May 2016 subject reports

Sciences

Comments from the chief examiner

This first full session of MYP on-screen examinations saw 8217 examination entries in MYP Sciences. The global context was personal and cultural expression with a focus on artistry, craft, creation and beauty. The teacher feedback comments indicated that there was a good coverage of the assessment criteria and the use of media and stimulus material was clear and helped candidates to engage with the questions in the on-screen environment. The vast majority of the feedback from teachers was positive, however, the number of teachers who provided feedback was relatively low compared to the number of schools that took the exam. This is the only opportunity teachers have to directly share their views with the examining teams and it would be beneficial to receive feedback from a greater proportion of schools with regard to what is working well and what could be improved.

It was clear that the majority of candidates had completed the familiarization exercises and these candidates were able to interact with the on screen assessment environment confidently. Some schools noted that with more opportunity to familiarize themselves candidates would be more confident using the calculator and on-screening drawing tools and schools are encouraged to make use of the familiarization materials.

Overwhelmingly, the feedback received from schools indicates that teachers judged the difficulty of the assessments to be appropriate and suitable for candidates in MYP5. Teacher feedback stated that the on-screen examinations were well balanced with regards to the published topic lists. The exams contained questions that allowed all candidates to demonstrate their understanding of basic scientific concepts and also provided stronger candidates an opportunity to demonstrate understanding of more complex concepts. Candidates were also able to demonstrate their ability to analyse and evaluate the application of science and to design and evaluate investigations.

Teachers noted that greater clarity regarding the topic list would be appreciated, and some teachers commented that the exams did not assess all areas of the published list. It is not the intention of the examiners to address each item in the exam; the strands of the criteria will be assessed using a balanced selection of the elements from the topic list each session.

Although many candidates were able to formulate a correct hypothesis, some of them incorrectly formulated an aim or a research question. Schools must ensure that candidates are familiar with a range of different strategies that can be employed when structuring a hypothesis linked to a valid scientific explanation. Hypotheses should not be formatted as a question, but as a predictive statement, justified using scientific knowledge, for example: “if (statement), then (predicting effect)”, “because (scientific explanation)”.

Candidates often showed they were familiar with the concept of experimental variables; however, they were unable to correctly identify the independent, dependent and control variables in an experimental

scenario; frequently interchanging them or not identifying them at all. Care needs to be taken by schools to ensure that these are regularly highlighted when criterion B is assessed.

It is also important to provide candidates with instruction related to the meaning of “sufficient, relevant data”. Sufficient data should be described as an appropriate number of trials (minimum of 3) so that error is reduced, so a judgment can be made regarding the consistency of the data collected, and statistical analysis can be performed. In addition candidates need to be able to justify a suitable number of increments of the dependent variable so that a pattern or trend can be seen in that graph (typically this number may vary from 3 to 9 depending upon the experimental scenario). Data should be collected over the whole range of possible values in an investigation with a regular increment between data points.

The final recommendation is for schools to ensure that candidates are exposed to the requirements of the criteria and the meaning of the command terms through authentic classroom based activities. The on-screen examination is designed to give candidates the opportunity to display the skills they have learnt through their experience in the programme. It was clear to the examiners that candidates who had completed a range of hands-on practical experiments were better able to display the skills needed in the on screen scenarios selected for them by the exam teams, than those with less direct lab experience. Candidates who had developed a thorough understanding of the command terms were also able to better understand how much detail was required in a response. Candidates should also be encouraged to use precise scientific terminology and correct units.

Biology

Overall grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 14	15 - 29	30 - 46	47 - 55	56 - 65	66 - 74	75 - 120

General Comments

Based on the feedback from teachers, the exam was well balanced in terms of the topic list and in the difficulty of the questions. The exam contained questions that allowed all candidates to demonstrate their understanding of basic biological concepts and also provided more advanced candidates with the opportunity to demonstrate understanding of more complex concepts. Candidates were also able to demonstrate their ability to analyse and evaluate the application of science and to design and evaluate investigations.

