
Cheltenham
Gloucester
HOSPITALS CHARITY
Lions at Large
Leaders in action
KS3-KS4 resource pack
spirax sarco

This activity pack contains multiple activity sheets students will need to complete activities. Lookout for the download links.

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01

Pride hunt simulation

The aim is for students to design the most effective hunt strategy using a map of the savannah. They must strategically assign roles, analyse the terrain, and plan their approach to maximise their pride's chances of successfully catching prey.

Students will work within groups to assign roles and plan tasks efficiently. Together they will understand the challenges lions face in securing prey and how each team member (lion role) contributes to success.

ACTIVITY TIME
1 HOUR 20 MINS

What you need

+ Printer
+ Large printed or digital maps of a savannah ecosystem
+ Role cards, prey profiles and terrain features. Click the button to download
+ Pens, sticky notes, and markers (if using physical maps)
+ Optional: Timer for keeping track of stages

DOWNLOAD ROLE CARDS

COLLABORATION

Basic dynamics of Lion prides and cooperative hunting

Structure of a Lion Pride

- Lion prides typically consist of 3-15 lions, with related females (lionesses), their cubs, and a few males
- Lionesses are the main hunters, while males primarily defend the pride and territory
- Cooperation within the pride is crucial for successful hunts, especially when targeting larger prey like zebras or wildebeests

Cooperative Hunting Behaviour

- Lions hunt as a group to take down prey too large or fast for a single lion
- Hunting in groups improves efficiency, as lions use stealth, ambush techniques, and distractions to corner and tire prey
- They work silently and use natural features of the savannah—like tall grass, rocks, or riverbanks—for cover during the stalk

Key challenges in a Lion hunt:

Prey Detection

Lions often spot prey from a distance using their keen eyesight and sense of smell. Prey detection may be influenced by time of day (lions often hunt at dusk or dawn) and wind direction (to avoid their scent being detected).

Stealth

Lions rely on stealth to get close to prey before launching an attack. Tall grass and uneven terrain help them stay hidden. A good stalk requires careful planning to avoid alerting prey prematurely.

Coordination and Role Assignment

Different members of the pride take on specific roles to increase hunting success. Communication is subtle, often through body language and positioning rather than vocal cues.

Timing the Attack

If the lions strike too soon, the prey will escape, but waiting too long increases the risk of being detected.

COLLABORATION

Explanation of Roles in the Simulation:

Lead Lioness

The team leader who oversees the plan and makes final decisions. The lead lioness is responsible for assigning tasks, ensuring coordination, and initiating the final stage of the hunt. The Lead lioness acts as the primary decision-maker if unexpected challenges arise.

Stalker

Responsible for planning the approach route and ensuring the pride gets as close to the prey as possible without being detected. Chooses cover and optimal terrain to hide behind, analysing the wind direction and prey movement.

Ambusher

Positioned strategically near where the prey is expected to pass, ready to attack when the prey is driven toward them by the stalkers or distractors.

Tips for teachers

- Stress the importance of collaborative problem-solving. Each role complements the others, and success depends on how well the team works together to overcome challenges like detection and terrain difficulties.
- Consider giving hints during the activity (highlighting areas of dense cover on the map) to guide teams in refining their strategies.

Instructions

1. Introduction & setting the scene (10 min)

Teacher/facilitator explains the basic dynamics of lion prides and how they hunt cooperatively

- Highlight the key challenges: prey detection, stealth, coordination, and timing
- Explain the objective: Design the most effective hunt strategy using provided resources

Introduce roles within the team:

Lead Lioness: Oversees the plan and gives final decisions.

Stalker: Plans approach routes to get as close as possible undetected.

Ambusher: Sets up in a concealed location, ready to spring into action.

Distraction team: Helps confuse the prey during the chase.

Cub protector: Ensures young lions remain safe and avoid injury.

2. Team planning (25 min)

Teams (of 3-5 students) gather around their maps and assign roles.

Each team analyses the following:

Prey behaviour: Understanding how the chosen prey responds to threats.

Terrain: Identifying areas for stealthy approaches, ambush spots, or risky open terrain.

Hunt strategy: Deciding the sequence of events — who does what, where, and when.

Collaboration: Ensure everyone contributes to planning; no one should work alone.

Teams must draw their plan on the map and note down key steps.

Tip: Encourage students to consider backup plans in case the prey escapes or the initial strategy fails.

3. Simulation & presenting the strategy (30 min)

One team at a time presents their strategy to the group, describing how their pride will hunt the prey.

Key details to explain:

- Why they chose their specific prey
- How terrain features influenced their decision
- The roles of each pride member and how they collaborate
- What their backup plan is if the prey escapes

4. Debrief & discussion (15 min)

Teams reflect on what worked well and what could be improved in their strategy

Discuss the following:

- What were the most important factors affecting their decisions?
- How does collaboration in a lion pride compare to teamwork in real life?
- How do environmental challenges affect the chances of success?

Reflection

- Did the team address key factors (prey, terrain, roles)?
- How well did they collaborate and assign tasks?
- Did they anticipate risks and develop solutions?

COLLABORATION

Key steps for a successful hunt

1. Assess the environment

Start by analysing the terrain features on the map:

- Identify nearby tall grass patches to use as cover during the stalking phase
- Take note of the rocky outcrops for ambush positioning
- Identify waterholes or rivers where prey may be drinking or passing by

2. Select the target prey

Choose a prey based on its location and vulnerability:

- **Zebras and wildebeests** are slower than gazelles but travel in herds. Isolate an individual if possible
- **Gazelles** are fast and alert but can be ambushed effectively using terrain

3. Assign Lion roles

Lead Lioness: Oversees the overall plan and ensures coordination of the pride.

