

Define **homeostasis**. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Why is **homeostasis** important? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Using temperature as an example, explain what is meant by tolerance limits. Draw a diagram as part of your answer.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

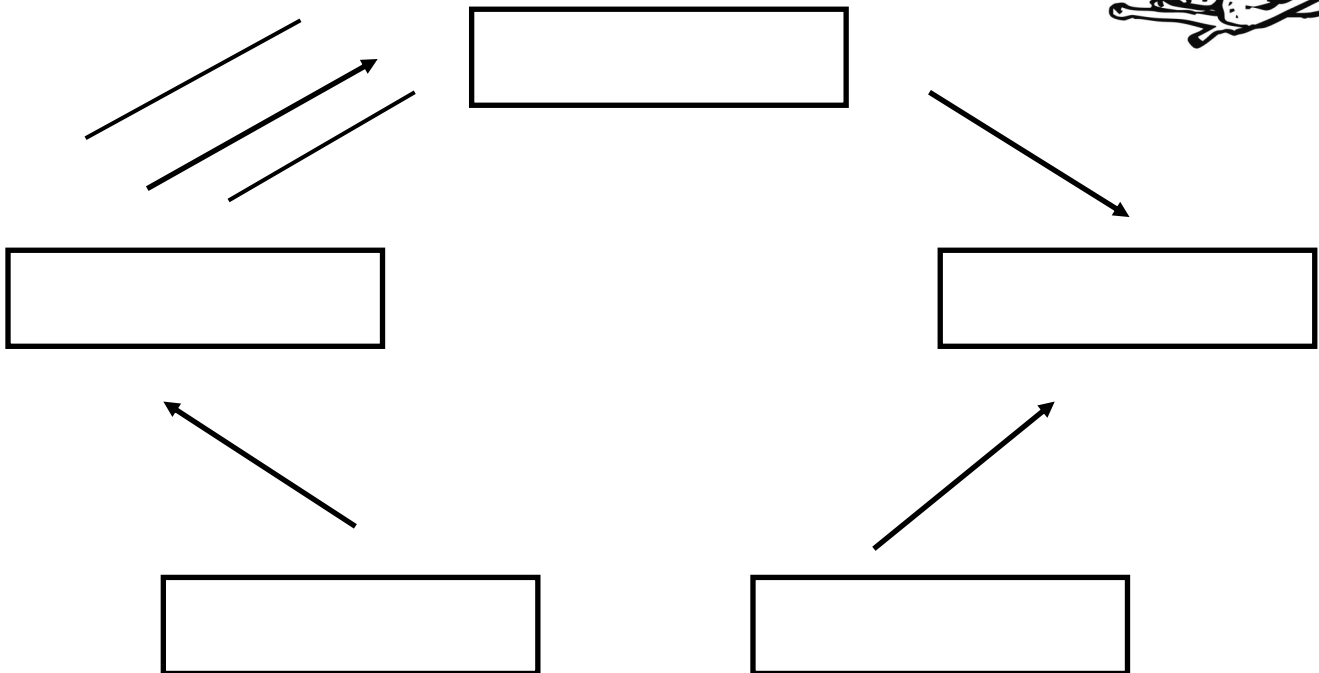
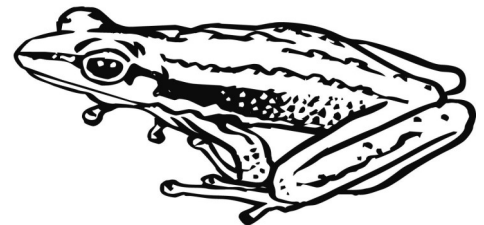
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Label this diagram of the **Stimulus Response Model**.



What is **negative feedback** and why is it important in maintaining homeostasis?

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What is **positive feedback** and why can it be harmful in maintaining homeostasis?

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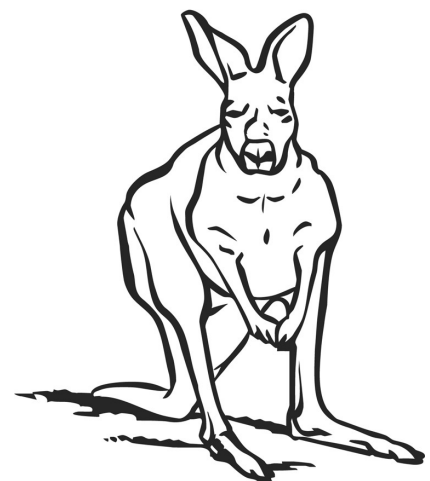
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Draw and label the negative feedback model for glucose level regulation.

