QER Science Lesson – Year 11
The formation of oil shale

Beginning as a living lake some forty million years ago, the Stuart oil shale deposit near Gladstone has had a long and fascinating life. This lesson follows the process that turns algae into jet fuel.

In this lesson, students will:

- create a flowchart to depict the stages in the formation of oil shale

LESSON-LEVEL CONTENT DESCRIPTIONS

Queensland Science 21 Syllabus: Year 11

Focus Area: Earth and space: Plate tectonics is the conceptual model for thinking about volcanoes, earthquakes and continental drift. Analysing past and present earth processes allows an understanding of global change and prediction of the future of the planet.

Key Concepts: ES1 Structure and properties of the Earth.

Elaborations:

Geological changes occur through physical and chemical processes.

Possibilities for linking key concepts to scientific priorities:

- human activities and natural processes impact on landscapes over human and geological timescales. (Tech, Env)
- the Earth's crust is exploited for non-renewable resources. (Tech, Env)

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:		
• explain the process of formation of oil shale • create a flowchart to depict the stages of its formation	• listen • read • view • write • speak • create print materials • crate visual materials • discuss scientific phenomena • document scientific phenomena • hypothesise about speculative ideas • use technical terms in a scientific context	• collect data • represent data • collect qualitative data • collect quantitative data • prepresent data in graphical forms

NOTES

BACKGROUND INFORMATION

Familiarise yourself with the two PowerPoint presentations and use the document The Formation of Oil Shale to provide the background to teach this topic.

PREPARATION LIST

- PowerPoint Presentation: Formation of Oil Shale – Part 1
- PowerPoint Presentation: Formation of Oil Shale – Part 2
- Document: The Formation of Oil Shale

ACTIVITY SEQUENCE

1. Introduce the lesson by asking students to explain their understanding of the formation of coal and oil. This will provide an insight into background knowledge around this topic and guidance in the depth of treatment required.

2. Explain to students that they will be creating a flowchart to depict the stages in the creation of oil shale. They should take notes on each of the stages. Use these resources to teach the process of the formation of oil shale:

   - Document: The Formation of Oil Shale
   - PowerPoint Presentation: Formation of Oil Shale – Part 1
   - PowerPoint Presentation: Formation of Oil Shale – Part 2

3. Students draw a flowchart to depict the stages in the creation of oil shale.

4. Answer this question: Using your knowledge of how oil shale is formed, explain why it is that the majority of Australia's deposits are found in Queensland.

OPPORTUNITIES FOR CONDUCTING FORMATIVE ASSESSMENT

- Observe flowcharts and the answer to the question at step 4 as students are completing them, or collect notebooks to check later

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.

- design a page for a year 8 textbook explaining the process of oil shale formation

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
- Oil Shale fact sheet www.oresomeresources.com/resources_view/resource/fact_sheet_oil_shale
- PowerPoint Presentations:
  - Paraho Process Presentation
  - QRC Oresome Resources – Formation of Oil Shale – Parts 1 and 2
- flow diagram The Paraho Process – Illustrative Process Flows

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