Stalkers: Move through tall grass or along rocky outcrops to get as close as possible without being detected.

Ambushers: Position near waterholes or on elevated areas (rocky outcrops) to launch surprise attacks.

Distraction Team: Flanks or chases the prey, driving it toward the ambushers.

4. Plan the stalking phase

- Stalkers begin their approach using tall grass or terrain features as cover
- Ensure that the wind direction is favourable (so the prey doesn't detect the lions by scent)
- Move slowly and stay low to avoid detection

5. Position ambushers strategically

- Place ambushers near the prey's escape route
- If the prey is drinking at a waterhole, ambushers should stay hidden nearby until the right moment

6. Initiate the chase

Choose a prey based on its location and vulnerability:

Distraction team: initiates the chase, causing the prey to flee toward the ambushers.

The stalkers: may also join the chase, applying pressure to the prey.

The ambushers: spring into action as soon as the prey enters their zone.

7. Capture the prey

The ambushers: aim to intercept the fleeing prey.

Stalkers and the distraction team: converge if needed to assist in the final capture.

Backup Plan

If the initial attempt fails, regroup the pride and plan a new strategy. Use waterholes or rocky outcrops to set a more effective ambush location.

Tip

Adjust the plan based on the prey's reaction. Lions are successful in about 25% of hunts, so being adaptable is key.

02

The savannah ecosystem

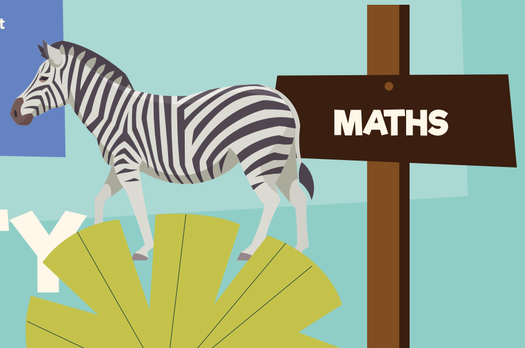
ACTIVITY TIME
1 HOUR 30 MINS

What you need

+ Printer
+ Savannah species cards. Click the button to download
+ Large chart paper or digital mapping tool
+ Markers, sticky notes, or digital drawing tools
+ Energy flow calculation worksheet
+ Calculator (if needed)

DOWNLOAD SPECIES CARD

In this activity, students will construct a savannah ecosystem food web centred around lions, calculate energy transfer through trophic levels, and analyse how energy efficiency affects ecosystem dynamics.



ACTIVITY

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Instructions

1.Introduction & instructions (10 min)

Begin by introducing key concepts

Food webs: Show examples and explain how they differ from simple food chains

Tropic levels: Producers > Primary consumers > Secondary consumers > Tertiary consumers (apex predators)

The 10% rule: Explain that only 10% of the energy from one trophic level is passed to the next (the rest is lost as heat, respiration, etc.)

Key Context: In the savannah, lions are at the top of the food web, but their survival depends on the populations and energy flow through plants, herbivores, and decomposers.

2. Build the savannah food web (30 min)

Divide students into small groups (3-5 students per group)

Each group will use species cards representing key organisms in the savannah:

- **Producers:** Grass, acacia trees
- **Primary consumers:** Zebras, gazelles, wildebeests
- **Secondary consumers:** Hyenas, jackals
- **Tertiary consumers:** Lions
- **Decomposers:** Vultures, bacteria

3. Energy flow calculations (30 min)

Using the completed food web, apply the 10% rule to calculate energy flow between trophic levels.

Each group will be given a starting energy amount for the producers by your teacher. Work through the following example together as a class before groups calculate their own flows:

Example calculation

Producers (grass): 100,000 kcal
- 10% of 100,000 kcal = 10,000 kcal moves to primary consumers

Primary consumers (zebra, gazelle, wildebeest): 10,000 kcal
- 10% of 10,000 kcal = 1,000 kcal moves to secondary consumers

Secondary consumers (hyenas): 1,000 kcal
- 10% of 1,000 kcal = 100 kcal moves to tertiary consumers

Group task
- Each group will calculate the energy available at each level using their specific web
- Record energy amounts on their chart or worksheet

4. Group Discussion & Reflection (20 min)

Discussion questions:
- What happens if a drought significantly reduces grass growth?
- How do decomposers like bacteria and vultures help maintain ecosystem balance?
- Why are there fewer lions compared to zebras in the ecosystem?
- What human activities (poaching or habitat loss) can disrupt this balance?

Discussion Point

Ask students why the lion, being at the top of the food web, has so little energy available and what this implies for population sizes at each level.

Reflection

- Accuracy of connections and understanding of energy flow
- Energy Calculations and correct application of the 10% rule
- Critical Thinking and thoughtful responses during group discussion

Exemplar food web for savannah ecosystem activity

Exemplar food web layout

- **Producers:** Grass, Acacia tree
- **Primary Consumers:** Zebra, Gazelle, Wildebeest
- **Secondary Consumers:** Hyena, Jackal
- **Tertiary Consumer:** Lion
- **Decomposers:** Vulture, bacteria

Energy Flow: Grass > Zebra > Lion > Vulture (decomposer)

Visual representation

The arrows in the food web show the direction of energy flow.

