Answers

Part 1: The Orion Nebula

Observation table

Picture name	Colours	What makes the colours?
The Orion nebula	Red Green Yellow Black	Atomic hydrogen Molecular oxygen Hydrogen and oxygen mixed Clouds of dust, Interstellar Medium (ISM)
The Horsehead nebula	Black Red Blue	Clouds of dust, ISM Atomic hydrogen Reflected starlight
Reflection nebula in Orion's sword	Blue Red Black	Reflected starlight Atomic hydrogen Clouds of dust, ISM

Questions

- Atomic hydrogen
- Atomic hydrogen is the simplest substance and the starting point for all other chemical elements, so is very common in the Universe.
- A large cloud of dust.
- The light is too faint to be seen by the naked eye.

Part 2: The Interstellar Medium (ISM)

The Orion nebula	Atomic hydrogen Molecular oxygen Hydrogen and oxygen mixed Clouds of dust, Interstellar Medium (ISM)
The Horsehead nebula	Clouds of dust, ISM Atomic hydrogen Reflected starlight
Reflection nebula in Orion's sword	Reflected starlight Atomic hydrogen Clouds of dust, ISM
Picture 1	Yellow: mixture of atomic hydrogen and molecular oxygen Black: dust, ISM Red: Atomic hydrogen Blue: Starlight reflected by dust
Picture 2	In the regions where there are stars.
Picture 3	In the dark clouds.
Picture 4	In the dark clouds.

The ISM contains complex molecules and simple molecules. Chemistry must be happening in the ISM, *ie* new bonds being formed between atoms. The stuff in the ISM comes from stars and new bond formation.

Other questions are to be answered by student research.

Acknowledgements

V. Kind, *Contemporary chemistry for schools and colleges*. London: Royal Society of Chemistry, 2004.

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