Overall, the teachers were very happy with the use of media to provide context to the questions and to pique the candidates’ interest. A majority of the teachers stated that the media used in the exam provided the candidates with useful information and was stimulating for the candidates. A few teachers stated that some of the media presentations contained information that was not useful to the candidate and that if the candidate had to watch a video more than once it could be time consuming. Some of the information in the videos, however, was there to allow candidates to analyse scientific concepts in unfamiliar contexts.

The areas of the programme and examination which appeared difficult for the candidates

Candidates used the prompts provided with each question to help structure their responses and often used information from the prompts within their response. Many candidates used this information to access the question at a basic level but if the candidate added value to this basic information they were able to earn marks at the higher levels. Information from many of the videos was used in the same way.

The format of the graphing question in question 5 was answered well and demonstrated that the graphing software worked well and was easy for candidates to manipulate. The data table software for question 5 was not as easy for candidates to manipulate and the format made it difficult for candidates to show what they knew.

There were three other trends related to how candidates answered the questions that were discussed by examiners. The first trend was that many candidates shared the information they knew about a topic but it was not directly related to the question asked. The second trend was that candidates did not always respond to the question at the level required by the command term. The final trend was that candidates did not answer the long response questions (7 and 10c) completely. Detailed information about individual questions is given below.

The areas of the programme and examination in which candidates appeared well prepared

There were a number of areas where a majority of candidates appeared to be well prepared and have a deep understanding of the concepts. Most candidates were able to identify a stimulus and response and to describe the pathway of a nerve impulse. Candidates also had a strong understanding of the final products of mitosis and meiosis. They could also describe that genetic traits could be inherited but traits caused by environmental factors were not passed to offspring.

Photosynthesis was another area where candidates demonstrated good understanding. Most candidates were able to organize the equation for photosynthesis and they were aware that enzymes catalysed the reactions that that limiting factors could increase or decrease the rate of photosynthesis. Candidates were also able to analyse how certain factors could influence photosynthesis and how the rate of photosynthesis could be measured directly or indirectly based on measurement of the products or reactants of photosynthesis.

Candidates also demonstrated a strong understanding of ecological topics. Candidates were able to identify food webs and to describe relationships between organisms based on the food webs. Candidates were also familiar with various roles played by organisms and could correctly use terminology such as producer, consumer, predator, prey, and herbivore to describe these relationships. Candidates were also able to define biodiversity and to discuss human activities that could impact biodiversity.

Many candidates also demonstrated proficiency in designing and evaluating investigations based on identifying variables and describing how they should be manipulated and measured. Candidates were also able to formulate a research problem and a hypothesis related to the problem. Most candidates were also able to use scientific knowledge to support their hypothesis.

The strengths and weaknesses of the candidates in the treatment of individual questions

One of the trends that examiners commented on was the lack of scientific terminology used in some responses. Also, candidates often wrote down information they knew about a topic but did not answer the specific question being asked.

Question 1c

Many candidates stated that diffusion was the process that allowed oxygen to be transported without the use of energy but they failed to use “concentration gradient” to explain the process.

Question 2

Candidates had a very general idea of the concept of cell division but did not use terminology (genes, alleles, sister chromatids, homologous pairs, or chromosomes) to describe the process of cell division. For question 2c, many candidates focused on the differences between mitosis and meiosis but did not focus on the “products” of mitosis and meiosis. For question 2d, many candidates included DNA replication (errors in base pairing) instead of errors in meiosis such as non-disjunction or translocation errors and in 2e many candidates confused the processes of meiosis with fertilization.

Question 3

Although the teacher comments stated that the questions were clearly written, it appears that a number of candidates misinterpreted question 3c and referred to the twins as children instead of discussing the children of the twins.

Question 4

Candidates answered this question partially but often lacked a complete answer. In 4c, candidates understood that an increase in temperature would increase the rate of photosynthesis but many candidates did not describe an optimum temperature or how an enzyme would denature at a certain temperature.

