

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

**British Columbia      All Schools      June /2005**

Provincial Science 10 Item-Level Response Reports include data for all BC students who wrote the exam in June 2005. Both public and independent schools are included. The Science 10 June 2005 (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	TF	10151	15	N/A
A	2	TF	10140	6	N/A
A	3	TF	10131	17	N/A
A	4	MC	10130	58	<ul style="list-style-type: none"> <li>Students answered that a plant's oxygen production decreased, but did not stop completely after four days in a completely dark closet.</li> </ul>
A	5	MC	10128	17	N/A
A	6	TF	10123	32	<ul style="list-style-type: none"> <li>Students mistook the cell membrane for the mitochondria; did not understand the function of mitochondria.</li> </ul>
A	7	MT	10107	29	<ul style="list-style-type: none"> <li>Students confused the term "mitosis" with "meiosis."</li> </ul>
A	8	MT	10110	31	<ul style="list-style-type: none"> <li>Students confused the term "meiosis" with "mitosis."</li> </ul>
A	9	MT	10114	16	N/A
A	10	MT	10086	24	*
A	11	MT	10123	25	*
A	12	MC	10135	31	*
A	13	TF	10120	38	<ul style="list-style-type: none"> <li>Students did not understand that the rate of diffusion</li> </ul>

					within cells limits cell size.
A	14	TF	10134	37	<ul style="list-style-type: none"> <li>Students did not understand how surface area and volume change relative to each other as a cell size increases.</li> </ul>
A	15	TF	10124	17	N/A
A	16	MC	10133	26	<ul style="list-style-type: none"> <li>Students correctly identified the order of the stages of mitosis – except for placing interphase after metaphase.</li> </ul>
A	17	MC	10125	24	*
A	18	TF	10136	11	N/A
A	19	MC	10114	52	<ul style="list-style-type: none"> <li>Students correctly answered that genetic material divides during meiosis and mitosis, but incorrectly answered that it also occurs during cytokinesis.</li> </ul>
A	20	MC	10122	37	*
A	21	MC	10115	41	*
A	22	MC	10112	42	<ul style="list-style-type: none"> <li>Students did not understand how errors occur with the chromatids of sperm cells during meiosis.</li> </ul>
A	23	TF	10127	31	<ul style="list-style-type: none"> <li>Students did not understand that in incomplete dominance there are three different phenotypes present.</li> </ul>
A	24	MC	10129	30	*
A	25	MC	10132	17	N/A
A	26	MC	10131	47	<ul style="list-style-type: none"> <li>Students mistook the parents with the gametes in a Punnett square.</li> </ul>
A	27	MC	10127	38	<ul style="list-style-type: none"> <li>Students chose the correct allele to show the dominant trait, but did not understand that only one allele was needed.</li> </ul>

A	28	MC	10133	23	*
A	29	MC	10137	31	*
A	30	TF	10128	12	N/A
B	1	MC	10243	80	<ul style="list-style-type: none"> <li>Students correctly chose two functions of vacuoles, but answered that structural support was not a function.</li> </ul>
B	2	TF	10250	21	<ul style="list-style-type: none"> <li>Students did not understand the function of the mitochondria.</li> </ul>
B	3	TF	10247	29	<ul style="list-style-type: none"> <li>Students did not know where DNA was located inside a cell.</li> </ul>
B	4	MT	10225	26	*
B	5	MT	10222	30	*
B	6	MT	10224	24	*
B	7	MT	10218	37	*
B	8	MT	10223	42	*
B	9	MC	10225	45	<ul style="list-style-type: none"> <li>Students did not make the connection between the function of the mitochondria and their abundance in muscle cells, and incorrectly answered that muscle cells contain more vacuoles than skin cells.</li> </ul>
B	10	TF	10230	14	N/A
B	11	MC	10239	51	<ul style="list-style-type: none"> <li>Students incorrectly answered that salt would diffuse instead of water, and chose the wrong direction of movement.</li> </ul>
B	12	TF	10251	4	N/A
B	13	TF	10246	53	<ul style="list-style-type: none"> <li>Students did not understand the processes that occur during interphase.</li> </ul>
B	14	MC	10232	47	<ul style="list-style-type: none"> <li>Students confused metaphase with anaphase.</li> </ul>
B	15	MC	10210	52	<ul style="list-style-type: none"> <li>Students answered correctly that spindle fibers are</li> </ul>

