Science 10 Life Science
Item-level Response Report
(Provincial Level)

British Columbia All Schools June /2007

Provincial Science 10 Item-Level Response Reports include data for all BC students who wrote the exam in June 2007 (about 34,300 students). Both public and independent schools are included. The Science 10 June 2007 (Life Science) provincial Item-Level Response Report displays the proportion of students who made errors on each test item and a description of the misconception.

Form	Item #	Question type	Number of Students who Responded to the Item	Percentage of Students who Answered Incorrectly	Specific Curricular Aspect that Needs Attention [>20% selected incorrect response]
A	1	MC	9389	43	*
A	2	MC	9381	28	*
A	3	MC	9389	47	• Students did not understand the term “chloroplasts”; correctly answered that chloroplasts are involved in photosynthesis, and that they combine carbon dioxide and water to produce glucose and oxygen, but did not consider that they contain chlorophyll.
A	4	MC	9378	30	*
A	5	MC	9359	43	*
A	6	MC	9389	30	*
A	7	MC	9387	71	• Students correctly compared two different sized cells in terms of their volumes, but incorrectly answered that the surface area to volume ratio for both cells is increasing as they grow.
A	8	MT	9371	53	• Students did not understand the process of mitosis; incorrectly answered that mitosis consisted of interphase, prophase, metaphase, anaphase and telophase only, instead of prophase, metaphase,

					anaphase and telophase only.
A	9	MT	9362	42	• Students did not understand the stages of the cell cycle; incorrectly answered that the stages of the cell cycle consisted of prophase, metaphase, anaphase and telophase only, instead of interphase, prophase, metaphase, anaphase and telophase only.
A	10	MT	9354	63	• Students did not understand the stage in which DNA duplication occurs; incorrectly answered that the stage in which DNA duplication occurs consisted of prophase only, instead of interphase only.
A	11	MT	9368	47	*
A	12	MT	9381	39	*
A	13	MC	9385	46	• Students correctly answered that mitosis was a process that produces daughter cells identical to the parents, and that the daughter cells have the same number of chromosomes as the parents cells, but incorrectly answered that it is a process by which gametes are produced, and did not consider that it is a process by which organisms grow.
A	14	MC	9386	55	• Students did not understand the term “mitosis”; incorrectly answered that binary fission is the process that is out of control, allowing cancerous body cells to divide continuously, instead of mitosis.
A	15	TF	9377	13	N/A
A	16	MC	9387	26	*
A	17	TF	9388	7	N/A
A	18	TF	9387	35	• Students did not understand that asexually reproducing organisms have a more limited ability to adapt to a changing environment than sexually reproducing organisms.

A	19	TF	9383	37	• Students did not understand the term “binary fission”; mistook binary fission for vegetative reproduction when given a picture and a description of a plant reproducing.
A	20	MC	9384	32	*
A	21	MC	9392	53	• Students did not understand the term “sex-linked trait”; understood how to identify a male genotype, based on having an X and a Y chromosome, but incorrectly answered that both the X and Y chromosome carry the recessive allele, not the X chromosome only.
A	22	MC	9376	49	• Students did not understand the term “carrier”; incorrectly answered that a woman is a carrier of a recessive sex-linked trait when she has the recessive alleles on both of her X chromosomes.
A	23	TF	9392	42	• Students did not understand the term “codominance”; did not understand how to complete and interpret the results of a Punnett square involving codominance.
A	24	MC	9387	25	*
A	25	MC	9384	35	• Students did not understand how to determine the genotype of an individual when given the dominant allele and the individual’s phenotype; correctly answered that the genotype of an individual with a convex nose is homozygous dominant, but did not consider that it could also be heterozygous.
A	26	MC	9372	63	• Students correctly answered that a woman’s father’s father could not have contributed any of the genes on either of her X chromosomes, but also incorrectly included her mother’s father.
A	27	MC	9386	51	• Students did not understand how to determine the

