Roots: Science
by Keith Kelly

YOUR CLIL TEACHER'S NOTES

AGE: Teenagers
LEVEL: Intermediate
TIME NEEDED: Approx. 90 minutes
OBJECTIVES: to compare and contrast ectothermic and endothermic animals; to take part in a group presentation; to complete exercises on root words
KEY SKILLS: reading, speaking, writing, listening
MATERIALS: one copy of the worksheet per student

Content focus
Ectothermic and endothermic animals

Warm-up: 2-3 minutes
Activity 1: 5 minutes
Activity 2: 10 minutes
Activity 3: 5 minutes
Activity 4: 20 minutes
Activity 5: 20 minutes

WARM-UP

1. Bring a woolly hat and scarf to class, put them on, and warm up by getting students to talk about when and why we wear them.

Note: If you live in a very sunny climate, you could use other equipment, e.g. sandals.

ACTIVITY 1

2. Continue on from the Warm-up and brainstorm other methods used for keeping warm or cool, then get students to read the question on the worksheet. Put students in groups of three or four and ask them to list some animals and the methods they use for heat regulation. Ask some groups to feed back to the class.

ACTIVITY 2

3. Get students to quickly read the text and check if any of their ideas and suggestions appear. Don't spend too much time getting feedback and elicit the following phrases: *bask in the sun*, *sit on exposed rock*, *retire to shade where it is cooler*.

4. Let students read the text again more slowly and write either *ecto* or *endo* next to each of the sentence fragments on the next page.

Key
1. ecto; 2. ecto; 3. endo; 4. endo; 5. ecto; 6. endo; 7. ecto; 8. endo

ACTIVITY 3

5. Tell students to look at the animal names in the box. Then, ask them to identify the shapes of the text boxes (a fish and a human face). Test students on which one is ectothermic and which is endothermic and tell them to work individually to write the animal words in the appropriate text box. If students are unsure what the animals are, encourage them to use a dictionary or encyclopedia.

Key
Ectothermic: lizard, alligator, turtle, frog, snake
Endothermic: hamster, sheep, dog, bird, tiger

ACTIVITY 4

6. Tell students to rejoin their groups, think about the different animals (themselves too!) and discuss the advantages and disadvantages of ectothermic and endothermic regulation of body temperature. If you need to prompt, give an example such as the fact that some snakes can go for a very long time without eating.

7. Give each group a number and tell them that they will be giving a short presentation on either ectothermic or endothermic animals. The length of the presentations will depend on the size of the groups and the abilities of your students. Between one and two minutes will be about right. Ensure that there are an equal number of groups covering both sets of animals, e.g. if you have 24 students, put them into six groups of four so that you have three groups working on ectothermic and three groups working on endothermic animals. Ensure that there are plenty of reference resources available for the whole class, such as encyclopedias or internet access. Tell them to try and find examples they think no one else will have chosen!

Go through the instructions in the four bubbles and tell students that they have 20 minutes to prepare for their presentation.

Don't take any feedback as a whole class during the preparation time. Instead, go round the groups and contribute to their discussion where needed.

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Note:
- Refer students to Your CLIL: Comparisons: Science for extra language support.
- Depending on your timing and planning, you could get students to finish preparing their presentations for the next lesson.

ACTIVITY 5

8. While each group is giving their presentation, the other groups can assess them on language use and content using the table to draw in the appropriate emoticon. You may want to have a brief talk about being objective and point out that the positive use of diagrams / images can boost the content score, and sticking to the time limit and delegating roles can boost the language score.

9. Ask students to mark the groups individually during the presentations, then, when all the groups have finished presenting, ask each group to share their opinions amongst themselves. Tell them to collectively decide on a positive / neutral / negative score for both language use and content for each group. Then, go round the groups for their scores and write them on the board, giving feedback as you go. The group with the most positive feedback wins.

