

# Examiners' Report/ Principal Examiner Feedback

March 2011

GCSE

360Science

GCSE Science  
Multiple Choice Paper P1b (5010/01)

GCSE Physics  
Multiple Choice Paper P1b (5046/01)

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## 5010 Science/ 5046 Physics (P1b) Examiners' Report

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### Foundation Tier

Many candidates have strange ideas about the Solar System. While as many as 72% realised that the Sun and the Moon look the same size because the former is further away, a worrying 16% thought they are the same distance and 7% thought the Sun is closer to us. Altogether, 18% thought the Sun was smaller than either Moon or Earth and 16% considered the Earth to be the largest of the three objects. 76% of candidates recalled that comets and asteroids orbit around the Sun, 16% thought the Sun orbits a comet, and 7% thought it went around an asteroid. Nearly twice as many candidates predicted that our Sun would end up as a black hole rather than a black dwarf.

The need for care with choice of words and language, which will feature more prominently with the increase in extended writing demanded by Ofqual for new specifications, was highlighted in relation to optical fibres. 46% of candidates chose 'externally' and 38% chose 'refracted' rather than 'totally internally reflected'.

Scanning processes are also misunderstood by many. As few as 33% realised that thermometers detecting 'radiation *coming from* a patient's body' is scanning by emission. Also, while 48% knew that fetal scanning was by reflection of ultrasound, 34% thought the fetus emitted either X-rays or ultrasound. Others thought the fetus reflected X-rays.

Most papers testing the 360Science specification have tested the shape of a digital signal with a variety of incorrect options. That for this series proved as challenging as usual with 53% recognising that the digital signal only has two values.

### Overlap Questions

Seven from the eight questions discriminated well between foundation and higher candidates. There is, however, a serious misunderstanding about the concept of action and reaction. Few seem to have seen the demonstration with a balloon, moving **horizontally** along a piece of thread, driven by escaping air. This air clearly cannot be pressing on the Earth. More than 20% at both tiers thought the 'hot gases push on the **vacuum** of space'.

### Higher Tier

The lowest scoring item at Higher tier occurred when candidates applied their knowledge of speed of sound and electromagnetic waves. 71% selected gamma and radio as being most different while as few as 14% went for the key – ultrasound and infrared.

Once again, units must be mentioned. In one question, candidates ignored the idea that a speed could be in km/s while, in a second, lots of noughts (or powers of 10) in a question where nm were explained caused a lot of confusion.

It was most pleasing to observe that the majority of candidates were able to apply the basic ideas of a Hertzprung-Russell diagram which were novel to them all.

## Grade Boundaries

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Grade boundaries for this, and all other papers, can be found on the website on this link:

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