					genotype for a man's blood type when given a woman's blood type, her brother's blood type and their son's blood type; correctly identified two blood types, but did not consider another possible genotype for the husband's possible blood types.
A	28	TF	9388	33	• Students did not understand the term "neutral mutation"; incorrectly answered that a neutral mutation occurs when a positive mutation is followed by a negative mutation.
A	29	TF	9382	19	N/A
B	1	MC	7682	44	*
B	2	MC	7679	26	*
B	3	MC	7681	45	• Students did not understand the term "chloroplasts"; correctly answered that chloroplasts are involved in photosynthesis, and that they combine carbon dioxide and water to produce glucose and oxygen, but did not consider that they contain chlorophyll.
B	4	MC	7677	30	*
B	5	MC	7676	41	*
B	6	MC	7685	30	*
B	7	MC	7679	73	• Students correctly compared two different sized cells in terms of their volumes, but incorrectly answered that the surface area to volume ratio for both cells is increasing as they grow. • Students incorrectly answered that a smaller cell has a smaller surface area to volume ratio, not larger; incorrectly answered that the surface area to volume ratio for both cells is increasing as they grow, and did not consider that a smaller cell has a smaller volume than a larger one.
B	8	MT	7677	50	• Students did not understand the process of mitosis;

					incorrectly answered that mitosis consisted of interphase, prophase, metaphase, anaphase and telophase only, instead of prophase, metaphase, anaphase and telophase only.
B	9	MT	7674	41	• Students did not understand the stages of the cell cycle; incorrectly answered that the stages of the cell cycle consisted of prophase, metaphase, anaphase and telophase only, instead of interphase, prophase, metaphase, anaphase and telophase only.
B	10	MT	7669	63	• Students did not understand the stage in which DNA duplication occurs; incorrectly answered that the stage in which DNA duplication occurs consisted of metaphase only, instead of interphase only. • Students did not understand the stage in which DNA duplication occurs; incorrectly answered that the stage in which DNA duplication occurs consisted of prophase only, instead of interphase only.
B	11	MT	7675	46	*
B	12	MT	7682	40	*
B	13	MC	7678	45	• Students correctly answered that mitosis was a process that produces daughter cells identical to the parents, and that the daughter cells have the same number of chromosomes as the parents cells, but incorrectly answered that it is a process by which gametes are produced, and did not consider that it is a process by which organisms grow.
B	14	MC	7676	56	• Students did not understand the term “mitosis”; incorrectly answered that binary fission is the process that is out of control, allowing cancerous body cells to divide continuously, instead of mitosis.
B	15	TF	7682	12	N/A

B	16	MC	7685	26	*
B	17	TF	7686	6	N/A
B	18	TF	7688	35	• Students did not understand that asexually reproducing organisms have a more limited ability to adapt to a changing environment than sexually reproducing organisms.
B	19	TF	7685	37	• Students did not understand the term “binary fission”; mistook binary fission for vegetative reproduction when given a picture and a description of a plant reproducing.
B	20	MC	7690	32	*
B	21	MC	7684	53	• Students did not understand the term “sex-linked trait”; understood how to identify a male genotype, based on having an X and a Y chromosome, but incorrectly answered that both the X and Y chromosome carry the recessive allele, not the X chromosome only.
B	22	MC	7683	49	• Students did not understand the term “carrier”; incorrectly answered that a woman is a carrier of a recessive sex-linked trait when she has the recessive alleles on both of her X chromosomes.
B	23	TF	7689	40	• Students did not understand the term “codominance”; did not understand how to complete and interpret the results of a Punnett square involving codominance.
B	24	MC	7688	25	*
B	25	MC	7685	35	• Students did not understand how to determine the genotype of an individual when given the dominant allele and the individual’s phenotype; correctly answered that the genotype of an individual with a convex nose is homozygous dominant, but did not