Question 5

Question 5a was also a question that was difficult for candidates to answer based on the format of the software and not the knowledge of the candidate related to designing data tables.

In 5b, most candidates calculated the averages correctly but few rounded the average to a whole number to indicate that they could not have counted a fraction of a bubble.

Questions 6 and 7

These questions allowed candidates to demonstrate their ability to design and analyse investigations and the examiners commented on two trends. The first was that candidates focused on very superficial strengths and weaknesses in the design of the investigation that was presented to them. Instead of commenting on the number of trials or specific control variables (or missing control variables) the candidates commented on whether or not measurements would be easy to make or if the directions were easy to read. Candidates also struggled to describe why certain control variables were relevant and how they could impact the data.

Questions 9 and 10

One other trend noticed by examiners was that candidates did not follow the prompts provided in the question for 9c or 10c. In 9c the candidates often repeated their answers from 9b instead of “referring to the diagram” of a food web to form their response. For 10c, many candidates would have earned higher marks if they would have commented on all of the prompts provided to them in the question.

Recommendations and guidance for the teaching of future candidates

One of the most beneficial actions for future candidates would be for them to design, conduct, and evaluate investigations. This would allow candidates to practice identifying independent and dependent variables, and would also allow candidates to practice describing how control variables could influence investigations

Candidates should also practice evaluating the strengths and weaknesses of investigations based on scientific concepts such as: how control variables are controlled; if all relevant variables are controlled, how the dependent variable can be measured; how many trials should be conducted, and how many increments of the independent variable should be studied.

Chemistry

Overall grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 13	14 - 27	28 - 46	47 - 57	58 - 67	68 - 78	79 - 120

General comments

Based on feedback from teachers and the examining team, the standard of the assessment was appropriate for Year 5 candidates and was aligned with the MYP sciences criteria. Feedback from teachers and examiners stated that the examination provided a whole range of questions which both allowed access by the lower ability candidates and challenged the higher ability candidates.

In their feedback, teachers expressed some concern that the topic lists provided do not provide detailed content.

The examination team agreed that the assessment tasks were fair, linked to the topic list available and assessed the MYP criteria. The length of the examination was suitable for candidates who had a good foundation in the topics covered within chemistry. The standard of candidate answers, however, was inconsistent: specific areas of weakness are explored elsewhere in this report.

The examination team believe that with full coverage of the topic list and better understanding of the command terms, objectives and criteria, candidate performance will improve.

The areas of the programme and examination which appeared difficult for the candidates

Candidates struggled with a number of key skills which, if a full MYP programme had been completed, was surprising.

Questions which required criterion A type responses were well answered and showed a good level of basic understanding of chemistry. Candidates were able recall basic information but questions involving comparison and interpretation of information were not answered as well. A number of candidates did not find it straightforward to extract relevant information from text. Candidates often did not include state symbols in their chemical equations. Some candidates did not differentiate between word and symbol equations and many found calculating numbers of reacting moles difficult. The ability of candidates to analyse and reflect on answers or information provided was an area that could be improved.

Candidates found writing a testable hypothesis difficult and often identified the independent, dependent and control variables incorrectly; frequently interchanging them or not identifying them at all.

Most candidates were able to produce graphs and images of suitable apparatus, however there were a number of candidates who did not use the tools provided for drawing placing additional pressure on producing the diagrams.

Questions which related to criterion D provided suitable prompts which candidates used to gain low level marks, however further information and structure was limited, meaning candidates did not achieve higher marks. Candidates could answer the questions in general terms but were unable to provide a coherent structured answer addressing the question. Candidates also found the process of relating social or ethical implications of additives with supporting scientific reasoning difficult and many answers were incomplete in this respect.

The areas of the programme and examination in which candidates appeared well prepared

Candidates showed good understanding of the questions about the periodic table: the identification of the elements by name and their characteristics, the ability to identify isotopes and undertake calculations involving them and the nature of atomic structure (questions 1 and 9).

