Appendix 5
How to facilitate evidence-based discussions

Introduction

Argumentation is at the heart of what scientists do — they pose questions, make claims, collect evidence, debate with other scientists and compare their ideas with others in the field.

In the primary science classroom, argumentation is about students:

- articulating and communicating their thinking and understanding to others
- sharing information and insights
- presenting their ideas and evidence
- receiving feedback (and giving feedback to others)
- finding flaws in their own and others' reasoning
- reflecting on how their ideas have changed.

It is through articulating, communicating and debating their ideas and arguments that students are able to develop a deep understanding of science content.

Establish norms

Introduce norms before starting a science discussion activity. For example:

- listen when others speak
- ask questions of each other
- criticise ideas not people
- listen to and discuss all ideas before selecting one.

Claim, evidence and reasoning

In science, arguments that make claims are supported by evidence. Sophisticated arguments follow the QCER process:

Q What **question** are you trying to answer? For example, 'Why do we only see Orion at certain times of the year?'

C The **claim**, for example, 'As the Earth moves around the Sun, the apparent position of the constellations changes, which means that sometimes Orion is not visible'.

E The **evidence**, for example, 'We showed in our model that sometimes the Sun is between the Earth and Orion'.

R The **reasoning** — saying how the evidence supports the claim. For example, 'When the Sun is between the Earth and Orion, the stars in Orion would need to be viewed during the daytime. We know from observations that you cannot see the stars during the day, because the Sun's light overpowers the light from the stars because the Sun is so close to the Earth.'

Students need to be encouraged to move from making claims only, to citing evidence to support their claims. Older students develop conclusions that include a claim, evidence and reasoning. This is an important characteristic of the nature of science and an aspect of scientific literacy. Using 'Science question starters' (see next section) helps to promote evidence-based discussion in the classroom.