Note: You could offer a prize or treat to the winning group. Also, if you can, bring in a reptile for the class to observe at first hand.

Language focus
Root words

Activity 1: 5 minutes
Activity 2: 5-10 minutes

ACTIVITY 1

Get students to match the prefixes in the left-hand column with the word endings on the right to make words from the text. Ask students not to look at the reading text from the Content focus section of the lesson. When they have finished, tell them to compare their answers with a partner, then check against the text.

Key
1. d; 2. c; 3. b; 4. a

ACTIVITY 2

Tell students to look at the definitions of key words from the text on the right side of the table and write the correct key word next to them.

Key
1. thermoregulation; 2. endothermic; 3. amphibians; 4. ectothermic; 5. survive; 6. transfer; 7. exposed; 8. constant; 9. processes; 10. internal

Tip: You can give students more contextualized examples of root words from Your CLIL: Roots: Science.

WORKSHEET

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YOUR CLIL WORKSHEET

Content focus
Ectothermic and endothermic animals

ACTIVITY 1

What do animals do to keep warm or cool in different climates?

ACTIVITY 2

Read the text and see if any of your ideas from Activity 1 appear.

ECTOTHERMIC AND ENDOTHERMIC ANIMALS

Animals have interesting techniques for thermoregulation. Some animals, such as birds and mammals, can keep a constant body temperature whatever the temperature of their surroundings thanks to their metabolism. These animals are said to be endothermic or warm-blooded. Other animals, such as reptiles, fish and amphibians, are ectothermic or cold-blooded, because their body temperature is affected by the temperature of their surroundings.

Ectothermic animals that live in water are in an environment where temperature changes very little. Ectothermic animals that live on land have different ways to survive in the changing temperature of their environment. Those that exist on or at the surface of water, such as lizards, may alter their behaviour at different times of the day in order to keep their body temperature more constant and so they can transfer between land and water. For example they bask in the sun on the top of an exposed rock during the morning to raise their body temperature above that of the air around them. However, as air temperature rises and gets too hot, they retire to shade where it is cooler. In this way, they can keep their body temperature more constant, which is better for all the chemical processes which are going on inside them.

Endothermic mammals can keep their internal body temperature at around 37°C, and birds at around 40°C, without using the heat changes in the environment. They need to do this because many of the chemical changes that happen inside the body work best at these temperatures. The human body temperature cannot drop below 35°C, or get higher than 42°C, for very long without death following rapidly.

Adapted from *CXC Integrated Science* by Tania Chung-Harris, pp. 197-8 © Macmillan Caribbean 2005

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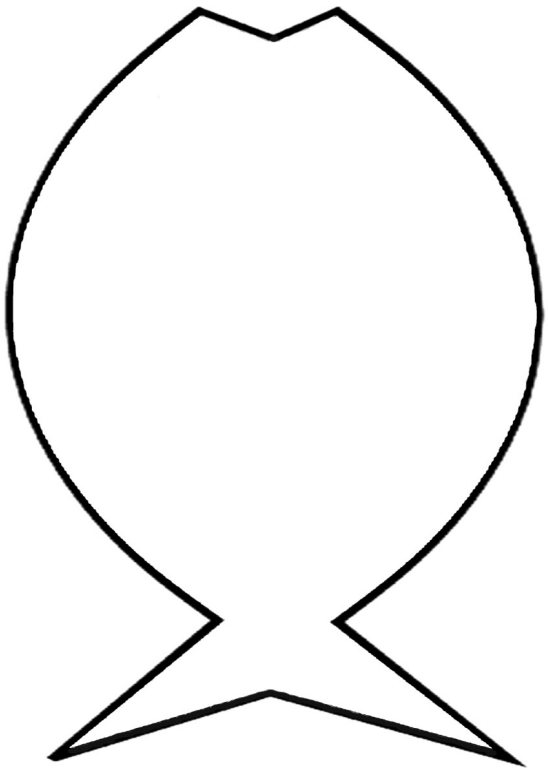
Read the text again and decide whether the sentence fragments below are about ectothermic or endothermic animals. Write *ecto* or *endo* next to each one.

