QER for Schools

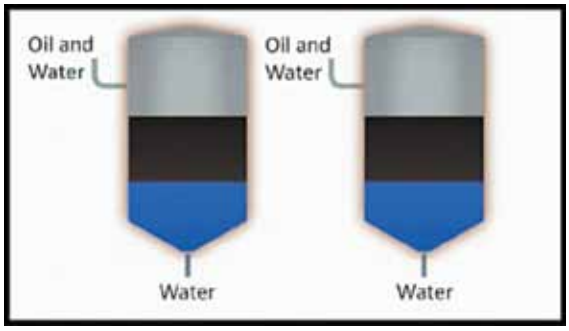
QER Science Lesson – Year 7
Decantation to separate oil and water

NOTES

After oil and water are extracted from oil shale at the QER New Fuels Development Centre, they settle in measure tanks which are kept warm to help the oil and water to separate into layers. In this way, the water can be decanted off to separate it from the oil. In this lesson you will learn to decant a mixture of oil and water.

In this lesson, students will:

- investigate decanting as a means of separating a mixture of oil and water



LESSON-LEVEL CONTENT DESCRIPTIONS

The Australian Curriculum: Year 7

Science Understanding

Chemical sciences: Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques (ACSSU113).

Elaborations:

- investigating and using a range of physical separation techniques such as filtration, decantation, evaporation, crystallisation, chromatography and distillation

Earth and space sciences: Some of Earth's resources are renewable, but others are non-renewable (ACSSU116).

Elaborations:

- considering what is meant by the term 'renewable' in relation to the Earth's resources
- considering timescales for regeneration of resources

Year 7 achievement standard

By the end of Year 7, students pose questions and apply scientific concepts to everyday problems and make general predictions based on their experiences. They plan procedures for investigations that take into account the need for fair testing and use equipment that improves fairness and accuracy. They communicate their observations and data clearly, summarise their data where appropriate, and suggest improvements to their methods. Students distinguish between pure substances and mixtures and plan appropriate methods to separate mixtures. They identify where science knowledge is used to propose solutions to problems and describe examples of where people use science in their work. They describe how evidence has led to an improved understanding of a scientific idea.

LESSON OUTCOMES

The assessment focus of this lesson is formative: The classroom activities provide an opportunity for students to generate evidence with which the teacher can establish the student's progress towards understanding the concepts that are being developed in this lesson.

Science Outcomes	Literacy Outcomes	Numeracy Outcomes
Students may/should be able to:		
• decant liquids • measure mass using a laboratory balance	• listen • read • view • write • speak • discuss scientific phenomena • document scientific phenomena • use technical terms in a scientific context	• measure practically • collect data • represent data • interpret data • measure using formal units • consider uncertainty and reliability in measurement • collect quantitative data • analyse data • determine mathematical relationships to calculate and predict values

BACKGROUND INFORMATION

Ensure students are competent in safe laboratory procedures and in the proper use of laboratory balances.

PREPARATION LIST

- Copy the activity Decantation of oil and water experiment
- assemble equipment for experiment:
  - vegetable oil
  - distilled water
  - laboratory balance
  - 250mL or 500mL measuring cylinders
  - 250mL or 500mL beakers
  - stirring stick

ACTIVITY SEQUENCE

1. Introduce the lesson by explaining the process used to separate oil and water in the QER New Fuels Development Centre, as explained in the introduction to this lesson plan.
2. Hand out the activity Decantation of oil and water experiment.
3. Discuss the procedure and safety considerations.
4. Students conduct the experiment and answer the questions.

OPPORTUNITIES FOR CONDUCTING FORMATIVE ASSESSMENT

- Observation of students performing the practical skill of decanting
- Marking answers to the questions in the experiment

NOTES

LINKS TO OTHER LEARNING AREAS

The following suggested activities may be used to provide a link between the content of this unit and that of other learning areas, in particular those related to Mathematics, English and ICT.

- potential extension to the mathematical relationship between mass and volume (density), either through calculation or direct measurement using a hydrometer

ADDITIONAL RESOURCES

- www.qervisitorcentre.com.au – Extensive overview of QER New Fuels Development Centre, including video snippets, animations, graphs, maps and explanations relating to:
  - Australia's fuel challenge
  - QER and sustainability
  - benefits for Australians
  - turning oil shale into fuel

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