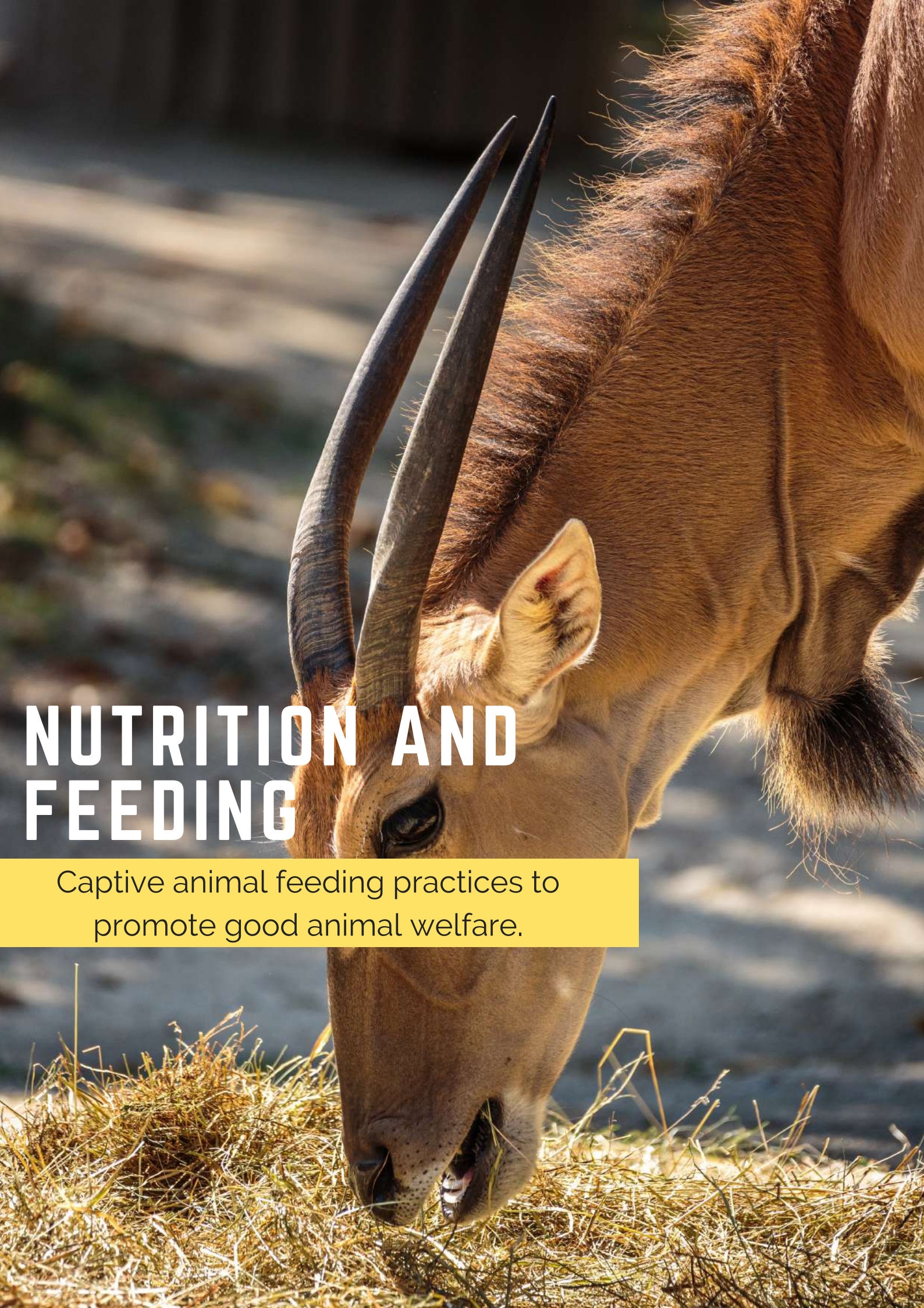


NUTRITION AND FEEDING

Captive animal feeding practices to promote good animal welfare.

NUTRITION AND FEEDING

AIMS

To gain knowledge and understanding of:

- Why a nutritionally balanced diet is necessary to maintain the health of an animal.
- How dietary requirements vary between species and individuals based on a variety of factors.
- How food can be presented in a way that encourages natural feeding behaviours and why this is important.