Candidates had a good understanding of the states of matter and the changes moving from one state to the other (question 2).

Plotting graphs and data was an area that most candidates were well prepared, especially when labelling axes and choosing suitable scales.

Candidates were able to balance chemical equations and answer questions involving the use of chemicals in unfamiliar situations. This includes the ability to understand and make inferences from equations which describe equilibria.

The strengths and weaknesses of the candidates in the treatment of individual questions

Question 1

Candidates struggled with quantitative chemistry calculations and mole ratios.

Questions 2 and 4

A confusion with the word ‘saturation’ was evident in a number of responses who made a connection with organic chemistry (alkenes and alkanes) and not with respect to solvents and solutions (questions 2 and 4).

Organic chemical reactions and naming of components was found to be difficult especially the naming of alcohols and carboxylic acids (question 4)

Question 5

Candidates were able to identify changes in state but could not relate the kinetic theory to the changes in energy or particle motion associated with these changes in state (question 5).

Questions 6 and 7

The writing of a method with suitable safety aspects which were relevant to the task proved difficult for a number of candidates. Many candidates omitted the safety aspects (question 6).

Candidates found difficulty with criteria B and C in particular the transformation and interpretation of data and graphical analysis. Candidates found it difficult to identify trends and outliers. Within criterion C (questions 6 and 7) evaluating unfamiliar experimental procedures proved difficult for a number of candidates as was the requirement to suggest realistic improvements to the method.

The test for common gases in an unfamiliar situation was found to be difficult for the candidates.

Recommendations and guidance for the teaching of future candidates

Candidates should be more familiar with the requirements of each criterion as answers covering criteria B, C and D could have demonstrated more understanding of these. Candidate led investigations with clear understanding of the difference of the three variables, development of hypotheses and evaluations in both familiar and unfamiliar situations will help in the development and application of criteria B and C.

Familiarisation of qualitative gas tests and the nature of gases needs to be examined by candidates.

Candidates should be exposed to the familiarisation material especially the graphing tool and drawing tools. Candidates would benefit from analysing graphs and identification of trends and anomalies.

Candidates should undertake more practice of open ended questions allowing exposure to criterion D and be able to apply and relate ethical, social or moral aspects with suitable scientific justifications. Candidates need to be able to reason conceptually and be able to apply their reasoning to unfamiliar situations.

Integrated sciences

Overall grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 13	14 - 27	28 - 44	45 - 53	54 - 63	64 - 72	73 - 120

General comments

This Integrated Sciences on-screen examination was developed considering the four assessment criteria, key and related concepts, the topic list and skills for this group of disciplines. The global context was personal and cultural expression with a focus on artistry, craft, creation and beauty.

Based on comments from teachers, the general structure of this exam was well-developed and allowed candidates to demonstrate a wide range of knowledge and skills throughout the exam. The comments also indicated that there was a good coverage of the assessment objectives and criteria and the use of media and stimuli material was very clear and appropriate for candidates. Most teachers also agreed that the questions were well-framed and explained.

Some teachers stated that the exam was based more on biology rather than on physics and chemistry and some questions or topics covered within the exam had medium or high difficulty since some of them are not part of their national curriculum or local requirements. It was also mentioned that the list of topics published by the IBMYP is not specific enough to allow good preparation.

The length of the exam seemed to be appropriate for candidates who had a good foundation of knowledge and scientific skills, although a few teachers considered that there was not a good balance between knowledge and understanding and the assessment of scientific skills.

During the grade award meeting, the examining team agreed that there was a good relationship among the topics and skills covered in the exam with the MYP sciences objectives, assessment criteria and level descriptors, the global context and the published topic list.

