2s		Given a diagram of a partially dissected human testis, identify the structure in the diagram where a particular hormone is produced and the name of the structure.
15	69.7 76.7	B1.4k			Given a description of sex determination during development, describe the genotype and phenotype of a fetus that develops under certain conditions.
16	68.8 80.0	B2.3k			Given a description of a hormone's negative feedback effect, predict a physiological consequence of the secretion of the hormone.
NR4	78.9 86.7	B1.1k	B1.2s		Given a diagram of the female reproductive system and a description of a surgical procedure, identify three structures that are removed during the surgical procedure.

Note: The reporting categories **Knowledge (k)**, **Skills (s)**, and **Science, technology and society (sts)** refer to curricular outcomes only. Items in each reporting category cover a range of cognitive levels.

**BIOLOGY 30 DIPLOMA EXAMINATION
SCHOOL REPORT
JUNE 2011**

Case Study #2

**Table 7 - 3
Biology 30**

Results, Blueprint Classifications, and Item Descriptions, by Item

Item #	% Correct Prov. Sch.	Knowledge	Skills	STS	Item Description
17	76.3 70.0	B2.1k			Given information about cosmetic products, identify the hormone additive that could directly cause a certain effect.
18	67.2 90.0	B2.1k			Given a description of how the activation of a particular gene stimulates the endocrine system, identify the hormone that is initially secreted when the gene is activated.
19	68.9 76.7	B1.5k		STS	Given a description of how a sexually transmitted infection (STI) affects the reproductive system, explain the mechanism by which the STI causes reduced fertility (B1.1sts).
20	71.6 83.3	B2.2k		STS	Identify a hormone given to a woman to increase the chance of having a successful outcome after in vitro fertilization (B2.1sts).
21	77.8 90.0	B3.5k		STS	Identify a hormone given to a woman to stimulate a particular outcome during the process of in vitro fertilization (B2.1sts).
22	45.8 63.3	C1.5k			Identify a cellular process during which an abnormality could occur that results in a chromosomal disorder.
23	52.8 40.0	B3.1k			Identify tissues from which a particular extra-embryonic structure develops.
NR5	56.3 53.3	B3.2k			Given descriptions of four events in human development, identify the sequence in which the events normally occur.
24	69.3 46.7	B3.1k			Identify the hormone that can be administered to produce a certain result.
25	83.6 90.0	C1.1k			Determine the total number of chromosomes in a cell in which nondisjunction has taken place.

Note: The reporting categories **Knowledge (k)**; **Skills (s)**; and **Science, technology and society (sts)** refer to curricular outcomes only. Items in each reporting category cover a range of cognitive levels.

BIOLOGY 30 DIPLOMA EXAMINATION
SCHOOL REPORT
JUNE 2011

Case Study #2

Table 7 - 4
Biology 30
Results, Blueprint Classifications, and Item Descriptions, by Item

Item #	% Correct Prov. Sch.	Knowledge	Skills	STS	Item Description
26	63.9 76.7	C1.3k			Contrast the products of two different types of cell division.
27	77.4 86.7	C1.2k			Given a diagram of the cell cycle and a description of how certain substances affect cell division, determine the part of the cell cycle that is affected by the substances.
NR6	68.4 73.3	C1.2k			Given a diagram of the cell cycle, match four phases labelled on the diagram with their names.
28	71.7 83.3	C1.4k			Given information about a method of reproduction and a diagram illustrating the method in an organism, identify two processes in the diagram and the sex of the organism produced.
29	67.1 80.0	C1.7k	C1.2s		Given information about two methods of reproduction in an organism and two life cycle diagrams, identify the diagram representing the method that takes place during certain conditions and justify the choice.
30	83.9 96.7	C1.4k			Given information about the reproductive strategies of an organism, compare two types of cell that are produced differently.
31	72.3 76.7	C2.2k	C2.3s		Given information about the offspring of a female parent whose phenotype is described, identify the genotypes of the parents and the phenotype of the male parent.
NR7	56.0 60.0	C2.2k	C2.3s		Given information about a genetic trait, determine the percentage probability that a child of specified parents will have a certain genotype.
32	76.6 93.3	C2.2k	C2.3s		Given information about the inheritance of a particular disorder and a pedigree, analyze the information to determine the genotypes of three individuals in the pedigree.
33	47.2 46.7	C2.2k	C2.3s		Given information about the inheritance of a particular disorder and a pedigree, analyze information to calculate the probability of two individuals in the pedigree having a child with a certain phenotype.