OBJECTIVES

- Identify what a nutritionally balanced diet is, depending on the species.
- Categorise different animal diets and link them to animal groups.
- Design food presentation strategies that encourage natural and rewarding behaviours.
- Connect hygienic food preparation with protection of good animal health.

REASONING

- What and how animals are fed is a vital component of providing good animal care.
- Recognising that food and water provision is susceptible to contamination and compromise which can lead to an animal's ill health.
- Realise that food presentation is very important to encourage natural feeding behaviours that the animal will find rewarding to undertake.

PROVIDING APPROPRIATE FOOD AND WATER IN CAPTIVITY

It is important that an appropriate, good quality diet and fresh water is provided daily. The diet provided for a zoo animal is fundamental to that animal's welfare, health and happiness. It is the zoo's role to ensure an appropriate and nutritionally balanced diet is given to all animals in its care. **Zootrition** is a diet balancing database resource to use if you are unclear on what animals in your care should be eating and how to present it. Swapping diet sheets with other zoos and making comparisons with wild diets can help influence what an animal should be fed in captivity.

The Lesser Flamingo has a high protein diet in the wild, and therefore it is sensible to assume we should provide a similar diet in captivity. They also need a supplement called astazathin (red algae) to ensure their feathers remain a pink/red colour.

Clean and fresh water, presented in an accessible manner is essential. A lack of water not only leads to health problems, but can cause unnecessary distress. Without appropriate food, or access to clean water, an animal may become predisposed to hunger, disease and ill health or dehydration.

A nutritionally balanced diet is necessary to maintain good health and meet the biological requirements of an animal. Poor provision of food can cause an animal to experience compromised physical health which can lead to poor mental well-being. An inappropriate or nutritionally deficient diet can lead to hunger and the same is true for a diet which does not contain enough food for all individuals present. Animals may become more aggressive to each other if they are hungry and are susceptible to injury or being dominated if malnourished. This can also have an adverse effect on the overall welfare of the entire group.

The Importance of Water

Water is the most essential nutrient for any animal. It is important to remember that water sources can easily become contaminated, sometimes on a microscopic level. Therefore it is important to remember to change water very regularly, even if it looks clean. In some climates an animal's water source can freeze or evaporate away therefore it is essential to keep checking regularly to ensure an animal always has access to water.

Providing a nutritionally balanced diet

Insufficient or inappropriate provision of nutrients through the diet can lead to disease, ill health and poor animal welfare. An animal's welfare may be compromised if it is deprived of suitable (species-appropriate) food or water. Malnutrition, thirst, hunger and exhaustion can all occur.

The nutritional requirements of animals vary between different species, but also between individuals. Life stage, age, physical activity, sex, size, and body condition, reproductive status and overall health will all affect the amount and type of food an animal needs. Good body condition is particularly important. Starvation and obesity can both adversely affect an animal's health, therefore overfeeding and underfeeding should be avoided. Close monitoring of the amount each individual consumes is important to prevent this. This includes animals involved in public feeding opportunities and social species whose social hierarchy ranking can impact their access to food.

A nutritionally balanced diet is one that considers and meets an individual animal's nutritional needs throughout its life.

If a diet is not nutritionally balanced, it will not be meeting the animal's nutritional needs. This can lead to poor health and subsequent welfare issues.

Other considerations

Social hierarchies and interactions must be considered when food and water are presented, to ensure that all individuals can access sufficient food and water for their needs. Multiple feeding sites will prevent problems from competition within groups and also provide choices for each individual as to where they eat and who they eat near to.

Food and drinking water should be provided in an appropriate way according to the behavioural feeding needs of each species (e.g filter feeding, foraging, browsing, grazing, stalking, hunting, social), in a way which allows sufficient access without risk of contamination, dominance or competition. Behavioural feeding needs are just as important as nutritional needs to ensure a good standard of welfare.

To maintain good health and welfare, dietary supplementation must be carried out where environment or diet cannot provide all the required nutritional elements. Supplements can come in the form of pills or powders to add to the diet and should always be stored and handled appropriately. Veterinary or specialist advice in animal nutrition should be sought and followed where necessary.

Q: Would you consider the food and drink you give to your animals clean enough for you to consume? Why do you think this is important?