1. Base level (producers)

- **Grass and Acacia trees** convert sunlight into energy through photosynthesis
- **Arrows** point from grass and trees to primary consumers

2. Primary consumers

- **Zebra, Gazelle, and Wildebeest** feed on the grass and acacia trees
- **Arrows** point from these herbivores to their predators (hyenas, jackals, and lions)consumers

3. Secondary consumers

- **Hyenas and jackals** hunt smaller herbivores like gazelles or scavenge larger prey
- **Arrows** connect secondary consumers to tertiary consumers and decomposers when applicable

4. Tertiary consumer

- **Lions** primarily hunt zebras, wildebeests, and gazelles
- **Arrows** point to lions as apex predators

5. Decomposers

- **Vultures and bacteria** break down organic matter from dead animals, returning nutrients to the soils
- **Arrows** show decomposition connecting dead matter to the decomposers

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Supporting teacher notes

Introduction to food webs

Begin by explaining the difference between food chains and food webs:

- Food chains represent a linear flow of energy, while food webs demonstrate interconnected energy flows
- Use simple examples before introducing the complexity of the savannah food web

2. Key concepts to emphasise

- **Trophic levels:** Producers, primary consumers, secondary consumers, and tertiary consumers
- **Energy flow:** Use the 10% energy transfer rule to explain why top predators like lions need large hunting ranges
- **Ecosystem balance:** Discuss what happens when a population at one level changes (e.g. over-hunting zebras)

3. Activity breakdown

1. Building the food web (30 min)

- Provide students with species cards and let them arrange the organisms on a large chart or digitally
- Encourage students to draw arrows showing the direction of energy flow
- Check for correct placement of arrows, ensuring energy flows correctly from producers to decomposers

2. Energy flow calculation (30 min)

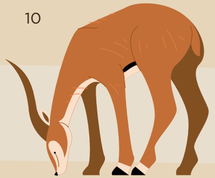
- Provide students with a starting amount of energy (example: 100,000 kcal at the producer level)
- Work through the 10% rule as students calculate the energy available at each level
- Highlight why less energy reaches the top predators (lions), making them vulnerable to ecosystem changes

4. Discussion questions (20 min)

- **What happens if a drought significantly reduces grass growth?**
  If grass growth is reduced, primary consumers like zebras and wildebeests will face food shortages, leading to population declines. This affects the entire food web, reducing available prey for predators like lions.
- **How do decomposers like bacteria and vultures help maintain ecosystem balance?**
  Decomposers recycle nutrients by breaking down dead animals and organic matter, returning essential nutrients to the soil. This supports plant growth, ensuring a continuous energy supply in the ecosystem.
- **Why are there fewer lions compared to zebras in the ecosystem?**
  Lions are at the top of the food chain and rely on energy transferred through several trophic levels. Due to energy loss (10% rule) at each level, there is less energy available to support large populations of apex predators.
- **What human activities (poaching or habitat loss) can disrupt this balance?**
  Poaching reduces key species like lions or their prey, breaking the food web. Habitat loss reduces space for grazing, leading to food shortages. Both can cause cascading effects that destabilise the entire ecosystem.

Example table for energy transfer

Trophic level	Organism(s)	Starting energy (kcal)	Energy transferred (10%)	Remaining energy (90%)
Producers	Grass, Acacia	100,000	10,000	90,000
Primary Consumers	Zebra, Gazelle	10,000	1,000	9,000
Secondary Consumers	Hyena, Jackal	1,000	100	900
Tertiary Consumer	Lion	100	10	90



Scenario 2

Trophic level	Organism(s)	Starting Energy (kcal)	Energy Transferred (10%)	Remaining Energy (90%)
Producers	Grass, Acacia	200,000	20,000	180,000
Primary Consumers	Zebra, Gazelle	20,000	2,000	18,000
Secondary Consumers	Hyena, Jackal	2,000	200	1,800
Tertiary Consumer	Lion	200	20	180

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Scenario 3

Trophic level	Organism(s)	Starting Energy (kcal)	Energy Transferred (10%)	Remaining Energy (90%)
Producers	Grass, Acacia	50,000	5,000	45,000
Primary Consumers	Zebra, Gazelle	5,000	500	4,500
Secondary Consumers	Hyena, Jackal	500	50	450
Tertiary Consumer	Lion	50	5	45

Tip

Encourage students to think creatively and draw real-world connections to modern conservation challenges.

03

Leadership in the pride

Students will work in teams to assume leadership roles in a lion pride.

They will make key strategic decisions, using critical thinking and leadership skills to balance survival, energy, and cooperation within the pride. The goal is to successfully navigate e challenges related to hunting, competition, and environmental changes.

ACTIVITY TIME
1 HOUR 30 MINS

Skills developed

+ **Critical thinking and adaptive problem-solving**
+ **Collaboration and team-based leadership**
+ **Strategic planning and risk assessment**

DOWNLOAD SCORING WORKSHEET

COLLABORATION

Instructions

1.Introduction & scenario setup (10 min)

Introduces the activity by explaining the importance of decision-making and leadership within the pride, and presents the core scenario of surviving the challenging season.

2. Team formation & role assignment (5 min)

Split students into groups of 4-5 and assign the roles within each lion pride: Lead Lioness, Deputy Leader, Stalker Coordinator, Ambusher Coordinator, and Cub Protector.

Phase 1: Planning the hunt (20 min)

- Teams choose a hunting strategy by analysing the risks, energy costs, and prey availability
- Discussion within the group on which roles to prioritise during the hunt
- Teams submit their decisions on location and role assignments

Phase 2: Handling competition & setbacks (20 min)

- Introduces one of the surprise scenarios (hyena encounter, escaping prey, or a thunderstorm)
- Teams deliberate and make their decision on how to respond
- They document their reasoning and next steps

Phase 3: Managing Energy & Long-Term Survival (15 min)

- Teams evaluate their pride's energy levels and make a decision on whether to rest, split, or continue aggressive hunting
- They record their final decision and justification

3. Presenting Decisions & Class Discussion (15-20 min)

- Each team presents their overall decisions, explaining how they adapted to challenges and what leadership qualities helped them
- Lead a reflection session focusing on how flexibility, decision-making, and collaboration affected success

Optional Extension (if time permits – 10 min):

- Explore additional conservation challenges (poaching or habitat destruction) and ask teams to adapt their strategies accordingly.

