**Science 10: All Domains**
**Item-Level Response Reports (Provincial Level)**

**British Columbia** **All Schools** **June / 2008**

Provincial Science 10 Item-Level Response Reports include data for all BC students who wrote the exam in June 2008 (about 34,740 students). Both public and independent schools are included. The Science 10 June 2008 (All Domains) provincial Item-Level Response Report contains three tables, one for each domain; the tables display the proportion of students who made errors on each test item and a description of the misconception.

**1. Question Type: MC, MT, TF** **Domain: Earth and Space Science**

| 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 | 88 | TF | 34655 | 34 | • Students did not understand how seismology was used to identify the boundary between the crust and the uppermost mantle. |
| A | 89 | TF | 34648 | 26 | • Students answered incorrectly that surface seismic waves travel through to the Earth's core. |
| A | 90 | MC | 34636 | 27 | * |
| A | 91 | TF | 34671 | 30 | • Students did not understand that tectonic plates have been moving on the Earth since the Precambrian Era; likely did not refer to the data booklet. |
| A | 92 | MC | 34640 | 47 | • Students likely did not refer to the Geological Time Scale in the data booklet; incorrectly answered that the Paleozoic Era represented the greatest length of time, not the Precambrian Era. |
| A | 93 | MC | 34649 | 77 | • Students likely did not refer to the Geological Time Scale in the data booklet; incorrectly answered that a trilobite fossil was from the Cambrian to Permian, not |

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| | | | | | the Cambrian. |
| A | 94 | MT | 34514 | 31 | * |
| A | 95 | MT | 34499 | 25 | * |
| A | 96 | MT | 34553 | 22 | * |
| A | 97 | MT | 34561 | 30 | * |
| A | 98 | MT | 34578 | 32 | * |
| A | 99 | MC | 34608 | 48 | * |
| A | 100 | TF | 34613 | 16 | N/A |
| A | 101 | MC | 34659 | 73 | • Students did not understand the Law of Superposition; were unable to correctly interpret two diagrams of cross sections of rock layers. |
| A | 102 | MC | 34658 | 14 | N/A |
| A | 103 | MC | 34662 | 34 | * |
| A | 104 | TF | 34651 | 30 | • Students did not understand that volcanoes can occur in areas other than subduction zones. |
| A | 105 | TF | 34612 | 9 | N/A |
| A | 106 | MC | 34644 | 57 | • Students likely did not refer to the data booklet; incorrectly answered that a divergent plate boundary is found on the North American continent, not the African continent. |
| A | 107 | MC | 34611 | 71 | • Students did not understand how oceans form in divergent plate boundaries as the plates continue to diverge; did not understand how hot spots form. |
| A | 108 | TF | 34659 | 43 | • Students likely did not refer to the data booklet; were unable to choose the correct era for 400 Ma; confused the Precambrian era with the Paleozoic era. |
| A | 109 | MC | 34640 | 49 | • Students were unable to interpret a diagram showing Pangea; incorrectly answered that Pangea was 150 |

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| | | | | | Ma, not 250 Ma. |
| A | 110 | MC | 34553 | 60 | • Students incorrectly answered that magnetic reversal patterns are evidence for transform faults, not seafloor spreading. |
| A | 111 | MC | 34662 | 29 | * |
| A | 112 | MC | 34614 | 68 | • Students did not understand that earthquakes can be used to outline all of the Earth's tectonic plates; incorrectly answered that mid-ocean ridges, not earthquakes, can be used to outline the Earth's tectonic plates.<br>• Students did not understand that earthquakes can be used to outline all of the Earth's tectonic plates; incorrectly answered that volcanic eruptions, not earthquakes, can be used to outline the Earth's tectonic plates. |
| A | 113 | MC | 34621 | 44 | • Students were unable to compare and contrast the Theory of Plate Tectonics and the Continental Drift Theory. |
| A | 114 | MC | 34637 | 49 | • Students did not understand the term "hot spot"; were unable to interpret a diagram of two hot spots and island chains, and compare the plate movement. |
| A | 115 | MC | 34620 | 27 | * |
| A | 116 | TF | 34632 | 9 | N/A |

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.
**Question Type:** Multiple Choice (MC), Matching (MT), True/False (TF).