Lifecycle and nutrition

Where the animal is in its lifecycle will have an impact on its nutritional needs.

Juvenile - After the baby is weaned or hatched, it will need an appropriate amount of food to help it to grow. Weight gain should be monitored frequently and should be consistent and increasing. An adequate supply of calcium for bone growth and protein for muscle development should be available within the diet.

Adult - Animals that have reached adulthood should be fed according to their activity levels and seasonal changes. There should always be a small amount of food left over, indicating that the animal is being fed enough but not so much that it becomes wasteful and attracts pest species. Body condition scores and weights should be monitored and remain at a consistent level.

Reproductive - Animals that are pregnant or lactating will need a slight increase in nutritional intake to get enough nutrients to sustain both themselves and the young individuals they are raising. However if too much food is given, the baby could be too big which can lead to complications during pregnancy and birth. Tracking weight gain in pregnant animals is essential for healthy offspring. Lactating mammals will need a higher concentration of calcium and moisture content within the diet to ensure good milk production. Birds and reptiles will need extra calcium for egg production.

Old Age - During old age, the amount of food needed may decline slightly due to lower activity levels but an appropriate amount and variety should always be offered. Extra supplements can be used to ensure the individual has all nutrients required during this life stage. Providing oily foods or particular supplements can ensure healthy joints. Dental issues that arise as a result of old age will need veterinary care but diets may also need adjusting to cope with this.

Seasonality

Seasonal changes such as weather and time of year can have an impact on nutritional requirements such as energy intake and water consumption. Understanding specific species' biology is important to know whether dietary intake changes are due to seasonality or ill health.

Cold weather may increase the need for a slightly increased calorific intake to enable the animal to keep warm. Torpor states can be impacted by a combination of nutrient availability and seasonality.

WHAT TO FEED YOUR ANIMALS

DIFFERENT ANIMAL DIETS

Some species have a specialist diet and some have a more generalist diet. Wild-type diet preferences, physiology and specialist feeding behaviours should all be considered when creating diets and presenting the food to different species. Some species might be classed **primarily** as feeders in one particular category but also eat a more varied diet than their taxonomic group. This is why a thorough understanding of the species' biology is important to ensure a good standard of animal welfare through appropriate diet provision.

CARNIVORE

An animal that feeds on meat derived from another animal. This could be through hunting or scavenging. Large carnivores can often have a feed and fast strategy (also known as gorge and starve) whereby they will eat a lot of meat at once and then do not need to eat for 2 - 4 days afterwards (e.g. big cat species). Smaller species will need feeding more frequently.

HERBIVORE

An animal that has a plant-based diet. Hoofstock species are herbivorous and can further be categorised into grazers or browsers. Grazers will spend most of their time eating grass and plant products from the ground (e.g. zebra). Browsers spend more time eating leaves from trees (e.g. giraffe) but will also supplement their diet with other vegetation. Herbivores need a continuous supply of food to ensure that they remain healthy. If they undergo large portions of the day without food, they can experience stomach problems.

OMNIVORE

Omnivores eat both a plant-based and meat-based diet (e.g. chimpanzee). Offering a variety of different food to omnivores is important to make sure they get all the nutrients they need. Eggs, insects and small amounts of meat are all good sources of protein for omnivores. Fruits and vegetables are more commonly eaten by omnivores than grasses and leaves, dependant on the species.

FRUGIVORE

An animal that primarily eats fruit (e.g. fruit bat). In captivity, a diet based purely on fruit can be too high in sugar due to the commercial way in which fruit is grown for human consumption. Vegetables can be offered to frugivores too. Cooking the vegetables makes them tastier for frugivorous animals

FOLIVORE

An animal that eats primarily leaves (e.g. koala). It is important to offer the correct species of leaves as some species of animal are so specialist that they will only eat one or two types of leaves. Fresh leaves should be provided each day.

INSECTIVORE

An animal that primarily eats insects (e.g. anteater). Many insectivores have specialised body parts (e.g. tongues) to help them feed on insects. This must be a factor when feeding insectivores to ensure natural feeding behaviours are encouraged. Gut loading (feeding insects nutritious food and supplements) can be a useful tool to ensure maximum nutrient levels are gained by the animal.

