



How is the Southern Ground-Hornbill adapted to life on land?

Aim: To understand that animals are evolutionarily adapted to their environments, and how specifically the Southern-Ground Hornbill is adapted to a mainly ground-dwelling lifestyle.

Objectives

Students will be able to:

1. Know the main characteristics of the Southern Ground-Hornbill.
2. Understand how anatomy relates to behavioural adaptations.
3. Learn about Southern Ground-Hornbill social structure and hunting strategy.

Materials Needed:

Plain Paper (per student)

Fact sheets 1 and 2 (1 set per pair of students)

Colouring Sheet 1 (per student)

Computer/projector to show videos

Video 1- https://www.youtube.com/watch?v=J_k1x0llBwc

Video 2- <https://www.youtube.com/watch?v=ZhckdQHe4Lo>

Video 3- <https://www.youtube.com/watch?v=ci9igMFmosE>

Question Sheet 1 (per student) (Appendix A in this lesson plan)

Answer Sheet 1 (per teacher) (Appendix B in this lesson plan)

Keywords:

Adaptation

The evolutionary process whereby an organism becomes better able to live in its habitat or habitats.

Alpha pair

The highest-ranking breeding pair of animals within a group.

Casque

An enlarged area on top of a bird's beak.

Terrestrial/ land-based

Spends most of the time on the ground.

Prey

An animal killed by another to be consumed (for food).

Territory/ Territorial

An area lived in and defended by a species.

Plumage

A grouped collective term for all of a bird's feathers.

Primary feathers

The main flight feathers along the outer edge of a bird's wingtip. In Southern Ground-Hornbills, these are all white.

Field of view

The total area(s) that can be seen through a bird's eyes.

Forage

To actively search for food items.

Activities: (Approx. 60-minute lesson)

Activity	Description	Estimated Time (minutes)
1. Lesson Introduction	Introduce the Southern Ground-Hornbill (SGH) as the Bird of the Year.	5
1.1	Make known their conservation status (Endangered) in South Africa.	
1.2	Ask pupils to raise a hand if they have seen one before. If so, ask where.	
1.3	Explain lesson aims and objectives.	
2. Drawing Challenge	Pupils will get a description of different elements of the bird and the relevant adaptive uses. They are asked to draw what they think would be useful features.	10
2.1	Hand out paper to start the game.	
2.2	Legs and feet- must be strong to walk on land where it spends most of its time and quick to catch prey from the ground.	
2.3	Body- a large body covered in feathers to protect it from different weather conditions.	
2.4	Wings- this bird nests and sleeps in trees (also needs to chase prey on the wing and fly away from danger).	
2.5	Neck- To support the head and long, strong beak when catching or digging for prey, or fighting (and/or cf. 2.7)	
2.6	Eyes- good eyesight to spot prey but also to see the tip of the bill when feeding. Eyelashes that protect them.	
2.7	Beak- sharp to grab onto prey. They hunt other animals, such as frogs, hares, snakes.	
2.8	Get a few pupils to show their drawings to the class.	
3. SGH Information	Explain that the characteristics you described are those of the SGH. Show an image of what it actually looks like (provided at the end of this document).	10
3.1	Tell students to look out for different ways in which the SGH is adapted to its lifestyle during videos.	
3.2	Show video 1- tell students to pay attention to how they walk and scan the ground for food.	
3.3	Show video 2- tell students to pay attention to their head movement to swallow food items.	
3.4	Show video 3- point out how it uses its bill precisely to get to the meat of the tortoise.	
4. Worksheets	Hand out fact files 1 and 2 and the question sheets.	25
4.1	Ask students to fill out the question sheets using these resources.	
4.2	If some students finish quicker than others, give them colouring sheet 1 to colour in and write their favourite SGH facts they have learnt.	
5. Evaluation	Ask students to swap question sheets with the pupil next to them.	10
5.1	Read the answer sheet out loud and get them to peer mark each other- writing correct answers where necessary.	
5.2	Return answer sheets.	
5.3	Ask pupils to think of their favourite fact they have learnt about the SGH during this lesson and ask them to tell you what it is.	

