



QUESTION WORKBOOK

Thermoregulation in endotherms and ectotherms

Hormonal communication, plant responses and homeostasis · Unit B15

AQA 3.6.4.1 · OCR A 5.1.1 · Edexcel A 5.16, 7.12 · Edexcel B 5.1 i, 9.1 ii, 9.9 vi, 9.9 vii
CAIE not examined as a topic

15 questions · 50 marks

NAVY SCREEN EDITION

Every question in this book has a code beside its number.
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SECTION A · Short, 1 to 2 marks**A1**

TCH-Q15

State the difference between core temperature and skin temperature, and state which one the body actually regulates.

[2]

SECTION B · Standard, 3 to 5 marks**B1**

TCH-Q8

A biologist claims that ectotherms will cope better than endotherms with a warming climate, because ectotherms do not need to spend energy producing their own heat. Evaluate this claim.

[5]

B2

TCH-Q1

Describe the responses of the skin when the body becomes too warm, and describe how each of those responses increases the loss of heat.

[4]

B3 Describe how a lizard raises and then limits its body temperature during a hot day in a desert, giving named examples of the behaviour involved. [4]
TCH-Q2

B4 Discuss the advantages and disadvantages of being an endotherm rather than an ectotherm of the same body mass. [4]
TCH-Q3

B5 Describe the responses of the skin and of skeletal muscle when the body becomes too cold, and describe how each response reduces heat loss or increases heat production. [4]
TCH-Q9

B6 Explain why a mammal controls its core temperature within narrow limits, referring to enzymes in your answer. [3]
TCH-Q4

B7 Compare the peripheral thermoreceptors of the skin with the central thermoreceptors of the hypothalamus. [3]
TCH-Q5

B8 A student writes that capillaries move closer to the surface of the skin when a person is hot. Explain why this is wrong, and explain what actually changes. [3]
TCH-Q6

B9 A person working in still air at 35 °C and high humidity overheats far more quickly than a person working at the same temperature in dry air. Suggest why. [3]
TCH-Q7

B10 Explain how non-shivering thermogenesis raises heat production in a person exposed to cold for several weeks, without any muscle contraction being involved. [3]
TCH-Q10

B11

TCH-Q11

An ectotherm and an endotherm of the same body mass are kept in the same conditions. Over a week the endotherm eats 2100 g of food and the ectotherm eats 190 g, figures constructed for this question rather than measured. Calculate the ectotherm's food intake as a percentage of the endotherm's, and calculate how many times greater the endotherm's intake is. [3]

B12

TCH-Q12

A well-furred mammal gains far more insulation from erecting its hairs in the cold than a human does. Explain why. [3]

B13

TCH-Q13

A small mammal such as a hedgehog lowers its own body temperature and metabolic rate for weeks at a time during winter, a state called torpor, rather than maintaining a normal core temperature throughout. Suggest the advantage of doing this, given what this lesson states about the energy cost of being an endotherm. [3]

B14 Compare the nervous and hormonal components of the response to cold, referring to their speed and how long each takes to have its full effect. [3]

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