PISCIVORE

An animal that primarily eats fish (e.g. pelican). Size of fish should be taken into consideration as some piscivores swallow fish whole and will refuse fish that are too big. Supplemental tablets can be hidden inside the gills if needed.

HAND FEEDING

Animal care staff hand feeding animals can be a great way to build a bond of trust as well as deliver medication or supplements. When hand feeding, always make sure the food comes out of the regular diet and is not an additional extra. Do not feed the entire diet by hand. Always ensure much of the diet is given in a way that promotes natural and rewarding feeding behaviours such as foraging.

Feeder Insects

Feeding animals insects such as locusts, crickets and mealworms can be excellent sources of protein for insectivorous species. They are palatable and, if fed live, will be a source of behavioural enrichment which will stimulate hunting and foraging behaviours. However, it is important to balance the available specific protein levels of the animal with the protein and fat content of the feeder insect. It is also important to ensure that the welfare of the feeder insects themselves is of a good standard before they are fed out. Keeping them in a clean and appropriate environment is essential, ensuring they experience appropriate ventilation, temperatures and resources such as food and surface area to move on.

Care must be taken to remove uneaten live insects after 12 hours so as to reduce the risk of the insects using the animal itself as a food source.

Gut Loading

Gut loading is a practice that ensures a large amount of nutrients can reach the intended animal through feeder insects. If good quality vegetables and supplement powder is given to the feeder insects and ingested by them, the positive impact of these nutrients will be passed on to the intended animal. This is particularly effective for calcium. Supplement powders can also be sprinkled on the surface of live insects but there is no guarantee of ingestion through this method and it can be wasteful.

The use of supplements may be required, particularly for insectivorous species given that they will naturally consume a large variety of insects in the wild. They may also choose to supplement their own diet with minerals found elsewhere, for example in soil. In captivity these options may be limited, therefore it is important to supplement the diet to ensure appropriate nutritional intake for each animal.

ESSENTIAL FOOD HYGIENE

Strict hygiene must be observed when preparing and storing food. This helps to prevent contamination and keep the food clean, fresh and appealing. Strict personal hygiene must be practiced by the animal care staff when preparing food to avoid compromising both staff and animal health.