**2. Question Type: MC, MT, TF  Domain: Life Science**

| 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] |
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| A | 1 | MT | 34554 | 47 | • Students confused the term “mitosis” with “meiosis”. |
| A | 2 | MT | 34503 | 45 | • Students confused the term “meiosis” with “mitosis”. |
| A | 3 | MT | 34689 | 18 | N/A |
| A | 4 | MT | 34682 | 17 | N/A |
| A | 5 | MT | 34650 | 7 | N/A |
| A | 6 | TF | 34702 | 36 | • Students did not understand the function of the ribosomes and their location within the cell. |
| A | 7 | MC | 34671 | 51 | • Students incorrectly answered that centrioles are found in large numbers in muscle cells; did not understand the function of centrioles. |
| A | 8 | TF | 34710 | 24 | • Students did not understand how to interpret a diagram of a plant cell that has lost water when placed in a salt-water solution. |
| A | 9 | MC | 34672 | 44 | • Students did not understand that human cells do not have cell walls, and therefore would not be affected by penicillin’s action. |
| A | 10 | TF | 34670 | 46 | • Students did not understand how the surface area to volume ratio changes as cell size decreases. |
| A | 11 | TF | 34691 | 39 | • Students did not understand the term “cytokinesis”; confused “cytokinesis” with “mitosis”. |
| A | 12 | MC | 34700 | 53 | • Students were unable to correctly identify the stage of mitosis from a diagram; mistook metaphase with |

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| | | | | | prophase in a diagram. |
| A | 13 | MC | 34696 | 43 | • Students were unable to correctly describe the events that occur during prophase from a diagram; did not understand the processes that occur during prophase. |
| A | 14 | MC | 34666 | 30 | * |
| A | 15 | TF | 34682 | 36 | • Students did not understand that a host is needed for a virus's survival and reproduction. |
| A | 16 | MC | 34710 | 40 | • Students incorrectly answered that a graph showed that nicotine reduces the oxygen content of fetal blood; misinterpreted a bar graph that did not contain enough information to answer the question. |
| A | 17 | MC | 34716 | 5 | N/A |
| A | 18 | TF | 34729 | 10 | N/A |
| A | 19 | TF | 34717 | 25 | • Students did not understand how to complete a Punnett square and interpret the percent probability of a certain trait. |
| A | 20 | MC | 34678 | 42 | • Students were unable to complete a Punnett square for a hybrid cross and/or were unable to write the correct ratio of dominant to recessive phenotypes from a hybrid cross. |
| A | 21 | TF | 34716 | 21 | • Students did not understand the term "codominance"; did not understand that there are three different phenotypes in codominance. |
| A | 22 | MC | 34723 | 41 | • Students were unable to interpret a diagram (showing the phenotypes of two parent pea plants and the four offspring produced) to determine the genotypes of the parents; chose the correct phenotype for the |

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| | | | | | homozygous recessive parent but not for the other. |
| A | 23 | MC | 34702 | 41 | * |
| A | 24 | MC | 34669 | 40 | • Students did not understand how to complete a Punnett square and/or write a genotypic ratio. |
| A | 25 | MC | 34675 | 39 | * |
| A | 26 | MC | 34703 | 51 | • Students did not understand the term “sex-linked inheritance”; mistook incomplete dominance with sex-linked inheritance. |
| A | 27 | MC | 34686 | 49 | • Students were unable to choose the best genotype to cross with a flower to determine its genotype. |
| A | 28 | MC | 34702 | 43 | * |
| A | 29 | MC | 34668 | 22 | * |

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**Question Type:** Multiple Choice (MC), Matching (MT), True/False (TF).

**3. Question Type: MC, MT, TF  Domain: Physical Science**

| 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] |
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| A | 30 | MC | 34606 | 67 | • Students were unable to determine how many electrons are in an ion of an element; incorrectly answered that the charge on the ion was the number of electrons in the ion.<br><br>• Students were unable to determine how many electrons are in an ion of an element; incorrectly answered the question for the number of electrons in |

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| | | | | | an atom of the element, not an ion of the element. |
| A | 31 | TF | 34729 | 20 | * |
| A | 32 | TF | 34716 | 32 | • Students did not understand how atoms become stable when their outer shells are full. |
| A | 33 | MC | 34688 | 55 | • Students did not understand the term “isotope”; did not understand the similarities and differences between isotopes of the same element; correctly answered that the number of protons is the same in two isotopes of the same element, but incorrectly answered that the mass number was also the same. |
| A | 34 | MC | 34655 | 32 | * |
| A | 35 | TF | 34568 | 30 | • Students did not understand how to calculate an atom’s ion charge when given a chemical formula. |
| A | 36 | TF | 34720 | 13 | N/A |
| A | 37 | MC | 34646 | 42 | • Students did not understand the characteristics of a covalent bond; mistook an ionic compound for a covalent compound. |
| A | 38 | MT | 34652 | 29 | * |
| A | 39 | MT | 34617 | 43 | • Students did not understand the rules for writing formulae for covalent compounds when given the chemical name; wrote the correct symbol for the metal but chose the incorrect polyatomic ion. |
| A | 40 | TF | 34681 | 25 | • Students did not understand the term “diatomic”. |
| A | 41 | MC | 34680 | 47 | • Students were unable to correctly interpret a small article; likely did not refer to the data booklet; did not understand how to write a chemical formula of a product formed when given two reactants. |

