Year 12 Science: Heat transfer in the Earth system

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. How much energy warms 2.0 kg of water by 3.0 °C? Use $c = 4200$ J kg^{-1} °C^{-1}.

2. 8400 J is absorbed by 0.50 kg of dry sand ($c = 800$ J kg^{-1} °C^{-1}). Find its temperature rise.

3. Using NIWA's table, how much bigger is Alexandra's July daily range than Dunedin's?

4. Explain why a cloudy winter night is usually warmer than a clear one.

5. Explain why the sky is blue.

6. Which way does the breeze blow on a beach on a clear night, and why?

Exam-style question: the Canterbury nor'wester

Moist westerly air from the Tasman Sea is forced up over the Southern Alps. The West Coast gets heavy rain, while the Canterbury Plains, on the other side, get a hot, dry nor'wester.

7. Describe what latent heat is.

8. Explain why the air cools as it rises over the Alps, and why rain falls on the West Coast.

9. Discuss why the air reaching the Canterbury Plains is warmer and drier than it was at the same height over the Tasman Sea.

Fix the mistake

10. Correct this statement: "Water has a high heat capacity, so it heats up quickly."

11. Correct this statement: "Greenhouse gases reflect heat back down to Earth."

12. Correct this statement: "The sky is blue because it reflects the colour of the sea."

13. Correct this statement: "Sunsets are red because the Sun cools down in the evening."