Year 13 Science: Composition, layers and energy balance of the atmosphere

Name: _____ Date: _____

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

Practice

1. Use p = 1013 e^(−h ÷ 8.0) to find the pressure at 5.5 km.

2. On a day when it is 15 °C at the ground, estimate the temperature 4.0 km up, using 6.5 °C per kilometre.

3. In which layer does temperature rise with height because ozone absorbs ultraviolet light?

4. Why is nitrogen not a greenhouse gas?

5. If Earth's albedo rose from 0.30 to 0.32, how much energy per square metre would be absorbed, taking 340 W m^{-2} arriving?

Exam-style question: summer UV in Aotearoa

Measurements at Lauder in Central Otago show that summer UV levels in New Zealand are much higher than at similar latitudes in Europe and North America.

6. Describe how ozone forms in the stratosphere and how it absorbs ultraviolet light.

7. Explain why temperature increases with height in the stratosphere.

8. Explain why New Zealand's summer UV is higher than at the same latitude in the Northern Hemisphere.

9. Explain how clouds and aerosols change the amount of UV reaching the ground.

Fix the mistake

10. Correct this statement: "The thermosphere is 1500 °C, so it would burn a spacecraft."

11. Correct this statement: "The greenhouse effect is caused by the ozone hole letting heat in."

12. Correct this statement: "Nitrogen is the main greenhouse gas because there is most of it."

13. Correct this statement: "Pressure falls by the same amount for every kilometre you climb."