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| A | 42 | MC | 34711 | 32 | * |
| A | 43 | MC | 34623 | 63 | • Students did not understand how to determine an element's ion charge and how to write a chemical formula for an ionic compound between two elements; correctly identified one element's ion charge, but incorrectly wrote the coefficient under the wrong element. |
| A | 44 | MC | 34595 | 63 | • Students did not understand how to determine and compare an element's ion charge when given different chemical formulae. |
| A | 45 | MC | 34643 | 24 | * |
| A | 46 | TF | 34705 | 36 | • Students did not understand the products that are formed when an acid and a base are combined. |
| A | 47 | MC | 34691 | 26 | * |
| A | 48 | MC | 34683 | 34 | * |
| A | 49 | MT | 34575 | 40 | * |
| A | 50 | MT | 34591 | 25 | * |
| A | 51 | MT | 34568 | 44 | * |
| A | 52 | MC | 34654 | 34 | * |
| A | 53 | MC | 34657 | 28 | * |
| A | 54 | TF | 34709 | 13 | N/A |
| A | 55 | MC | 34596 | 65 | • Students did not understand the characteristics of an alpha particle; correctly answered that an alpha particle is heavier than a beta particle, and that it has the same charge as two protons, but did not include that it is made of matter.<br><br>• Students did not understand the characteristics of an alpha particle; correctly answered that an alpha particle is made of matter and that it is heavier than a beta particle, but did not consider that it has the |

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| | | | | | same charge as two protons. |
| A | 56 | TF | 34717 | 12 | N/A |
| A | 57 | MC | 34684 | 52 | • Students were unable to correctly interpret a small article; incorrectly answered that cobalt-60 is useful in radiation therapy as it is a stable isotope. |
| A | 58 | MC | 34664 | 44 | * |
| A | 59 | MC | 34686 | 34 | * |
| A | 60 | MC | 34698 | 46 | • Students were unable to correctly interpret a small article; incorrectly answered that electromagnetism was used in a photocopier, not static electricity. |
| A | 61 | TF | 34694 | 30 | • Students did not understand the laws of attraction and repulsion of static electricity. |
| A | 62 | TF | 34675 | 16 | N/A |
| A | 63 | MC | 34668 | 39 | • Students did not correctly interpret a small article; incorrectly answered that solar radiation and electricity were responsible for the aurora borealis, not magnetism and electricity. |
| A | 64 | TF | 34655 | 21 | • Students were unable to correctly interpret a small article; were unable to calculate power when given voltage and current; likely did not refer to the data booklet. |
| A | 65 | TF | 34588 | 13 | N/A |
| A | 66 | TF | 34682 | 25 | • Students did not understand the relationship of the direction of the magnetic field and the current; did not understand the right-hand rule. |
| A | 67 | MC | 34658 | 21 | * |
| A | 68 | TF | 34676 | 42 | • Students did not understand the relationship between |

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| | | | | | current and voltage through a resistor. |
| A | 69 | MC | 34662 | 58 | • Students were unable to correctly interpret a small article; confused transformers with resistors. |
| A | 70 | MC | 34615 | 30 | * |
| A | 71 | MC | 34675 | 45 | • Students did not understand how to calculate and compare total voltage for cells connected in series and parallel. |
| A | 72 | MC | 34639 | 56 | • Students incorrectly calculated the total voltage in the circuit, instead of the voltage across one resistor; likely did not refer to the data booklet. |
| A | 73 | MC | 34662 | 11 | N/A |
| A | 74 | MC | 34570 | 60 | • Students did not understand how to compare current and resistance at different points in a series circuit. |
| A | 75 | MT | 33994 | 34 | * |
| A | 76 | MT | 34492 | 49 | * |
| A | 77 | MT | 34518 | 42 | * |
| A | 78 | MT | 34462 | 50 | * |
| A | 79 | MT | 34477 | 44 | * |
| A | 80 | MC | 34617 | 66 | • Students correctly answered that the voltage across each branch in a parallel circuit is equal and that a single switch can be placed to control current flow to both branches, but did not consider that each branch operates independently. |
| A | 81 | TF | 34665 | 22 | • Students did not understand how to calculate energy when given power and time; likely did not refer to the data booklet. |
| A | 82 | MC | 34605 | 63 | • Students did not understand how to calculate power in a parallel circuit when given voltage and |

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| | | | | | resistance; likely did not refer to the data booklet. |
| A | 83 | MC | 34645 | 61 | • Students used the correct formula for energy used when given voltage, current and time, but incorrectly used the voltage for one cell when there were three connected in series; did not understand how to calculate total voltage of a series connection of cells. |
| A | 84 | MC | 34535 | 68 | • Students did not understand how to calculate current when given voltage, energy and time; likely did not refer to the formulae in the data booklet. |
| A | 85 | MC | 34609 | 42 | • Students incorrectly answered that silk allows electrons to flow through it, not that it is an insulator. |
| A | 86 | TF | 34661 | 5 | N/A |
| A | 87 | MC | 34538 | 68 | • Students did not understand how to calculate energy in kW?h when given power and time, and then compare that number to meter readings from various appliances. |

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