Some teachers questioned whether the exam was fair for all candidates due to the coverage and the use of topics in unfamiliar situations or the use of skills to develop appropriate scientific designs to perform investigations, however the examining team felt that the candidates should be able to use the knowledge and development of skills of their MYP studies related to a global context to reach the maximum levels of the four assessment criteria for Integrated Sciences. It was also expected that there would be an improvement in future examination sessions since schools, teachers and candidates will be more aware of the structure and the objectives of the on-screen examination.

The areas of the programme and examination which appeared difficult for the candidates

Some candidates seemed to have only basic or no knowledge about specific science topics.

Some candidates were not able to interpret data or analyse information (i.e. graphs) to explain a phenomena using scientific reasoning.

The areas of the programme and examination in which candidates appeared well prepared

Candidates did very well with short answers and were able to identify some patterns using stimulus material.

In general, most of the candidates were well prepared for questions related to criteria B and C (6a and 8c). This demonstrates that most schools are working hard on scientific investigations which includes design, data collection and processing. Candidates seem to be well prepared for designing an investigation using a suitable structure. Details of the independent, dependent, control variables were identified and used for the design of the method. Many candidates could link these variables in order to provide quantitative data. Also, ethical and safety concerns were mentioned, although in some cases these were incorrect or not relevant to the process. It was clear to the examining team that the prompts provided in the questions proved to be a good help for candidates.

Some candidates wrote good extended responses using the prompts and included personal experiences to enrich their answers. Many candidates demonstrated excellent critical thinking and communication skills.

The strengths and weaknesses of the candidates in the treatment of individual questions

Question 1

Candidates generally found question 1 straightforward and could achieve maximum marks. Only a few candidates stated that diffusion was a chemical process rather than a physical process.

Question 2

For question 2b, many candidates were not able to explain clearly how the galvanic facial treatment could improve the absorption of the cream into the skin which contained the active ingredient although the stem and media stimuli provided clear information about this process. Many candidates did not notice that the active ingredient contained in the cream was positively charged and so was the electrode and as similar charges repel the cream is pushed deeper into the skin. For question 2c, although most candidates were able to find the correct equation, many of them were not able to substitute values correctly and match with the correct units.

Question 3

For question 3a, 3c and 3d, most of the candidates demonstrated a good understanding of the periodic table and trends among the different groups and periods.

For question 3b, many candidates found difficult to write a balanced chemical equation including state symbols. It was clear that some candidates were not able to write correct chemical formulas for each compound. This prevented the candidates from obtaining full marks for this question.

Question 4

For questions 4a, 4b and 4c, most of the candidates had a basic idea of the electromagnetic field lines produced by a solenoid. Candidates were not able to construct a diagram using interactive tools and then explain how a speaker works although this device could be familiar to them.

Question 5

For question 5b, although many candidates formulated a correct hypothesis, some of them incorrectly formulated an aim or a question. Candidates must be very familiar with different strategies to write a correct hypothesis, for example “if the concentration of salt increases (statement), then the seedlings would germinate slowly (predicting effect)”. The hypothesis needs to be linked to a scientific reason “because salt increases the osmotic pressure of water”.

For question 5c, some candidates struggled determining the LD50 using information from the graph.

Question 7

For question 7b, candidates found it difficult to interpret data collected in question 7a and use scientific knowledge to connect this information to make a relationship between the pH change of water with the process of photosynthesis. For question 7c, candidates also struggled to describe how the shape of the graph would change in winter. Candidates need to be prepared to collect different types of data, analyse and interpret this to obtain a conclusion.

Question 8

In questions 8a and 8b, candidates could not easily identify dependent and independent variables and then formulate a testable hypothesis to investigate the effect related to both variables. Candidates were then unable to describe a suitable method using relevant equipment to test the hypothesis. Although they were able to identify relevant variables, other candidates did not set a range for the independent variable, justify their selection of control variables or mention ethical or safety concerns. The method should include how many values need to be measured (at least 5) and repetitions (at least 3).

Question 9

Candidates generally scored well on this question which related to criterion D. A great number of candidates included personal experience in their answers to questions 9d and 9e which improved the quality of their answers. For question 9c, most of the candidates analysed the graphs and explained appropriately the information provided.