Scenario

Your lion pride is facing a difficult season. Prey availability has decreased, competition with other predators like hyenas h as intensified, and environmental changes have made hunting more dangerous. As leaders of the pride, your team must decide how to prioritise resources, assign roles during hunts, and adapt to new challenges.

Your goal

Ensure the survival and long-term success of the pride.

Activity structure and steps

1. Form Teams

Split students into groups of 4-5. Each group will act as a lion pride

- Within each group, assign roles: **Lead Lioness, Deputy Leader, Stalker Coordinator, Ambusher Coordinator, and Cub Protector**
- The Lead Lioness will make the final decisions based on team input

Phase 1: Planning the hunt

Challenge 1: Decide on the hunting strategy.

- **Waterhole**: High prey density, high risk of competition with hyenas
- **Open Plains**: Scattered prey, low cover for stalking
- **Grassland**: Fewer prey, excellent cover for stalking

Phase 2: Handling competition and setbacks

Challenge 2: Mid-hunt, you encounter an unexpected setback

Decision Point: As a team, decide how to respond:

- Do you chase the escaping prey?
- Do you confront the hyenas and protect your kill?
- Do you regroup and try a different location tomorrow?

Phase 3: Managing energy and long-term survival

Challenge 3: Balancing energy and rest.

- **Option A**: Rest for a day to conserve energy but risk missing potential prey
- **Option B**: Continue hunting aggressively to secure food but risk exhaustion
- **Option C**: Split the pride, with some members hunting and others resting

COLLABORATION

End of Simulation

After completing the challenges, each team will present their decisions and justify their choices based on leadership principles. They will explain:

- How they made decisions as a team
- The leadership qualities that helped them manage setbacks
- What they learned about collaboration, flexibility, and decision-making under pressure

Discussion Questions

1. How did your team manage disagreements during decision-making?
2. What leadership qualities were most important in guiding your pride to success or failure?
3. How do the lessons from this activity relate to leadership challenges in real life (in sports, school, or future careers)?

Optional Extension

Introduce a conservation aspect where teams must also consider threats from human activities, such as poaching or habitat destruction, and decide how to adapt.

Scenarios where the pride survives

SCENARIO 1.

Successful hunting strategy with balanced roles

- The pride chooses a hunting location with good prey density (near a waterhole or dense grass) and assigns roles effectively
- The stalkers successfully approach undetected, driving prey toward ambushers, who execute the final capture
- After the hunt, they manage their energy well, allowing for adequate rest before the next hunt

Key Outcome:
The pride secures enough food for survival, and cubs are well-fed and protected.

SCENARIO 2.

Adaptability to setbacks

- The pride starts a hunt but faces a challenge such as prey escaping or hyenas attempting to steal a kill
- Instead of giving up or panicking, the team quickly adapts by pursuing new prey or defending their kill
- They divide responsibilities effectively, with some lions protecting cubs while others handle threats

Key Outcome:
The pride avoids major losses, manages to secure enough food, and conserves enough energy to recover.

SCENARIO 3.

Good resource and energy management

- After a successful hunt, the pride doesn't overextend itself by immediately seeking more prey
- The team decides to rest and recover, ensuring cubs and weaker members regain strength
- They avoid unnecessary risks, like hunting in open plains with little cover

Key Outcome:
The pride maintains a sustainable hunting and resting cycle, promoting long-term survival.

COLLABORATION

Scenarios where the pride does not survive

SCENARIO 1.

Poor role assignment and coordination

- The pride chooses a hunting strategy that lacks coordination. For example, two few lions are assigned as stalkers, and prey detects them early
- Ambushers are positioned incorrectly, resulting in missed opportunities to catch prey
- Poor communication causes confusion during the hunt, leading to wasted energy

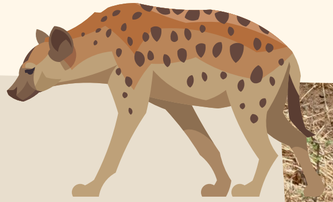
Key Outcome:
The pride fails to secure food, leading to hunger and weakness.

SCENARIO 2.

Overexertion without rest

- After a successful hunt, the pride immediately moves to a new location without allowing time for rest
- Weaker pride members, including cubs, become exhausted and vulnerable
- When the next hunt fails due to fatigue, the pride lacks the energy to continue

Key Outcome:
Fatigue and hunger cause the pride to lose members, putting its survival at risk.



SCENARIO 3.

Failure to adapt to environmental changes

- A drought reduces prey availability, but the pride continues hunting in the same location without adapting
- They don't consider moving to a different area with better prey density or changing their hunting strategy
- As prey becomes scarce, hyena competition further depletes available resources

Key Outcome:
The pride suffers from food shortages and increased competition, leading to gradual decline.

SCENARIO 4.

Ignoring threats from competitors

- The pride successfully hunts but fails to guard the kill from a large group of hyenas
- Hyenas steal the food, and the pride is left with insufficient energy to attempt another hunt
- The decision to chase or fight hyenas results in injuries and wasted energy

Key Outcome:
The pride weakens due to lack of food and injuries, making future hunts even harder.

Tip

- Allow students to experience both success and failure scenarios to emphasise the importance of adaptability and decision-making
- Use hypothetical follow-up questions to extend learning e.g. What could the pride have done differently? Or How could better planning have avoided this?

ROAAAARRRR

04

Tracking the Lion pride

ACTIVITY TIME
1 HOUR

Students will use mathematical concepts such as ratios, percentages, averages, and probability to simulate the survival of a lion pride. The activity involves calculating energy intake, success rates of hunts, and the impact of various scenarios on the pride's survival over time.