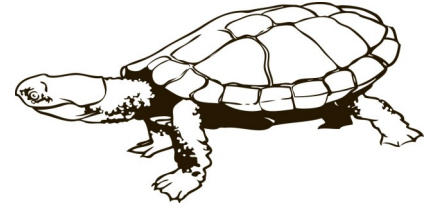
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Define **osmoregulator**. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

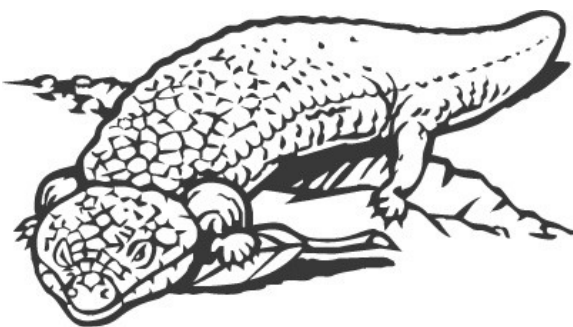
Define **osmoconformer**. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



When is **nitrogenous waste** produced during metabolic processes?  
\_\_\_\_\_  
\_\_\_\_\_

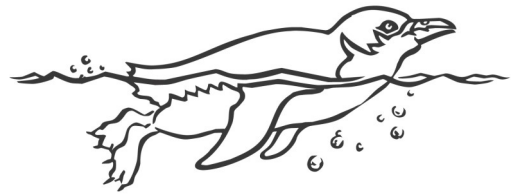
Where is this waste removed from the blood and in what forms can it be excreted?  
\_\_\_\_\_  
\_\_\_\_\_

How does this excretion effect water balance? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**Thermoregulation on land and at sea.**

Little penguins face two distinct environments and many temperature challenges. List three behaviours, structures or processes that are used to promote temperature homeostasis in these two environments.



Reduce the risk of overheating on land	Reduce the risk of heat loss at sea
1.	1.
2.	2.
3.	3.

Visit the Penguin Plunge to see Perth Zoo’s Little Penguins. Observe the colony for 10 minutes and make a tally of the following behaviours.

Scientific Name: \_\_\_\_\_

Distribution: \_\_\_\_\_

Time of Day: \_\_\_\_\_

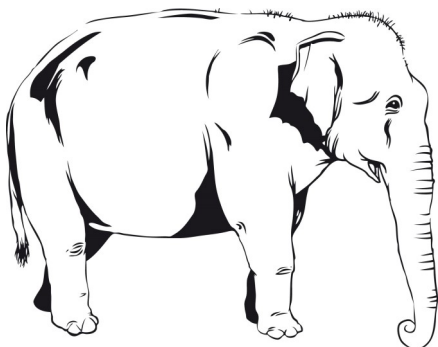
Ambient Conditions (please circle):                  hot                  mild                  cold  
    dry                  wet

Behaviour	Tally	Thermoregulation effect
Swimming		
Preening		
Standing in the shade		
Standing in the sun		

**Thermoregulation in gigantotherms.**

Asian elephants face temperature regulation issues that come with a large body mass in a tropical environment.

List five behaviours, structures or physiological processes that Asian elephants use to promote temperature homeostasis in a tropical environment.



1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_



**Thermoregulation on the Savannah.**

**Did you know** that African lions have very few sweat glands, so they are unable to use sweating as an affective method of thermoregulation?

African lions use a variety of behavioural adaptations to regulate their temperature in the heat of the Savannah. Observe the lions and complete the following details.

Scientific Name: \_\_\_\_\_

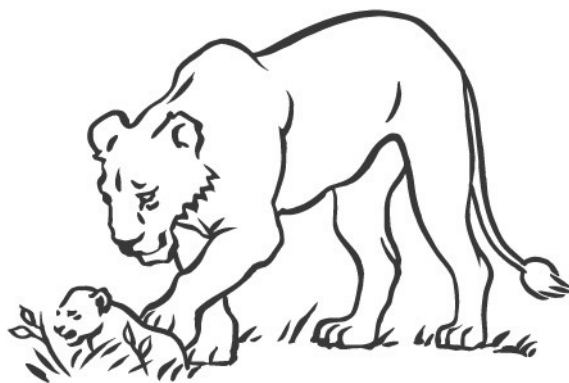
Distribution: \_\_\_\_\_

Time of Day: \_\_\_\_\_

Conditions (please circle):      hot      mild      cold  
    dry      wet

List three behaviours exhibited by the lions and the way this helps regulate their temperature.