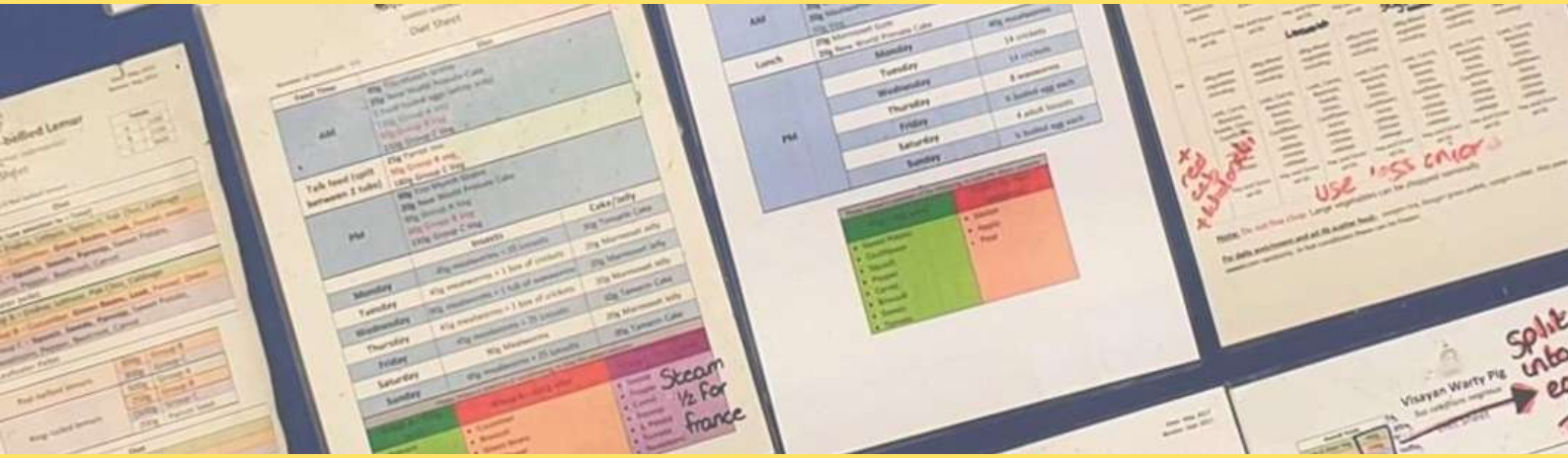
Tips On How To Be Hygienic

- Prepare and store food in an area that is only used for this purpose. No toxic substances should be kept in that area.
- Staff should always keep strict standards of personal hygiene. Hands should be washed regularly, during and in between preparation.
- Food should be protected from damp and contamination by pests (e.g. birds, rodents, insects) in appropriate containers.
- Perishable food such as meat and vegetables should always be stored separately and in refrigerators that are regularly checked.
- Self-feeders and automatic watering systems must be checked daily for contamination and faults.
- Uneaten food in enclosures should be removed regularly to maintain hygiene and be disposed of correctly (but always allow the animal appropriate time to eat the food, they don't always want to eat it all at once).
- Have a separate set of utensils for meat and non-meat products to avoid cross-contamination whilst preparing food.
- Feed stock should be rotated as it is being used and controlled by an ordering system which reduces waste.

Clean, well-stocked feed preparation rooms are essential. Keeping food diaries that are accessible to all animal care staff helps ensure a nutritionally balanced diet is provided.

Q. Do you think your zoo's feed preparation area is hygienic? If not, what simple improvements could you make?

Diet sheets and diaries



Simple **diet sheets** are a useful record of the amount and type of food that should and shouldn't be fed to a species daily, weekly and monthly. **Diet diaries** are a way to document the amount and type of food that has and has not been eaten after being given to the intended animal. Both are helpful in providing a nutritionally balanced diet. A diet sheet must be updated when numbers within a group or seasonal behaviours change because the amount of food needed will also change.

Diet diaries can help animal care staff discover what type and amount of food is being wasted and whether there is a drastic change in dietary intake. which could help indicate if there is a health and welfare issue. It can also help identify food preferences between individuals. Just like us, animals like some foods more than others. If food is repeatedly being left, it may prevent particular nutrient uptake and can also act as an attractant to pest species.

Example of a diet sheet

Species:

Number of Individuals:

Presentation:

Items to avoid:

<u>Ad libitum</u> items:

	Vegetables	Other food items
Morning Feed	200g carrots 150g parsnips 50g pepper 70g cauliflower	50g apple 100g pellets 30g egg
Afternoon Feed	70g carrots 70g sweet potato 50g squash 50g fennel	100g seed mix
Evening Feed	150g swede 80g endive 80g leek 50g tomato	200g pellet

Body Condition Scores

Body condition scoring is another way to asses an individual's diet and overall health. Scoring your animal's body condition is a simple, non invasive way to help you assess the health of an animal. It is a subjective measurement so it is useful for several animal care staff to score the same animal and compare results. An animal is scored from 1 - 5 with 1 being severely underweight and 5 being severely overweight. The ideal score is 3. Below is an example of a black bear. Other examples of body condition scores for different species can often be found online.

Asiatic Black Bear Body Condition Scoring, modified from Animals Asia Foundation infographic.