What you need

+ Printer & scissors
+ Scenario cards. Cards will need cutting. Click the button to download
+ Worksheets for calculations
+ Calculator (optional)

DOWNLOAD RESOURCES

MATHS

Instructions

Step 1: Introduction (10 min)

Explain to students that they are tracking the survival of a lion pride over 7 simulated days. Each day involves a hunting attempt, and their goal is to calculate whether the pride can survive based on energy intake, expenditure, and the probability of success.

Step 2: Setting the scene (5 min)

Provide students with the following background information:

- **Energy Requirement:** The pride requires 100,000 kcal per day to survive (shared among the lions)
- **Prey Energy Values:**
  Gazelle: 30,000 kcal
  Wildebeest: 60,000 kcal
  Zebra: 80,000 kcal
- **Success Rates (Probability):**
  Gazelle: 50% chance of success
  Wildebeest: 40% chance of success
  Zebra: 30% chance of success

Step 3: The daily hunt (25 min)

Students will simulate 7 days of hunting and track the following information for each day:

1. Draw a scenario card at random and apply its effect. Example, if the Rainstorm card is drawn, success rates are reduced by 10% for that day. Record the card on the worksheet so students can track how it affected their success.
2. Choose the prey for the day (Gazelle, Wildebeest, or Zebra).
3. Roll a die or use probability charts to determine whether the hunt is successful (based on success rates provided)
4. If successful, record the energy gained. If unsuccessful, record 0 kcal.
5. Calculate the remaining energy requirement for the day and check whether the pride survives or if they suffer hunger.

Example Calculation for Day 1:

Prey chosen: Wildebeest

Probability check: Roll a die – if it's 1 or 2, the hunt is successful (40% chance)

Hunt result: Successful > Energy gained = 60,000 kcal

Remaining energy needed: 100,000 - 60,000 = 40,000 kcal (deficit)

Step 4: Calculate averages and percentages (10 min)

After the 7-day simulation, students will calculate:

- The average energy intake per day
- The percentage of successful hunts
- The number of days the pride met their daily energy requirement

Step 5: Reflection and discussion (10 min)

- What hunting strategies (prey choice) were most effective?
- How did probability and luck play a role in the pride's survival?
- What changes could be made to improve the pride's chances of survival in a real-world scenario?

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Probability Chart

Prey	Success Rate %	Energy Gained	Roll Range	Scenario Expansion
Gazelle	50%	200,000	20,000	1-6
Wildebeest	40%	20,000	2,000	1-6
Zebra	30%	2,000	200	1-6

Expansion explained

- Under normal conditions, students use the base roll range for prey success.
- If favourable scenarios are applied (e.g. using the Ideal Conditions or Strong Wind scenario cards), success rates expand to 1-6 on a 6- sided die, increasing the probability of successful hunts.

Example:

- Under normal conditions, a zebra hunt requires a roll of 1 to succeed
- With favourable conditions applied, rolls 1 through 6 result in a successful hunt

05

Wildlife monitoring system design

ACTIVITY TIME
1 class period
(1 hour)

Students will develop and manage a simple database to track wildlife populations in a digital wildlife reserve. They will create a spreadsheet or database, input wildlife data, and generate visual reports (charts or graphs) to help with conservation decision-making.

What you need

+ **Printer**
+ **Computers with spreadsheet or database software**
+ **Wildlife population and habitat data. Click the button to download**
+ **Projector or whiteboard for teacher demonstrations**

DOWNLOAD RESOURCES

Instructions

1. Introduction to data management (10 min)

Discuss: How wildlife reserves rely on accurate data to monitor animal populations, track migration patterns, and manage resources.

Explain: How spreadsheets or databases can help store large datasets and allow for meaningful analysis and visualisation.

Real-World Connection: Mention wildlife conservation organisations that use digital tracking systems e.g. WWF or national parks.

2. Create a wildlife monitoring database (15 min)

1. Create columns

Students will create a table or database with the following fields:

- Species name
- Habitat zone
- Population count
- Daily food/water needs
- Threat level (endangered, stable)
- Last sighting date

3. Formatting

Students will apply basic formatting to make the data easier to read e.g. bold headers, coloured cells for critical values.

3. Analyse the Data (15 min)

Step 1: Sorting and filtering

- Sort animals by population size to identify which species need immediate attention
- Filter the table to show only endangered or vulnerable species

Step 2: Calculating resource needs

- Use spreadsheet formulas (e.g., SUM or AVERAGE) to calculate total food/water requirements per habitat zone

Step 3: Identify trends

- Use conditional formatting to highlight species with critically low populations or long periods since their last sighting

4. Visualise the data (10 min)

Create charts or graphs to display key insights:

- Population trends: A bar chart showing population size by species
- Resource needs: A pie chart comparing daily food/water consumption across species
- Threat levels: A colour-coded graph showing the status of species (endangered, vulnerable, stable)

5. Presentation and discussion (5 min)

- Students can present their visualisations and explain any insights they discovered, such as species at risk or zones requiring more resources
- Discuss how data-driven decisions can improve wildlife conservation efforts

Optional extension

GIS MAPPING

Use simple mapping tools e.g. Google Earth to visualise where each species is located within the reserve.

ADVANCED DATABASES

Have students explore more complex database functions like queries or relational databases using software like MS Access or SQL.

SCENARIO SIMULATION

Introduce a crisis event e.g. drought or poaching and have students update their database and recommend changes based on the new data.