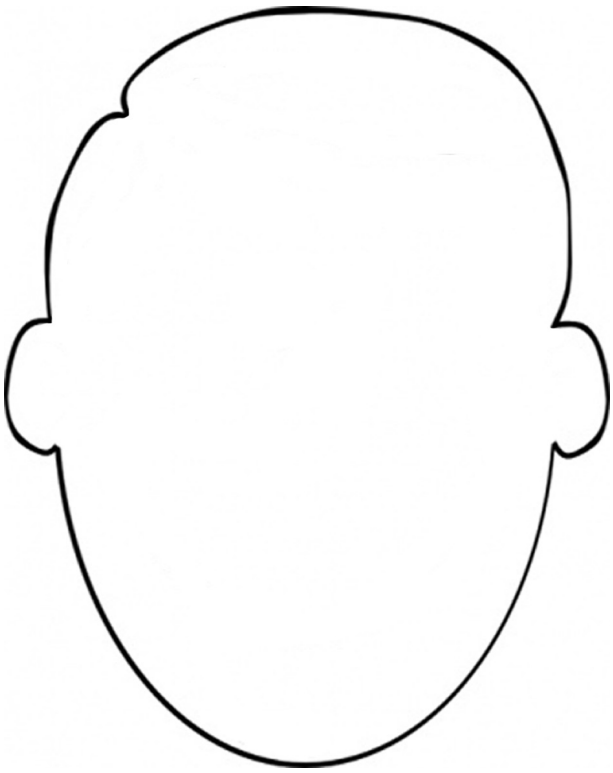
1. body temperature is affected by surroundings _____
2. alter behaviour to keep body temperature constant _____
3. control own body temperature _____
4. keep body temperature constant by metabolism _____
5. bask in the sun to get warm _____
6. do not rely on external sources for temperature control _____
7. retire to shade to cool down _____
8. internal body chemical changes need specific temperature _____

ACTIVITY 3

Look at the animal names in the box. Decide whether they are ectothermic or endothermic and write them in the appropriate text box. Label the animals in the pictures below with 1) endothermic and 2) ectothermic.

lizard	alligator	hamster	sheep	dog
turtle	bird	frog	tiger	snake





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ACTIVITY 4

1. **Is it better to be endothermic or ectothermic? What are the pros and cons?**

2. **Produce a short presentation on either endothermic or ectothermic animals. In your groups you should:**

find three advantages and three disadvantages of being an ectothermic / endothermic animal

find images to support your presentation

decide which group of animals has the best deal

all speak in your presentation

ACTIVITY 5

Give feedback on the other presentations using the table below, giving a score for language use and content. Draw a ☺ to give positive feedback, draw a 😐 to show that you have a mixed opinion and draw a ☹ if you thought the presentation needed more work.

evaluation		
group number	**language**	**content**
group 1		
group 2		
group 3		
group 4		
group 5		
group 6		

WORKSHEET

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YOUR CLIL WORKSHEET

Language focus
Root words

ACTIVITY 1

Without looking at the text, match the prefixes on the left with the word endings on the right to create words from the text. One of them has been done for you.

1. amphi-	a. -regulation
2. ecto-	b. -thermic
3. endo-	c. -thermic
4. thermo-	d. -bians

ACTIVITY 2

Read the definitions in the right-hand column and write the correct key words from the text in the left-hand column.

	key word	definition
1		the ability of an animal to control its temperature
2		an animal that stays the same temperature
3		animals that live on both land and water
4		an animal whose temperature changes due to its environment
5		to stay alive in a difficult situation
6		to move from one place to another
7		not covered or hidden
8		continuing in the same way over time
9		series of changes or actions
10		existing inside the body