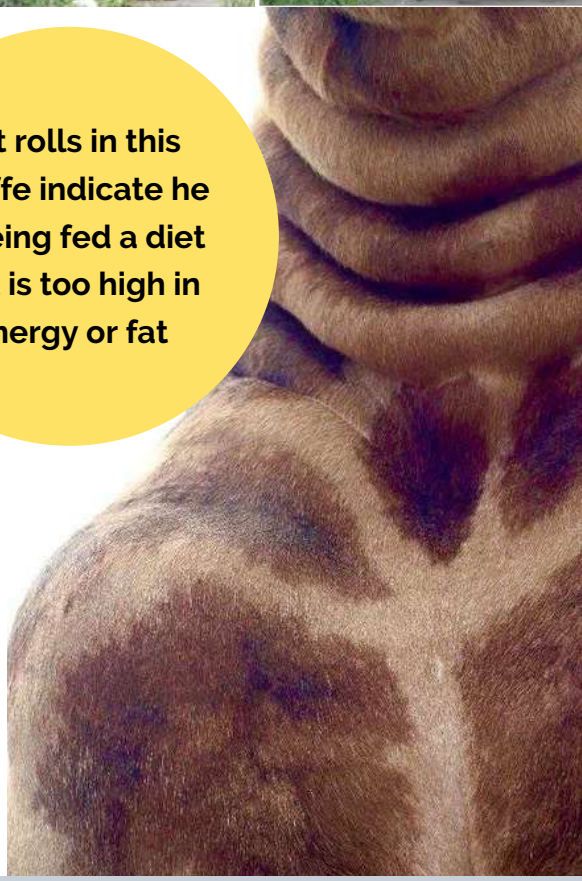
1	2	3	4	5
Pelvis and shoulder blades protruding, ribs easily palpated, angular appearance with no fat rounding out the silhouette. A hollow will be seen between the pelvis and last rib, showing no fat.	Pelvis easily palpated but good muscle coverage over rump. Ribs can be felt when palpated but some muscle covering them, The hollow between pelvis and ribs still obvious but softer than score 1.	Body is fully fleshed out. Obvious fat is present over pelvis and shoulders, ribs not visually obvious, Hollow between pelvis and last rib absent.	Bear has a rounded appearance, very well fleshed over all bony areas, obvious fat over rump and shoulders.	Legs appear too short for the body of the bear, rolls of fat on neck and lower shoulders.

Weighing your animals

Training your animals (using positive reinforcement methods) to be weighed voluntarily is a useful way of keeping track of any changes in their weight. You can compare weight changes to diet or seasonal changes. Having an accurate weight can help when calculating medications or formulating diets.

Photo by kind permission of Rosie Badger

Fat rolls in this giraffe indicate he is being fed a diet that is too high in energy or fat



Q. Do you think your animals have a good body condition? How would you go about creating an accurate condition scoring sheet for them?

NATURAL FEEDING BEHAVIOURS

Feeding behaviours that animals conduct in the wild should influence how animals are fed in captivity. Animal care staff should ensure that these behaviours are used to inform their feeding practices. Animals are strongly motivated to carry out feeding behaviours which are appropriate to the environment they evolved in. Even if they are not in that environment anymore, there is still a motivation to carry out such behaviours and it can be frustrating for the animal if they cannot be expressed. This can lead to behavioural problems and associated health problems such as obesity, dental issues and health issues associated with stereotypical movement.

It is important to understand the reasoning behind certain wild behaviours. For example, coprophagia is a naturally occurring behaviour in some species that derive additional nutritional benefits from ingesting their faecal matter twice. This can be seen in particular in rodents. However, this behaviour can also be indicative of a problem in species that would not naturally do this, therefore it is classed as an abnormal behaviour and is used by the animal as a coping mechanism to an environmental stressor.

There are very generalist and very specific behavioural feeding strategies that occur in the wild. Meeting the behavioural feeding needs of captive animals can provide a stimulating, enriching and rewarding feeding regime, whilst simultaneously preventing obesity, aggression and other unwanted behaviours. Feeding regimes can also influence behaviours. For example, in some bear species a reduction in food provision coupled with seasonal changes can stimulate the beginning of torpor.

Examples of different feeding strategies influenced by environmental and biological aspects can be seen below:

Foraging and searching for food can take up a large proportion of an animal's daytime and night activity, with various species having evolved specific skills for this purpose. Scatter feeding, feeding at irregular times and hiding food can add to an enriching feeding programme, stimulating activity, reducing the risk of obesity and also boredom.

Arboreal (tree-living) species - will eat their food whilst in the trees and should be presented with food off the ground. Hiding food in branches of trees can be a great way to encourage exploratory behaviours.

Filter feeders - Several animal species including many types of birds use filter feeding as a strategy. Birds that feed in this way have beaks which are specifically shaped for filter feeding. Food must be presented in water so that the animal is able to utilise this natural feeding behaviour.

Encouraging Natural Feeding Behaviours

Food based enrichment strategies form an important part of enrichment programmes. Appropriate food should be presented in a manner that challenges relevant behavioural, social and cognitive abilities in each species of animal.