For question 9b, most candidates just stated the differences between virus and bacteria using the pictures provided. Candidates did not use their scientific knowledge to determine real differences between virus and bacteria. This prevented them achieving maximum marks.

Question 10

Candidates appeared to be well prepared to answer extended responses. Most of the candidates used the prompts provided in the question to organize their ideas. Strong candidates also used personal experience to answer this question, this allowed them to score higher marks.

Recommendations and guidance for the teaching of future candidates

Candidates should know the details of the four sciences assessment criteria and how they will be applied. Teachers should focus on the use of command terms and their specific meaning. For example, most of the candidates did not “compare and contrast” chemical reactions given in question 3c.

Candidates should have a wide range of opportunities to design and develop their own investigations following specific protocols according to sciences assessment criteria B and C and also to analyse and evaluate different investigations.

Candidates should be capable of differentiating between dependent, independent and control variables when designing an investigation. Also, they should be able to justify their selection, include values and ways to obtain relevant quantitative data. Also candidates must know the differences between a hypothesis, aim and a research question.

Candidates need to be familiar with the use of media resources and stimulus material (interactive tools, videos, graphics, images, others).

Candidates should be capable of processing data using correct scientific notation and units.

Candidates need to be aware of the importance of the correct use of scientific terminology.

Candidates should use all the information provided to answer a question, especially the prompts used to structure extended responses and should practice writing structured extended responses especially for criterion D.

It is highly recommended that schools use the familiarization material provided by the IB to enhance candidates’ preparation for the exam.

Physics

Overall grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 13	14 - 27	28 - 45	46 - 55	56 - 65	66 - 75	76 - 120

General comments

The feedback received from schools overwhelmingly indicates that teachers judged the difficulty of the Physics assessment to be appropriate and suitable for candidates in MYP5. While it was noted that greater clarity regarding the topic list would be appreciated, the majority of candidates proved that they were able to access the material. Teachers judged the questions to be clear and examiners found few insistences of candidates being unable to discern the focus of the questions raised. The examiners found that candidate responses included information shared using media and onscreen stimuli and teacher feedback was generally positive, although the length of some videos was challenged.

According to the evidence of the candidate responses to questions it is clear that candidates, on the whole, found the time to complete the exam adequate. However, the increasing occurrence of blank responses to questions towards the end of the exam suggests that some candidates were not able to complete all aspects of the assessment. The examiners would suggest that teachers review the structure of the assessment prior to the completion of the examination and encourage candidates to structure their time so as to allow them to attempt all questions.

The areas of the programme and examination which appeared difficult for the candidates

The on-screen examination is designed to directly examine the four sciences criteria, with each of the criteria receiving equal weighting and candidates directed in the questions using the language of the published criteria. The middle section of the assessment examined the candidate's experimental skills as described by criteria B and C. It was clear from the candidate responses that, although they were familiar with requirements of the command terms, the language of the criteria was not always so familiar; this was particularly evident in those questions addressing criteria B and C.

Where candidates were prompted to establish that sufficient relevant data had been collected it was evident that this was not always well understood. The examiners would encourage teachers when preparing candidates to plan investigations in class using the phase 'sufficient relevant data'. Consideration should be given to the range of data collected, the increment between data points and the number of trials of each data point collected. In this way the candidates should be ready to tackle questions examining this strand of criterion B in the environment of the on-screen examination.

The use of scientific language was also an area in which the examiners found candidates lacking in preparedness when attempting some questions. The range of responses provided by candidates when they attempted to accurately interpret data and explain results using correct scientific reasoning typifies this. It was common to see candidates incorrectly describe relationships displayed by curved graphs as "proportional". Candidates also used terms like "exponential" where it was not possible to determine such a relationship from the data provided. In addition, some candidates were unfamiliar with the language, common in experiments prepared to assess criterion B, surrounding the description of variables: controlled, independent and dependent. In some cases candidates incorrectly planned experiments with multiple independent variables which would lead to invalid results.

