Year 13 Science: Ocean composition, layers and circulation

Name: _____ Date: _____

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

Practice

1. Find the total pressure 500 m down. Use $\rho = 1025$ kg m^{-3}, $g = 9.8$ N kg^{-1} and air pressure 1.01×10^5 Pa.

2. In the Southern Hemisphere a wind blows from the south, towards the north. Which way is the net Ekman transport?

3. What happens to the salinity and density of surface water in the subtropics, where evaporation is strong?

4. Why does sea ice forming make the water beneath it denser?

5. Why is the thermocline near New Zealand stronger in summer than in winter?

Exam-style question: West Coast upwelling

Fishers on the West Coast notice that in some summers, when south-westerly winds blow for days, the sea near the shore turns cold and green and fish gather. When north-easterly winds blow, the sea stays warm and clear.

6. Describe how wind sets a surface current moving.

7. Explain how the south-westerly wind and the Coriolis effect cause upwelling along this coast.

8. Explain why upwelling makes the sea green and attracts fish.

9. Explain why north-easterly winds stop the upwelling.

Fix the mistake

10. Correct this statement: "The Coriolis effect makes currents turn right in New Zealand."

11. Correct this statement: "Ekman transport goes the same way as the wind."

12. Correct this statement: "Seawater is densest at 4 °C, so the deep ocean is at 4 °C."

13. Correct this statement: "The thermocline is the warm layer at the top."