					consider that it could also be heterozygous.
B	26	MC	7671	64	• Students correctly answered that a woman's father's father could not have contributed any of the genes on either of her X chromosomes, but also incorrectly included her mother's father.
B	27	MC	7676	51	• Students did not understand how to determine the genotype for a man's blood type when given a woman's blood type, her brother's blood type and their son's blood type; correctly identified two blood types, but did not consider another possible genotype for the husband's possible blood types.
B	28	TF	7691	34	• Students did not understand the term "neutral mutation"; incorrectly answered that a neutral mutation occurs when a positive mutation is followed by a negative mutation.
B	29	TF	7683	17	N/A
C	1	MC	8358	45	*
C	2	MC	8347	28	*
C	3	MC	8355	46	• Students did not understand the term "chloroplasts"; correctly answered that chloroplasts are involved in photosynthesis, and that they combine carbon dioxide and water to produce glucose and oxygen, but did not consider that they contain chlorophyll.
C	4	MC	8355	30	*
C	5	MC	8351	45	*
C	6	MC	8363	32	*
C	7	MC	8363	74	• Students correctly compared two different sized cells in terms of their volumes, but incorrectly answered that the surface area to volume ratio for both cells is increasing as they grow.

					• Students incorrectly answered that a smaller cell has a smaller surface area to volume ratio, not larger; incorrectly answered that the surface area to volume ratio for both cells is increasing as they grow, and did not consider that a smaller cell has a smaller volume than a larger one.
C	8	MT	8337	52	• Students did not understand the process of mitosis; incorrectly answered that mitosis consisted of interphase, prophase, metaphase, anaphase and telophase only, instead of prophase, metaphase, anaphase and telophase only.
C	9	MT	8342	43	• Students did not understand the stages of the cell cycle; incorrectly answered that the stages of the cell cycle consisted of prophase, metaphase, anaphase and telophase only, instead of interphase, prophase, metaphase, anaphase and telophase only.
C	10	MT	8330	64	• Students did not understand the stage in which DNA duplication occurs; incorrectly answered that the stage in which DNA duplication occurs consisted of metaphase only, instead of interphase only. • Students did not understand the stage in which DNA duplication occurs; incorrectly answered that the stage in which DNA duplication occurs consisted of prophase only, instead of interphase only.
C	11	MT	8348	48	*
C	12	MT	8352	43	*
C	13	MC	8359	46	• Students correctly answered that mitosis was a process that produces daughter cells identical to the parents, and that the daughter cells have the same number of chromosomes as the parents cells, but incorrectly answered that it is a process by which gametes are produced, and did not consider that it is

					a process by which organisms grow.
C	14	MC	8354	57	• Students did not understand the term “mitosis”; incorrectly answered that binary fission is the process that is out of control, allowing cancerous body cells to divide continuously, instead of mitosis.
C	15	TF	8347	14	N/A
C	16	MC	8366	27	*
C	17	TF	8369	6	N/A
C	18	TF	8366	35	• Students did not understand that asexually reproducing organisms have a more limited ability to adapt to a changing environment than sexually reproducing organisms.
C	19	TF	8362	38	• Students did not understand the term “binary fission”; mistook binary fission for vegetative reproduction when given a picture and a description of a plant reproducing.
C	20	MC	8365	35	• Students did not understand the results of asexual reproduction; incorrectly answered that a zygote results from asexual reproduction, not a bud.
C	21	MC	8363	55	• Students did not understand the term “sex-linked trait”; understood how to identify a male genotype, based on having an X and a Y chromosome, but incorrectly answered that both the X and Y chromosome carry the recessive allele, not the X chromosome only.
C	22	MC	8356	51	• Students did not understand the term “carrier”; incorrectly answered that a woman is a carrier of a recessive sex-linked trait when she has the recessive alleles on both of her X chromosomes.

C	23	TF	8367	43	• Students did not understand the term “codominance”; did not understand how to complete and interpret the results of a Punnett square involving codominance.
C	24	MC	8364	27	*
C	25	MC	8360	37	• Students did not understand how to determine the genotype of an individual when given the dominant allele and the individual’s phenotype; correctly answered that the genotype of an individual with a convex nose is homozygous dominant, but did not consider that it could also be heterozygous.
C	26	MC	8351	65	• Students correctly answered that a woman’s father’s father could not have contributed any of the genes on either of her X chromosomes, but also incorrectly included her mother’s father.
C	27	MC	8357	52	• Students did not understand how to determine the genotype for a man’s blood type when given a woman’s blood type, her brother’s blood type and their son’s blood type; correctly identified two blood types, but did not consider another possible genotype for the husband’s possible blood types.
C	28	TF	8368	35	• Students did not understand the term “neutral mutation”; incorrectly answered that a neutral mutation occurs when a positive mutation is followed by a negative mutation.
C	29	TF	8365	19	N/A
D	1	MT	8746	63	• Students did not understand where proteins are produced and/or mistook the mitochondria for a ribosome.
D	2	MT	8737	41	*
D	3	MT	8755	19	N/A

