Alexandra House
33 Kingsway
London
WC2B 6SE

T 08456 404045
F 020 7421 6855
www.ofsted.gov.uk

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Mr Stephen Brierley
Headteacher
Archbishop Blanch Church of England Voluntary Aided High School
Mount Vernon Road
Liverpool
Merseyside
L7 3EA

Dear Mr Brierley,

Ofsted survey inspection programme – Science and mathematics

Thank you for your hospitality and co-operation, and that of your staff, during the visit of myself and Jim Bennetts HMI on 25-26 January 2007 to look at work in science and mathematics.

The visit provided valuable information which will contribute to our national evaluation and reporting. Published reports are likely to list the names of the contributing institutions, but individual institutions will not be identified in the main text. All feedback letters will be published on the Ofsted website at the end of each half-term.

The evidence used to inform the judgements made included: interviews with staff and pupils, scrutiny of relevant documentation, analysis of pupils' work and observation of lessons.

Science

The overall effectiveness of science was judged to be **good**.

Achievement and standards

Achievement and standards in science are good.

- Achievement at Key Stage 3 is very good. The proportions of students gaining level 5 and above are consistently well above those found nationally. The proportions of students achieving level 6 and level 7 are also high.
- Contextual value added measures, which take account of students' prior attainment and circumstances, show that students consistently make good progress during key stage 3.

- Achievement at Key Stage 4 is very good. Taking all science GCSEs into account, the proportions of students who gain A*-C grades is high, and has improved each year in recent years.
- The percentage of students who attain the highest grades of A* and A in the separate science subjects of biology, chemistry and physics is high. These results were particularly good in 2005 when around three quarters of those who took biology and chemistry achieved the top grades, and just over 60% of those who took physics GCSE.
- In the sixth form pass rates for GCE AS and A level science subjects are high. Value added data show that students make very good progress in biology and chemistry.
- There is good progression from GCE A levels to higher education courses in science subjects.

Quality of teaching and learning of science

The quality of teaching and learning in science is good.

- Most lessons were good, and one was outstanding.
- No unsatisfactory teaching was seen.
- Good use is made of learning objectives.
- A very good range of activities is used in lessons to motivate students, provide interest, and promote learning. A particular strength is the use of many different tasks to help develop understanding and consolidate learning in individual lessons.
- Learning materials, such as worksheets, are well designed and are used effectively. Tasks are varied, and require students to think carefully about what they are learning and apply their knowledge.
- In lessons there is good emphasis on learning key scientific terms. Good use is made of different exercises to reinforce students understanding and to help them remember these terms.
- There is some good use of presentation software, for example to provide photographs and diagrams to help explain concepts.
- Teachers' exposition and explanations are clear.
- Very good use is made of practical and experimental work.
- Good use is made of games which help to reinforce and consolidate learning as well as adding interest and enjoyment.
- A good pace is maintained in most lessons, with students actively engaged in learning and no time wasted. The best lessons include lots of different tasks to consolidate learning, with time limits set and a smooth transition from one to another.
- Students are very well behaved and have outstanding attitudes to learning.
- Teachers provide very good support to students, which they value.
- In a minority of lessons there is too much whole class teaching which does not meet the full range of needs and abilities.
- Good use is made of a variety of different methods of assessment in class.

- Assessment and progress monitoring are effective.
- Good use is made of individual targets at GCSE and AS and A level. Students know the grades they are aiming for and what they need to do to achieve these.
- Insufficient use is made of individual targets at Key Stage 3, particularly in the marking of student work, where there are few references to national curriculum levels.

Quality of curriculum

The curriculum in science is good.

- At key stage 4 options include single science, core science, additional science, additional applied science, physics, chemistry and biology.
- At key stage 3 the curriculum includes a course, 'Aim 4 five', specifically designed to raise attainment of the less able by teaching science through particularly topical and exciting activities, such as those based on popular television programmes.
- Post 16 courses offered include GCE AS and A levels in physics, chemistry, biology and environmental science. Local collaborative arrangements ensure that if numbers are too small to offer a subject in school it is available at another institution.

Leadership and management of science

Leadership and management of science are good.

- The science department has a committed, hard working, and enthusiastic team of teachers.
- There is a strong focus on raising achievement.
- The departmental analysis of results is comprehensive and accurate. The report includes appropriate actions to address weaknesses identified.
- Leadership and management have been successful in steadily improving student achievement at Key Stage 3.
- Leadership and management have been successful in steadily improving the proportion of students gaining A*-C grades in science GCSEs.
- Leadership and management have been very successful in improving the progress students make at GCE A level in biology and chemistry. Value added analyses show dramatic improvement in recent years, and students now get better grades in these subjects than would be expected on the basis of their GCSE results.
- Strategies are in place to improve the proportion of students who go on to achieve level 5 at Key Stage 3 from the lower range of attainment at Key Stage 2. It is too early to assess the full impact of these.
- Planning and day to day management are thorough and effective.

- Monitoring of the quality of teaching and learning is carried out both by the head of department and senior managers. Their assessment is accurate.
- Action is taken to continuously improve the quality of teaching and learning through in-house continuing professional development, external courses, coaching and sharing good practice. The role of the Assistant Headteacher with responsibility for teaching and learning is particularly valuable.
- Some laboratories have old furniture, fixtures and fittings which are dilapidated and in poor condition. These laboratories do not provide a modern scientific learning environment.

Inclusion

Inclusion in science is good.

- Appropriate in class support is provided by teaching assistants.
- In most lessons the needs of most students are well catered for.
- All students, but particularly the less able, benefit from the wide range of interesting and effective activities to consolidate and reinforce learning.

