

Report on the 2026 MiSAC Annual Competition

How Microbes Make Milk

Sponsored by MiSAC

The aim of the 38th MiSAC Annual Competition was to develop an understanding among teenagers of the role of microbes in enabling cows to produce milk throughout the year. The requirements of the 2026 competition maintained the well-established approach of basing the competition on a topic that is associated with school curricula but with specifications that require students to explore material beyond the curriculum. It has been some time since the competition explored an agricultural theme, though this did not attract as many entries as in previous years. MiSAC was disappointed that no schools in Wales entered the competition and we had hoped for more entrants from schools in Scotland and Northern Ireland. It was evident, however, that students had still enjoyed researching the topic and demonstrated their enthusiasm in producing an illustrated web-page report in a variety of imaginative ways to convey their findings. Teachers thanked MiSAC for organizing the competition. Overall, the judges were impressed by the quality of the entries.

On the publicity flyer, the *Object of the competition* with its three bullet points provided the remit for the students' entries. They were required to explain how it is the microbes in the cows' stomach that are essential to make the enzymes which break down cellulose in the grass they eat to provide the nutrients for the production of milk. In addition, students needed to show their appreciation that, during the winter months, when cows are unable to find sufficient fresh grass, they are provided with stored silage. Microbes ferment this silage, lowering its pH that stops other bacteria breaking it down, which would otherwise make it inedible. Some students failed to discuss the importance of farmers providing legumes in the cows' fodder which allow the nitrogen-fixing bacteria in their roots to improve the quality of nutrients so that proteins can be synthesised.

Whilst MiSAC is always pleased to welcome back entries from regular, established school participants, we were delighted by the number of newcomers to the competition, as well as schools returning to submit entries after an absence last year. As usual, there were two groups, KS3 and KS4 (S1/2 and S3/4 in Scotland; PS4/5 in Wales). Entries were received from a total of **56** establishments: from schools in England (50), Wales (0), Scotland (4) and Northern Ireland (1), together with just one overseas school in the Philippines. This year, the number of state-funded schools that entered (30) was greater than those that are fee-paying (25).

15 schools submitted entries to both entry groups. In total, there were **320** separate entries consisting of 228 in the KS3 group and 92 at KS4. Many participants took the opportunity to work together in groups of up to 4, making a total of **543** students who entered the competition. The judging took place on the campus of Reading University; the NCBE, one of MiSAC's sponsors, hosted the event. The judging panel consisted of MiSAC officers & members.

Entries from students in the KS3 group provided a very strong field with some detailed and beautifully-illustrated accounts which met the key requirements. The entries for the KS4 group were also of great merit and led to extensive discussion amongst the judges about potential prize winners. A number of entries in both age groups were commended, not only for their artistic merit, but also for their clarity of presentation. However, students should be careful in their choice of background colours; some were so dark that these made it difficult to read the information. Teachers should remind students that the entry *must* be presented on one sheet of A3 paper. Students should be discouraged from extending the area of their report with flaps to be lifted and tabs to be pulled to reveal initially-hidden drawings, photographs and other data. One student, evidently used to viewing a smartphone to research the topic, decided to confine his entry as a thin strip of information down the middle of the paper. Good students quoted references for the material used in their entries. This need not take up much space but it should be visible on the *front* of their presentations; several used the back of the entry.

Most students discussed named organisms, as required. Many students wrote correctly the genus and species names of the microbes they described, eg, *Ruminococcus albus* (which can be abbreviated to *R. albus* after its first use). However, many had **not** learned to be *consistent* in their proper use of naming all organisms. (Teachers therefore still need to emphasise the use of an upper-case initial letter for the genus name and a lower-case initial letter for the species. This should be in *italics* when printed and underlined when hand-written.)

The judges continued to be impressed by the imagination and creativity of the students as they compiled their entries. Many students showed remarkable technical skills in using their computer to design their submission. In previous competition reports, we have commented on the skill of some students who created a *working* QR code for use with a smartphone to connect to URLs giving further information. This year, the number of entries that incorporated functioning QR codes showed a significant increase. Those who chose to write their entry by hand could also achieve notable results.

The judges should also like to thank teachers for responding to the request to record full identification details on the back of each entry which eases the administration of several hundred entries, many involving more than one student. A total of £1335.00 was awarded to prize winners and their establishments. Winning and commended entries will be displayed on the MiSAC web site www.misac.org.uk which includes a list of the prize-winning and commended students and their schools. MiSAC thanks all the students for making the 2026 competition an outstanding success and their teachers for their support. We look forward to entries for the next MiSAC competition in 2027, which will explore the theme of *The Return of Deadly Diseases*.

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