ACTIVITY

06

Nature-inspired engineering

ACTIVITY TIME

1-2 class periods

(1 hour each)

What you need

+ **Printer**
+ **Lion Anatomy & Hunting behaviour sheets. Click the button to download**
+ **Paper, sketchbooks, or digital design tools for planning**
+ **Prototyping materials (cardboard, LEGOs, motors, sensors – if available for hands-on builds)**
+ **Markers, rulers, and drawing materials**

Students will explore how lion anatomy and behaviour can inspire innovative designs in robotics and technology.

By analysing key features of lions, students will develop prototypes for a robot or machine that mimics specific lion characteristics such as speed, stealth, and cooperation.

DOWNLOAD RESOURCES

DESIGN & TECHNOLOGY

ACTIVITY

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Instructions

1. Introduction (10 min)

Begin by explaining biomimicry as the process of drawing inspiration from nature to design solutions for human challenges.

Examples: Velcro (inspired by burrs), bullet trains (inspired by kingfisher beaks), drones (inspired by birds and insects)

- Introduce the lion as the focus for the lesson. Discuss how lions' speed, agility, and group coordination during hunts make them ideal models for biomimicry in robotics and engineering

2. Analyse Lion anatomy and behaviour (15 min)

Provide students with videos, diagrams, and descriptions of key lion characteristics. Focus Areas for Analysis:

- **Muscle strength and power:** Lions use strong leg muscles for rapid acceleration and pouncing
- **Stealth and stalking:** Lions move silently through tall grass to surprise prey
- **Group coordination:** Lion prides work together to encircle and ambush prey
- **Claws and paws:** Lions have retractable claws and padded paws for grip and stealth
- **Vision and night hunting:** Excellent night vision allows lions to hunt effectively in low light

3. Design challenge: Nature-inspired robot (25 min)

1. Choose a Lion feature to mimic

- Select a specific lion feature (speed, stealth, group coordination) to focus on in your design
- Decide whether your design will be a robot, vehicle, or another type of machine

2. Ideas and sketching

- Create a rough sketch of your design, showing how the chosen lion feature is incorporated
- Annotate the design to explain the purpose of each component e.g. padded feet for silent movement or retractable claws for gripping rough surfaces

3. Consider Engineering Principles

Discuss how you could incorporate materials, sensors, and mechanisms. For example:

- Motors to mimic powerful leg muscles
- Sensors to detect prey or obstacles (like night vision)
- Hinges or flexible joints for agile movement surfaces

4. Presentation and peer review (15 min)

- Each student or group presents their design concept to the class
- The audience can ask questions and provide constructive feedback
- Encourage students to suggest improvements or adaptations (combining two lion features in one design)

5. Reflection and discussion (10 min)

- What challenges did you encounter when designing your robot or machine?
- Which lion feature was the easiest or hardest to translate into a mechanical function?
- How could your design be improved if you had more time or resources?
- Can you think of real-world applications for your design (search-and-rescue robots, surveillance drones)?

Optional extension

PROTOTYPE CREATION

If time and resources allow, have students build simple prototypes using available materials e.g. cardboard and motors

DIGITAL DESIGN

Students can create digital 3D models using design software

Ideas

SPEED & POWER

Designing a fast robot or vehicle

Lion Feature: Strong leg muscles for quick acceleration and short bursts of speed (up to 50 mph).

IDEA

Design a high-speed robotic vehicle with spring-loaded or motorised legs mimicking a lion's explosive movements.

Engineering Tip: Include strong, retractable wheels or legs with a flexible suspension system for agility and off-road performance.

Real-World Application: Search-and-rescue robots or high-speed delivery vehicles in rough terrain.

STEALTH

Creating a silent, stealthy machine

Lion Feature: Padded paws and low-profile movement allow lions to stalk prey undetected.

IDEA

Design a surveillance robot or drone capable of moving quietly and avoiding detection.

Engineering Tip: Use noise-dampening materials (like rubberised pads) and low-speed, high-torque motors for silent operation.

Real-World Application: Military reconnaissance, wildlife monitoring, or security systems.

GROUP COORDINATION

Designing cooperative robots

Lion Feature: Lions hunt in coordinated groups, using teamwork to encircle and ambush prey.

IDEA

Design a swarm of small, cooperative robots that can communicate and work together to achieve a task (like surrounding and capturing a target).

Engineering Tip: Use sensors and simple communication protocols (e.g. infrared or wireless signals) for coordination.

Real-World Application: Collaborative drones for disaster response, delivery, or search-and-rescue missions.

VISION & NIGHT TRACKING

Creating a vision-enhanced robot

Lion Feature: Lions' excellent night vision allows them to hunt in low light.

IDEA

Design a robotic explorer equipped with night vision cameras and sensors to detect objects in darkness.

Engineering Tip: Integrate thermal imaging and light-sensitive sensors to enhance low-light performance.

Real-World Application: Robots for night-time surveillance, space exploration, or underground mining.

Ideas

CLAWS

Building a gripping or climbing machine

Lion Feature: Retractable claws help lions grip prey and climb rough surfaces.

IDEA

Design a climbing robot or gripping device that mimics the function of retractable claws.

Engineering Tip: Use spring-loaded or servo-based retractable claws that engage when needed for gripping or climbing.

Real-World Application: Wall-climbing robots for inspections or maintenance of tall buildings.

ENERGY EFFICIENCY & REST CYCLES

Self-sustaining machine

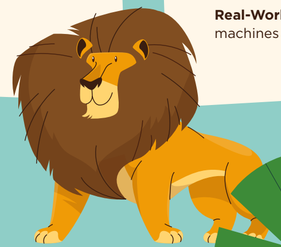
Lion Feature: Lions balance periods of activity with long rest to conserve energy.

IDEA

Design a self-regulating robot that can switch between active and idle modes based on energy consumption.

Engineering Tip: Incorporate solar panels or self-charging mechanisms and an energy-monitoring system.