Areas for improvement, which we discussed, included:

- continue to improve the quality of teaching and learning to ensure that all lessons meet the needs of all students, emulating the good practice that already exists within the department
- continue to develop and implement strategies to support lower ability students, especially at Key Stage 3, to improve progress and raise attainment
- improve the laboratory accommodation which is shabby and out of date, and does not provide a modern scientific learning environment.

Mathematics

The overall effectiveness of mathematics was judged to be **good**.

Achievement and standards

Achievement and standards are good.

- Data for Key Stage 3, GCSE and sixth form examination results show students achieve well. Standards at these stages are above average.
- The department promotes quite good uptake of the subject at age 16, and has considerable success in enabling students with modest prior attainment to achieve worthwhile results at AS and, sometimes, at A level.
- Students' books and their response in lessons are indicative of their outstanding commitment to learning mathematics. Teachers prepared

them well for national tests and external examinations, providing ample time for revision using material selected from past test papers.
- Students generally made good progress in the lessons observed.

Quality of teaching and learning

Teaching and learning are good.

- Lessons are clearly planned.
- Teachers present concepts with outstanding clarity of explanation, and this is greatly appreciated by students who pay full attention. Teachers make very good use of whiteboards and information and communication technology software.
- There is comprehensive coverage of the specified knowledge and skills in programmes of study and syllabuses. Duplicated notes are issued in the sixth form. Students' own notes on procedures are thorough and clear.
- Students aged 11-16 are grouped in ability sets. Teaching has broadly appropriate pace and challenge for the students in each set.
- Marking gives students good guidance. It is appropriate in frequency; there is a suitable balance of self-marking and marking by teachers, and succinct well-focused annotations are helpful.
- Tests at the ends of blocks of work, record keeping, and the flexible management of grouping of students in sets are all efficient. These effective procedures keep track of students' progress.
- Lessons are characterised by safe and thorough teaching styles and procedures. This approach has great strength in boosting students' confidence, and ensuring that even the weakest in each group make good headway.
- Whilst there are significant strengths in assessment, teachers are not always good in weighing up a class during a lesson to ensure that the most able are challenged as much as possible, that pace is as brisk as possible, and to deal with lapses in recall or misconceptions that become evident. On occasion, a few students could have been encouraged to come up with solutions before they were explained, or could have coped with a slightly more advanced twist of a topic. Sometimes, omission of some examples in an exercise would have been advantageous in getting through work more quickly. Where students have forgotten earlier work that is necessary for a new topic, recapitulation could sometimes be more adroit. In some lessons, time in the final five minutes could have been used more effectively to consolidate on points that appeared insecure as the teacher observed students at work.
- Refreshment of previous learning is not as systematic as it should be. The first few minutes of lessons are not generally planned with this in mind.

The quality of the curriculum

The curriculum arrangements for mathematics are good.

- The use of tiers of entry for examinations at age 14 and GCSE is effective. The selection of modules for advanced mathematics and further mathematics is sensible.
- The "maths office" provision is outstanding. Sixth-form and other students appreciate the opportunity to work in the spacious office, knowing that they will receive the willing help of whichever teachers are there. They value the back-up material that is available in electronic form.
- Lessons tend to be planned very closely to the text books. Whilst this ensures continuity and reasonable pace week by week, the approach limits opportunity for spontaneous response to needs and ideas that surface from students, and adventurous explorations that make mathematics fun.
- There is a satisfactory range of investigative work. However, this is not as extensive as it should be, and there is a missed opportunity to develop the associated algebra, and general notions about the uses and applications of mathematics.
- The single Year 12 group has nearly thirty students. Commendably, some students with relatively weak GCSE results have been encouraged to take mathematics; with the thorough and supportive teaching, they enjoy success. However, it is difficult with such an arrangement for teachers to challenge the prospective grade A (and further mathematics) students as well as support those for whom a grade D or E would be a significant achievement. Moreover, with the students' diverse career aspirations (business, engineering etc) it is difficult to provide a menu of alternative modules.

Leadership and management

Leadership and management are good.

- From lessons observed, the department has a team of good practitioners.
- There is a good collaborative spirit in the department and staff share common aims. The team is well led.
- The administration of tests, tracking of progress and management of materials are efficient.
- There has been no recent professional development on teaching styles.

Subject issue: pupils' enjoyment and understanding of mathematics

Students enjoy their lessons and feel secure with the through and clearly presented teaching they receive. They respond well to the consistent encouragement that teachers provide. They recognise the importance of mathematics and are glad that they can cope with it confidently. They are highly conscientious in following teachers' instructions and learning from their

notes in preparation for examinations. Occasionally, though tasks in lessons have been completed, understanding is not entire; for example, in representations of three dimensional figures. Opportunities for excitement and wonder are somewhat limited.

Inclusion

Inclusion is outstanding. Teachers know their students well and are very painstaking in keeping them on track and ensuring that even the weakest achieve success. The support provided raises self-esteem as well as performance.

Areas for improvement, which we discussed, include:

- improve the fine tuning of challenge and pace to meet the needs of the range of learners in each class
- increase emphasis on securing understanding, ensuring past learning is consistently refreshed and current learning reinforced
- develop the implicit as well as the explicit skills in a unit of work, providing more opportunity for investigation, finding a route through novel problems, and having fun
- broaden teachers' range of teaching styles by acquainting them with alternative approaches
- provision of two mathematics groups in Year 12 to make room for even more than the present number, and to facilitate differentiation in the modules offered and the pitch of teaching.

I hope these observations are useful as you continue to develop science and mathematics in the school.

As I explained in my previous letter, a copy of this letter will be sent to your local authority and will be published on Ofsted's website. It will also be available to the team for your next institutional inspection.

Yours sincerely,

Ruth James
Her Majesty's Inspector