Note: The reporting categories **Knowledge (k)**, **Skills (s)**, and **Science, technology and society (sts)** refer to curricular outcomes only. Items in each reporting category cover a range of cognitive levels.

BIOLOGY 30 DIPLOMA EXAMINATION
SCHOOL REPORT
JUNE 2011

Case Study #2

Table 7 - 5
Biology 30
Results, Blueprint Classifications, and Item Descriptions, by Item

Item #	% Correct Prov. Sch.	Knowledge	Skills	STS	Item Description
NR8	58.4 60.0	C2.5k	C2.3s		Given information about the inheritance of two traits in an organism, calculate the probability of two individuals producing offspring with a particular phenotype.
34	71.7 76.7	C2.3k			Given information about the inheritance of some traits in an organism, analyze the information to determine one aspect of the disorder's inheritance.
35	57.4 60.0	C2.2k			Given information about the inheritance of a disorder in humans, determine the pattern of inheritance of the disorder.
36	80.2 86.7	C2.2k			Given information about a gene mutation that causes a disorder in humans, infer one aspect of the disorder's inheritance at the chromosomal level.
37	56.7 43.3	C3.6k	C3.2s		Given information about a particular gene mutation, predict how the mutation changes the products of transcription and translation.
38	53.9 70.0	C2.3k	C2.3s		Given the cross-over frequencies of some genes on a chromosome, identify the two genes that are most likely transferred together during crossing over.
NR9	55.2 46.7	C3.3k	C3.2s		Given descriptions of four events that take place during protein synthesis, determine the sequence in which the events normally occur.
39	69.5 90.0	C3.2k	C3.2s		Given a diagram of a section of a DNA molecule, identify one specific subunit of the molecule that is implicated in a particular process and the name of the subunit.
40	66.9 56.7	C3.2k			Given information about a mutated gene and its function, identify the process that results in the presence of the gene in fetal cells.
41	56.6 63.3	C3.4k		STS	Given a description of a procedure to genetically modify an organism, evaluate how particular enzymes are used at different times during the procedure (C3.2sts).

Note: The reporting categories **Knowledge (k)**; **Skills (s)**; and **Science, technology and society (sts)** refer to curricular outcomes only. Items in each reporting category cover a range of cognitive levels.

BIOLOGY 30 DIPLOMA EXAMINATION
SCHOOL REPORT
JUNE 2011

Case Study #2

Table 7 - 6
Biology 30
Results, Blueprint Classifications, and Item Descriptions, by Item

Item #	% Correct Prov. Sch.	Knowledge	Skills	STS	Item Description
42	56.9 60.0	C3.3k	C3.2s		Given a sequence of amino acids, determine a gene sequence that could have coded for the sequence of amino acids.
43	74.8 63.3	D1.2k			Given a description of a change that occurred in the gene pool of a particular population, evaluate information to determine the phenomenon that accounted for the change.
NR10	57.7 50.0	D1.1k			Given a list of some factors that affect gene pool equilibrium in a population, select four factors that are required for a population to be in Hardy-Weinberg equilibrium.
NR11	71.2 73.3	D1.3k	D1.3s		Given information about a genetic disorder in a certain population, determine the frequency of the disorder in the population.
44	69.9 80.0	D2.3k			Given information about changes in a community over time, identify the process exemplified by the changes.
45	72.5 63.3	D2.1k	D2.3s		Given a description of a particular community, describe the relationships between members of the community.
46	81.2 83.3	D3.2k	D3.1s		Given a description of a particular population and an expected change in the growth of the population, describe a factor that could account for the change.
47	76.0 86.7	D3.4k			Given information about a particular species, describe the expected reproductive strategy and growth pattern of the species.
NR12	75.9 76.7	D3.2k	D3.3s		Given information about the number of individuals in a particular population over a period of time, use data to calculate the growth rate of the population.
48	55.6 56.7	D3.3k	D3.3s		Given information about the number of individuals in a particular population over a period of time, use data to estimate the shape of the graph illustrating population growth.

Note: The reporting categories **Knowledge (k)**; **Skills (s)**; and **Science, technology and society (sts)** refer to curricular outcomes only. Items in each reporting category cover a range of cognitive levels.