Real-World Application: Autonomous agricultural machines or environmental monitoring devices.



TAIL & BALANCE

Stability-focused robot

Lion Feature: Lions use their tails for balance while making sharp turns or sudden movements.

IDEA

Design a robot with a balancing mechanism, where a counterweight or stabilising bar functions like a lion's tail.

Engineering Tip: Use gyroscopic sensors to detect changes in movement and adjust the balance automatically.

Real-World Application: Robotic animals or exploration robots for unstable terrain.

PREY DETECTION

Target-tracking robot

Lion Feature: Lions detect prey using sharp eyesight and hearing.

IDEA

Design a target-tracking robot capable of locating and locking onto a moving target.

Engineering Tip: Use motion detectors, heat sensors, and sound localisation technologies for accurate tracking.

Real-World Application: Automated drones or hunting robots for industrial purposes (locating defective machinery parts).

ROAAAARRRR

07

Lion migration corridor

ACTIVITY TIME
1 class period
(1 hour)

Students will map a wildlife corridor to support lion migration between fragmented habitats while analysing geographical features and human land use.

They will identify suitable routes for the corridor, avoid conflict zones, and propose sustainable solutions for conservation.

DOWNLOAD RESOURCES

What you need

+ **Printer**
+ **Sample data sheets. Click the button to download**
+ **Worksheet for recording findings and justification of corridor placement. Click the button to download**
+ **Large printed maps or digital mapping tools (Google Earth, GIS software, or printed topographic maps)**
+ **Markers, rulers, and graph paper (if working offline)**

GEOGRAPHY

ACTIVITY

Instructions

1. Introduction to Lion migration corridors (10 min)

Discuss: Lions require large hunting ranges and often migrate between protected areas to find prey, water, and safe habitats. Fragmentation of their habitats due to human activities e.g. farming, road construction leads to conflicts.

Real-World Example: The Masai Mara–Serengeti Lion Corridor in Kenya and Tanzania is a critical route for lions but is under pressure due to tourism and agricultural expansion.

Objective of Activity: Design a corridor that connects two protected lion habitats while minimising human-wildlife conflicts.

2. Analyse the map and geographical features (10 min)

Provide students with a map that includes:

- **Lion habitats:** Protected zones (starting and ending locations of the corridor)
- **Human land use:** Farmland, villages, and roads
- **Natural features:** Rivers, forests, grasslands, mountains
- **Water resources:** Lakes and watering points

Students will identify key constraints and opportunities for planning the corridor.

3. Design the Lion Migration Corridor (25 min)

Instructions for Students:

1. Map the Path. Draw a route connecting the protected lion habitats.

2. Consider Key Factors:

- Follow terrain that provides cover (grasslands, forests) to support lion movement
- Include access to water sources along the corridor
- Avoid human conflict zones (e.g. farmland, villages)

3. Mitigation Measures: If the corridor crosses conflict zones, suggest solutions such as wildlife overpasses, underpasses, or buffer zones.

4. Annotate the Map: Add labels explaining key decisions e.g. water point for lions, buffer zone to protect farmland.

4. Scenario Challenges (Optional Extension, 10 min)

Introduce dynamic environmental or human challenges:

Scenario 1: A new highway is planned through part of the corridor.

Scenario 2: Drought affects nearby water sources, forcing lions to change their route.

Scenario 3: Farmers report increased lion attacks on livestock near the corridor.

Students must adapt their corridor design or propose mitigation measures e.g. building artificial watering points or fencing near farms.

5. Presentation and peer review (10 min)

- Groups present their corridor designs and justify their route choices
- Peers and the teacher provide feedback, focusing on whether the corridor balances lion conservation with human land use

6. Reflection and discussion (5 min)

- How does habitat fragmentation affect lion populations and biodiversity?
- What real-world policies and strategies can support wildlife corridors e.g. protected area expansion, community-based conservation?
- How can we balance development and environmental protection?Justify their route choices

Activity Resources

MAPPING.

Digital mapping tools

Google Earth
Provides satellite imagery and terrain maps for identifying land use and natural features.

Instructions: Search for the Masai Mara or Serengeti to view real-world lion migration regions.

OpenStreetMap
Provides free, editable maps that can include layers for roads, water bodies, and settlements.

MAPPING.

Printed maps

Regional Maps of Africa
Provide a map highlighting key locations like the Masai Mara, Serengeti, or Kruger National Park.

Topographic Maps
Show elevation, rivers, and major landforms that could impact lion movement.

GEOGRAPHY

Sample data

Lion Population

Habitat zone: Protected zone A

Lion population: 35

Status: Stable

Habitat features:
Grasslands, prey availability (zebras, gazelles)

Human Activity

Activity: Farming

Location: Adjacent to Zone C

Description: Cropland for maize and vegetables

Potential conflict: Crop raiding by lions and elephants

DOWNLOAD RESOURCES

08

Lion hunt obstacle course

ACTIVITY TIME
1 class period
(1 hour)

Students will engage in a dynamic obstacle course simulating a lion's hunting process.

They will develop agility, speed, coordination, and teamwork while completing tasks that mimic stalking prey, sprinting, and pouncing.

What you need

+ Cones or markers to set up the course
+ Hula hoops or mats for pouncing areas
+ Small hurdles or balance beams for obstacles
+ Timer or stopwatch
+ Soft balls or bean bags
+ Whistle

Instructions

1. Warm-Up activity (10 min)

Dynamic Stretching: Include stretches that focus on leg muscles, core, and balance e.g. lunges, knee hugs, arm circles.

Lion walks: Have students practice stalking movements by walking low to the ground with bent knees.

PROMPT
Discuss the importance of agility, speed, and coordination in both lion hunting and sports.