How the Southern Ground-Hornbill is adapted to life on land

1. Name 4 identifying features of the Southern Ground-Hornbill. *(4 points)*

2. How do you tell the difference between males, females and juveniles? *(3 points)*

3. Southern Ground-Hornbills mainly walk rather than hop like most other hornbill species. Why is this? *(2 points)*

4. Describe the typical group dynamics of Southern Ground-Hornbills. *(2 points)*

5. What is the size of their permanent territories? *(1 point)*

6. Why do they have good eyesight? (1 point)

7. What's special about their bone structure? (1 point)

8. What are the five main animal groups that their diet consists of? (5 points)

9. Name two ways in which they are specially adapted to hunt their prey. (2 points)

10. Why do you think 'gifting' is an important behaviour between individuals? (1 point)

BirdLife South Africa's Bird of the Year 2020**How the Southern Ground-Hornbill is adapted to life on land**

1. Name 4 identifying features of the Southern Ground- Hornbill. (4 points)
 - *Large size*
 - *Black plumage*
 - *Red neck*
 - *Red face*
 - *Stout legs*
 - *White upper wing coverts in flight*
 - *Large bill with casque*
 - *Large and wide wingspan*

2. How do you tell the difference between males, females and juveniles? (3 points)
 - *Males have a red face and neck.*
 - *Females have a violet throat patch.*
 - *Juveniles have a light-yellow coloured face and neck.*

3. Southern Ground-Hornbills mainly walk rather than hop like most other hornbill species. Why is this? (2 points)
 - *They walk effectively as they walk on their tiptoes/end joints of their toes. The elongated tarsus and tiptoes increase stride length.*
 - *This allows them to walk quickly to hunt and avoid predators.*

4. Describe the typical group dynamics of Southern Ground-Hornbills. (2 points)
 - *2-12 individuals.*
 - *Comprised of an alpha breeding pair and young males and immatures.*

5. What is the size of their permanent territories? (1 point)
 - *50-100 km²*

6. Why do they have good eyesight? (1 point)
 - *To scan for prey items on the ground and in low vegetation. They can see the end of their bill in their field of view to help them precisely pick up food items.*

7. What's special about their bone structure? (1 point)
 - *Their first two neck vertebra are fused.*

8. What are the five main animal groups that their diet consists of? (5 points)
 - *Arthropods*
 - *Reptiles*
 - *Amphibians*
 - *Mammals*
 - *Birds (Aves)*

Explain to students why the 'small birds and mammals' is not one animal group as birds are not classed as mammals but are Aves. Birds are now classified as derived from feathered theropod dinosaurs (= reptiles?), not in their own order but rather in the class Aves.

9. Name two ways in which they are specially adapted to hunt their prey. (2 points)
 - *Strong bill to dig*
 - *Sharp eyesight to find prey*
 - *Beak in field of view for precision*
 - *Leg structure and walking speed*
 - *Neck vertebra for strength.*

10. Why do you think 'gifting' is an important behaviour between individuals? (1 point)
 - *Strengthens social bonds and solidifies group structure.*

Attachment A: Southern Ground-Hornbill Image



Sourced from:

[https://commons.wikimedia.org/wiki/File:Southern_Ground_Hornbill_\(Bucorvus_leadbeateri\)_male_\(12714625605\).crop.jpg#/media/File:Southern_Ground_Hornbill_\(Bucorvus_leadbeateri\)_male_\(12714625605\).crop.jpg](https://commons.wikimedia.org/wiki/File:Southern_Ground_Hornbill_(Bucorvus_leadbeateri)_male_(12714625605).crop.jpg#/media/File:Southern_Ground_Hornbill_(Bucorvus_leadbeateri)_male_(12714625605).crop.jpg)