D	4	MT	8739	57	• Students did not understand the function of the mitochondria; mistook the mitochondria for the nucleus.
D	5	MT	8742	33	*
D	6	TF	8773	59	• Students incorrectly answered that plant and animal cells use a different organelle for cellular respiration.
D	7	MC	8763	71	• Students correctly understood that a cell? larger vacuole would affect the volume of the cytoplasm, but incorrectly answered that it would increase the volume, not decrease. • Students incorrectly answered that a cell? larger vacuole increases the cell? surface area.
D	8	MC	8774	54	*
D	9	MC	8767	47	• Students did not understand the processes that occur during metaphase; confused the process of prophase with metaphase.
D	10	MC	8750	42	*
D	11	MC	8761	56	• Students did not understand the term ?iploid? did not understand that the chromosome number is duplicated before mitosis occurs.
D	12	TF	8775	81	• Students incorrectly answered that a virus?protein coat is made up of its genetic material.
D	13	MC	8775	24	*
D	14	TF	8774	21	• Students miscalculated the number of chromosomes in an unfertilized egg when given the number of chromosomes found in a body cell of the same organism.
D	15	TF	8764	39	• Students did not understand the terms “asexual” or

					“regeneration”; did not understand that regeneration is a type of asexual reproduction in animals, not plants.
D	16	TF	8777	43	• Students did not understand the term ?ex-linked disorder? answered incorrectly that the gene for a sex-linked disorder is found on the Y chromosome, not the X.
D	17	MC	8772	46	*
D	18	MC	8773	38	• Students did not understand how to write the percent probability of a phenotype from a genetic cross; did not understand the term ?henotype?
D	19	MC	8766	56	• Students did not understand the term ?omozygous dominant?or ?ominant allele? did not understand how to determine which phenotypes arise from different possible genotypes.
D	20	MC	8768	44	• Students did not understand how to complete a Punnett square for blood types; did not understand the term ?odominant?
D	21	MC	8779	56	• Students did not understand that a person who has a dominant phenotype could be either homozygous or heterozygous with their genotype; students did not understand that there was not enough information given to answer the question.
D	22	MC	8768	56	• Students answered incorrectly that HH would be the best genotype to use for a cross to best reveal if a trait is homozygous dominant or heterozygous dominant, not hh. • Students answered incorrectly that Hh would be the best genotype to use for a cross to best reveal if a

					trait is homozygous dominant or heterozygous dominant, not hh.
D	23	MC	8778	39	• Students incorrectly answered that an article refuted the fact that the white-eyed mutation is negative for a fruit fly, when not enough information about the mutation was given.
D	24	MC	8773	39	• Students did not understand how to complete a Punnett square for a sex-linked trait; students were unable to interpret an article to determine that a statement was supported by the article.
D	25	MC	8773	52	• Students did not understand how to complete a Punnett square for a sex-linked trait; students were unable to interpret an article to determine that a statement was refuted by the article.
D	26	MC	8774	23	*
D	27	TF	8777	33	• Students were unable to interpret the purpose of a bar graph; incorrectly answered that a bar graph showing the rate of superbug infections was used to show an increase in the use of antibiotics over time.
D	28	TF	8782	7	N/A
D	29	TF	8773	28	• Students did not understand how bacteria can become resistant to antibiotics through undergoing mutation.

Note:
'*****' indicates that there were fewer than 20% of the students who selected any of the possible incorrect answers to the item, hence, no curricular note is reported;
'**N/A**' indicates that there were fewer than 20% of the students who incorrectly answered the item, hence, no curricular note is reported.