					present during anaphase and metaphase, but answered incorrectly that spindle fibers are present during interphase.
B	16	MC	10238	63	<ul style="list-style-type: none"> <li>Students did not understand that viruses cannot reproduce by mitosis.</li> <li>Students did not understand that viruses cannot reproduce on their own.</li> </ul>
B	17	TF	10242	35	<ul style="list-style-type: none"> <li>Students did not understand the process of viral replication.</li> </ul>
B	18	TF	10246	19	N/A
B	19	TF	10247	9	N/A
B	20	MC	10251	27	*
B	21	MC	10253	72	<ul style="list-style-type: none"> <li>Students confused the term "genotypic ratio" for "phenotypic ratio."</li> </ul>
B	22	MC	10248	40	<ul style="list-style-type: none"> <li>Students misunderstood that the Punnett square reflected only one trait.</li> </ul>
B	23	MC	10254	31	<ul style="list-style-type: none"> <li>Students did not know the definition of the term "carrier" and did not recognize the genotype of a carrier in a Punnett square.</li> </ul>
B	24	MC	10254	28	*
B	25	MC	10246	33	<ul style="list-style-type: none"> <li>Students did not understand that sex-linked inheritance can be determined from the Punnett square.</li> </ul>
B	26	MC	10235	46	*
B	27	MC	10253	8	N/A
B	28	TF	10243	22	<ul style="list-style-type: none"> <li>Students did not understand the term "fertilization" or</li> </ul>

					confused the term "fertilization" with "mutation."
B	29	TF	10250	28	<ul style="list-style-type: none"> <li>Students did not understand that mutations occur randomly.</li> </ul>
B	30	MC	10239	60	<ul style="list-style-type: none"> <li>Students understood the negative outcome of a mutation but did not consider the possibility of a positive outcome or a neutral outcome.</li> </ul>
C	1	TF	10130	15	N/A
C	2	TF	10144	7	N/A
C	3	TF	10121	38	<ul style="list-style-type: none"> <li>Students did not understand where DNA was located inside a cell.</li> </ul>
C	4	MC	10117	55	<ul style="list-style-type: none"> <li>Students did not understand the function of the cell membrane.</li> </ul>
C	5	MC	10124	18	N/A
C	6	MC	10141	35	*
C	7	MT	10108	31	<ul style="list-style-type: none"> <li>Students confused the term "mitosis" with "meiosis."</li> </ul>
C	8	MT	10109	33	<ul style="list-style-type: none"> <li>Students confused the term "meiosis" with "mitosis."</li> </ul>
C	9	MT	10123	16	N/A
C	10	MT	10088	25	*
C	11	MT	10127	28	*
C	12	TF	10122	38	<ul style="list-style-type: none"> <li>Students did not understand that the rate of diffusion within cells limits cell size.</li> </ul>
C	13	TF	10137	38	<ul style="list-style-type: none"> <li>Students did not understand how surface area and volume change relative to each other as a cell size increases.</li> </ul>
C	14	MC	10120	61	<ul style="list-style-type: none"> <li>Students chose the answer opposite to describe the</li> </ul>

					surface area to volume ratio of a shrinking cell.
C	15	TF	10120	28	<ul style="list-style-type: none"> <li>Students did not recognize a cell going through the telophase stage of cell division.</li> </ul>
C	16	TF	10130	45	<ul style="list-style-type: none"> <li>Students did not understand the processes that occur during metaphase.</li> </ul>
C	17	MC	10120	25	*
C	18	TF	10136	9	N/A
C	19	TF	10138	18	N/A
C	20	MC	10136	53	<ul style="list-style-type: none"> <li>Students correctly answered that genetic material divides during meiosis and mitosis, but incorrectly answered that it also occurs during cytokinesis.</li> </ul>
C	21	TF	10143	12	N/A
C	22	MC	10137	30	*
C	23	MC	10142	20	*
C	24	MC	10136	25	*
C	25	MC	10135	30	<ul style="list-style-type: none"> <li>Students understood that the Punnett square is not used to determine the number of offspring in a family, but did not consider the possibility of having four offspring in the family.</li> </ul>
C	26	MC	10143	31	*
C	27	MC	10140	32	*
C	28	MC	10131	47	*
C	29	MC	10139	23	*
C	30	MC	10127	46	<ul style="list-style-type: none"> <li>Students correctly answered that radiation and chemicals may both lead to mutations, but incorrectly answered that viruses will not.</li> </ul>

Note: 'N/A' represents that there were fewer than 20% of the students who incorrectly answered the item; '\*' represents that there was no specific curricular aspect that needed attention since each of the incorrect answers has been chosen by less than 20% of the students.