The areas of the programme and examination in which candidates appeared well prepared

The questions towards the end of the examination were designed to assess criterion D, and these questions naturally call upon candidates to offer longer, essay style, responses to the situations posed. Both question 10 (examining the role of satellite communications) and question 11e (medical uses of imaging technology) were consistently tackled by candidates in such a way as to demonstrate they were familiar with the Impacts of Science criterion D. Candidates were able to assess the relative merits and impacts of the use of physics and technology to solve problems, and the ways in which these interact with the various factors. Teachers should, however, remind candidates to review the stimulus material carefully and note the direction of the questions posed. Often candidates attempted to examine the impact of all relevant factors, or in the case of question 11e, review all imaging techniques. In the timed environment of the examination, this prevented candidates having sufficient time to write responses with the necessary depth of reasoning for a higher mark to be awarded.

The strengths and weaknesses of the candidates in the treatment of individual questions

Question 3

Many candidates were able to superficially appreciate the need to control variables, although many struggled to articulate their understanding of the concept of terminal velocity sufficiently to understand what variables would the need to be controlled in order for an experiment to investigate surface area to be completed.

Question 6

Question 6 highlighted an inconsistent understanding of the requirements of criterion B, in particular the need to collect sufficient relevant data across an appropriate range of the possible data set. Many candidates only addressed the need to take repeated readings of the dependent variable.

Question 7

Again question 7 highlighted the fact that many candidates did not understand the need to record results across the range of possible readings; although this was taken into consideration when assessing candidate performance, teachers should be encouraged to emphasise this during the assessment of criterion B.

Questions 8 and 11

Questions 8 and 11 required candidates to demonstrate their knowledge of the electromagnetic spectrum. Some teachers questioned whether it was fair to expect candidates to have detailed knowledge of the spectrum. However, given its inclusion on the topic list, the examining team consider it reasonable to assume that any teaching of this area of physics would include knowledge of the relative placement of the regions of the spectrum by decreasing wavelength. It was evident from candidate responses that this was a suitable area of assessment. Candidates were less successful at displaying their understanding of the concept of change through their descriptions of kinetic theory and resistance in question 8.

Question 9 and 10

While questions 9 and 10 required candidates to display their understanding of physics in a situation that was deliberately unfamiliar, it was clear from the responses that candidates were confidently able to do so although again, question 9 highlighted the need for a better understanding of common terminology used to describe variables. Question 10 required candidates to reflect upon the impact of satellite technology and responses showed that they clearly understood the requirements of criterion D.

Question 11

This question focused on ionisation radiation. Most candidates were able to successfully examine the impact of science and weigh up the relative merits of differing forms of medical imaging but only the strongest candidates were able to offer convincing explanations for the process of ionisation.

Questions 12 and 13

Questions 12 and 13 focused on the global context for this examination and it was pleasing that candidates were able to respond positively to the stimulus of the application of physics, although many candidate responses lacked clarity and depth.

Recommendations and guidance for the teaching of future candidates

Candidates who were familiar with the on-screen environment found the examination easy to approach and were able to respond more quickly to the questions posed. It is of the greatest importance that teachers allow time for candidates to complete the familiarization exercises and understand the full potential of the on-screen tools available to them.

The on-screen examination is written to address directly the requirements of the published MYP Year 5 criteria, and as such candidates who are familiar with the language of the assessment criteria and the requirements of the strands of the criteria have a significant advantage. Preparation for approaching those questions designed to assess criteria B and C is best done through the use of typical laboratory based activities. Teachers are strongly encouraged to highlight to candidates those aspects of lab reports that meet the needs of the strands of the criteria; in particular the need to control variables and describe the role of these variables in the scientific method.

The key common vocabulary of science needs to be addressed in classrooms so that candidates are able to describe scientific process using precise and correct language.