ACTIVITY

2. Explain the Obstacle Course (5 min)

Set Up: Create a course that simulates the stages of a lion's hunt:

- **Stalking Zone:** Set up cones to create a zigzag path that students must navigate by staying low and moving quietly
- **Obstacle Zone:** Include small hurdles, balance beams, or ropes to simulate obstacles in the terrain
- **Sprint Zone:** A straight sprint section to simulate the final chase (10-15 meters)
- **Pounce Zone:** Place hula hoops or mats where students must pounce on their prey (a ball or bean bag)

3. Running the obstacle course (25 min)

Instructions:

Split students into small groups (3-4 students per group). One student from each group starts the course while the others wait for their turn.

Sequence of the Course:

- **Stalking Zone:** Stay low and move around the cones quietly
- **Obstacle Zone:** Jump over hurdles, balance on beams, or crawl under a net
- **Sprint Zone:** Sprint as fast as possible to the pounce area
- **Pounce Zone:** Jump into the hula hoop or mat and grab the prey target
- **Final Task:** Carry the prey back to the starting line (like lions dragging their catch)

Timing Option: Record each student's time to encourage friendly competition.

4. Cool down (5 min)

- Perform light stretching to relax muscles and reduce soreness
- Discuss which parts of the course were most challenging and how they relate to real lion behaviours

5. Reflection and discussion (5 min)

- Which skills did you need to be successful in the obstacle course e.g. agility, balance, speed?
- How do lions balance energy between slow stalking and explosive bursts of speed?
- What did you learn about teamwork and problem-solving during the activity?

Optional extension

TEAM CHALLENGE

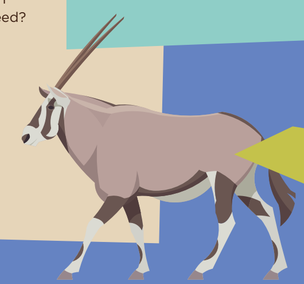
Turn the activity into a relay race where groups complete the course together.

LION PRIDE COORDINATION

Add tasks requiring cooperation, such as two students carrying the prey together.

CONSERVATION AWARENESS

Discuss how human activities affect lion hunting ranges and what we can do to protect their habitats.



09

Channel your inner Lion

Help students build confidence by embodying the characteristics of a lion—strength, courage, and leadership—through power poses and self affirmations.

ACTIVITY TIME
10-15 MINS

Optional Lion roar sound effect or music

CONFIDENCE

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Instructions

1. Introduction (2 min)

Discuss: Lions are known as the King of the Beasts because of their strength, leadership, and fearlessness. But lions are also strategic—they know when to be bold and when to conserve energy. Confidence isn't about being loud all the time; it's about believing in yourself when it matters most.

Prompt: Today, we'll channel our inner lions by striking bold lion poses and affirming our strengths!

2. Power poses (5 min)

Lead the students through a few lion-inspired power poses to mimic a lion's confidence and grace:

The Lion stance (dominant pose):

- Feet shoulder-width apart, hands on hips, chest lifted, and head held high
- Imagine a lion surveying its territory
- Breathe deeply and confidently

The prowl pose (focused pose)

- Crouch low, knees bent, with one foot slightly forward as if stalking prey
- Maintain focused eye contact, like a lion targeting a goal

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- Crouch low, knees bent, with one foot slightly forward as if stalking prey
- Maintain focused eye contact, like a lion targeting a goal

The victory pose (triumphant pose)

- Stand tall with arms raised in a V-shape above your head, legs firmly planted
- Let out a silent roar or an actual soft lion roar if comfortable

3. Lion affirmations (5 min)

While holding a chosen pose, have each student say a self-affirming statement aloud to boost confidence.

Suggestions:

- I am strong like a lion
- I have the courage to face challenges
- I lead with strength and wisdom
- I am brave and unstoppable

4. Reflection (2-3 min)

- **Ask:** How did it feel to embody the lion's strength and say positive affirmations?
- **Discuss:** How lions balance moments of calm and bursts of action, showing that confidence comes from within and doesn't always have to be loud
- **Encourage:** Students to use a lion stance or positive affirmation before a test, presentation, or any challenging task

Optional extension

PRIDE OF LIONS GROUP ACTIVITY

Have students form small groups (their prides) and take turns giving each other compliments or sharing moments when they showed courage, just like lions support their pride

Lion leadership skills

Decision-Making

The ability to evaluate options, consider consequences, and make sound decisions, even under pressure.

Communication

Clearly expressing ideas and actively listening to others to promote understanding and collaboration.

Teamwork and Collaboration

Working effectively with others by appreciating diverse perspectives and fostering a cooperative environment.

Problem-Solving

Identifying challenges and developing creative or practical solutions to overcome them.

Adaptability

Being flexible and willing to change strategies or approaches when faced with new challenges or setbacks.

Conflict resolution

Mediating disagreements and helping the team reach a constructive solution.

Time management

Organising and managing time efficiently to complete tasks and achieve group objectives.

Empathy and emotional intelligence

Understanding others' feelings and motivations to build positive relationships and create a supportive environment.

LEADERSHIP SKILLS

Responsibility and accountability

Taking ownership of tasks and being accountable for outcomes, whether successful or not.

Motivating and inspiring others

Encouraging team members to stay motivated, committed, and confident in their abilities.

Goal setting and planning

Setting clear, achievable objectives and mapping out strategies to meet them.

Resilience

Staying positive and persistent in the face of challenges, failure, or criticism.

Delegation

Assigning tasks appropriately, trusting team members, and empowering them to take responsibility.

Creativity and innovation

Thinking outside the box and proposing new ideas to solve problems or improve processes.

Integrity and honesty

Leading by example with honesty, fairness, and strong moral principles.

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