Behaviour Observed	Thermoregulation Effect



### Thermoregulation Challenges and Adaptations

Most organisms are classified as homeothermic endotherms or poikilothermic ectotherms.

Match the term with its definition.

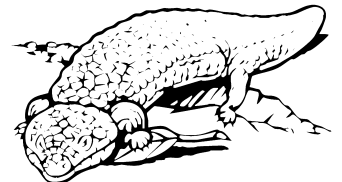
endothermic	Organism depends on absorbing heat from the external environment.
ectothermic	Organism can maintain a relatively constant body temperature.
homeothermic	Organism retains heat generated from metabolic activity.
poikilothermic	Organism's body temperature fluctuates with environmental temperature.

**Visit the Reptile Encounter** and select a **poikilothermic ectotherm** to study. Fill in the following information for your chosen organism.

Common Name: \_\_\_\_\_

Scientific Name: \_\_\_\_\_

Distribution: \_\_\_\_\_



Animal activity observed: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Factor	Maintenance of homeostasis through...
Temperature	_____
	_____
Water balance	_____
	_____
Nitrogenous waste	_____
	_____



### Thermoregulation Challenges and Adaptations

**Visit the Australian Bushwalk** and observe our mob of Western Grey Kangaroos. Fill in the following information.

Scientific Name: \_\_\_\_\_

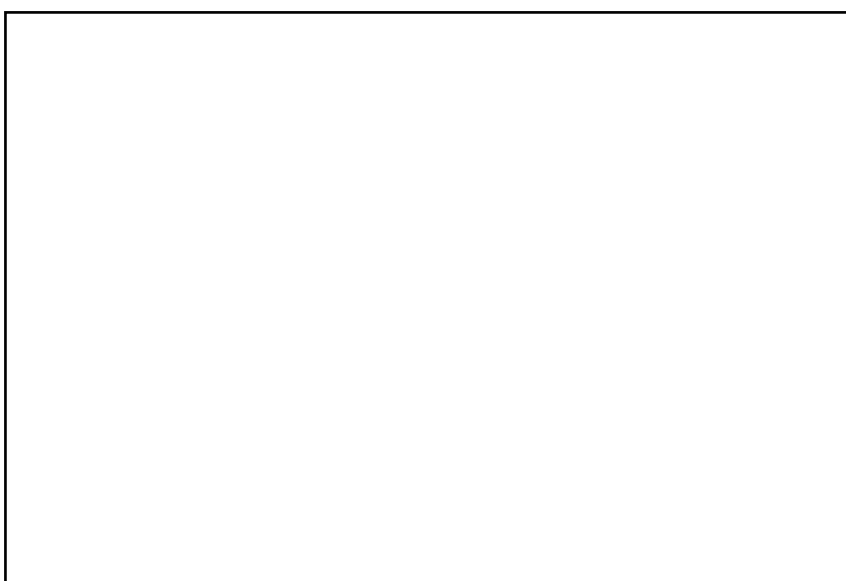
Distribution: \_\_\_\_\_

Time of Day: \_\_\_\_\_

Conditions (please circle):      hot      mild      cold  
   dry      wet

Animal activity observed: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Factor	Maintenance of homeostasis through...
Temperature	_____
	_____
Water balance	_____
	_____
Nitrogenous waste	_____
	_____



Draw and label a diagram of a Western Grey Kangaroo, highlighting adaptations for homeostasis.



## Surviving in a harsh environment

Arrange a time to meet your supervisor at the **Nocturnal House** to see the **Spinifex Hopping-mouse**.

Fill in the following based on your observations and learning about osmoregulation.

Scientific Name: \_\_\_\_\_

Distribution: \_\_\_\_\_

Behavioural adaptations for osmoregulation: \_\_\_\_\_

Structural adaptations for osmoregulation: \_\_\_\_\_

Physiological adaptations for osmoregulation: \_\_\_\_\_

### Follow up investigation.

Using your textbook and reliable internet sources compare and contrast the structure of the kidney of the Spinifex Hopping-mouse with that of a human. Include labelled diagrams in your explanation and highlight the osmoregulation properties of both.