Grazing, browsing, foraging, scavenging, hunting and filter feeding are all examples of specific feeding strategies. Animals have biological as well as behavioural adaptations to help them e.g. different beak shapes in birds. Some species use several of these strategies for a more generalist approach. It is important to replicate the need for these strategies in captivity.

Consider how a species eats in the wild and think about how you might replicate natural and rewarding feeding behaviours for an animal. For example:

Are they social eaters? Provide multiple feeding stations that allow for family/social groups to eat together and discourage aggression due to resource guarding.

Are they opportunistic feeders? Scatter and hide food around an enclosure, encouraging foraging and exploration.

Are they nectar feeders? Nectar feeding devices which store wells of nectar can be bought or made. Providing many of these devices within one enclosure encourages foraging for nectar.

Are they grazers? Ensure a continuous supply of varying grasses.

Are they fishers? Provide food in water and encourage fishing type behaviours.

Are they nocturnal, diurnal or crepuscular feeders? Consider when they would eat in the wild and try to accommodate this through timed feeders or other means.

How are they adapted physically to eat their food? Provide feeding apparatus that encourages appropriate use of their anatomy to eat.

How often do they eat? Some species eat several times a day whereas some eat only a few times a month, Replicate this through the use of feeding schedules.

Photo by Elke Schwierz

Encouraging Natural Feeding Behaviours

Food can be presented in lots of different ways:

Pole feeds
Ice blocks
Puzzle feeders/trickle feeders
Scatter feeds
Kebab feeders
Tongue feeders
Forage boxes
Smears/smoothies
Floating feeds

BAD BOWLS!

Feeding animals from bowls does nothing to encourage natural feeding behaviours. It is a predictable way to present food to animals and can result in reduced activity levels or stereotypical anticipatory behaviours. Bowls do not present a challenge to the animal and can result in them finishing their food too quickly. This can lead to physical and psychological issues.

There are no bowls in the wild!

If you have no other choice than to feed from a bowl then make sure there are multiple bowls around the enclosure at different levels. This encourages more foraging type behaviours as well as reducing guarding behaviours between individuals. Change the amount and type of feed found in each bowl every day.

Q. How many of your animals are fed in bowls? Can you think of alternative ways to feed them that is both safe and interesting?

Animals that hunt for their food

Providing live vertebrates for other species to hunt is not advised. Providing food in a manner that requires animals to work for their food (for example high up on a pole for big cats, or hidden in a sack that requires tearing and ripping) will help replicate some of the behaviours required for hunting. Irregular feeding times and whole carcass feeding will also help towards encouraging rewarding behaviours related to predatory animals. It is also beneficial to include feather, fur, bone etc in carnivore and omnivore diets to improve digestion and general health.

Fasting and Feasting

Many species of large carnivores, have a 'fast and feast' eating routine. Lions in particular in captivity are more prone to obesity, inactivity and stereotypies if not offered these opportunities. Irregular feeding (which helps reduce undesirable behaviours) can improve digestibility of fat, protein and dry matter and can result in maintaining a healthy weight (or weight loss when required). Because of this, fasting days do not result in feelings of hunger, providing that whole carcass meat is given. Snakes also use this feeding method. It is important to replicate this in captivity due to the anatomy of the stomach and the associated behaviours of the animal.

Carcass Feeding

- Whole carcasses provide the opportunity for large carnivores to use their teeth, claws and muscles to tear off smaller pieces.
- Whole carcass feeds encourage important social hierarchy behaviours to be exhibited.
- More nutrients are available from a whole carcass feed.
- It is a more natural feeding method overall.

Q. Are your animals fed carcasses or lumps of meat? Do you notice undesirable behaviours in your carnivores?

APPROPRIATE FEEDING GUIDELINES

FEEDING LIVE VERTEBRATE PREY – AN ETHICAL DILEMMA

Feeding live vertebrate prey is sometimes carried out to provide an enriched feeding environment. However it is illegal in some countries as it can cause stress, pain and poor welfare for the prey animals and occasionally the predator too. For example, snakes can be bitten by their live rodent prey in captivity.

If live prey is being fed at your zoo, think about whether it is necessary and carry out an ethics and welfare review process. This process will consider the pros and cons of live feeding and alternative feeding options that still meet the behavioural needs of the species. It is the responsibility of a zoo to ensure a high standard of welfare is provided to all animals under their care, this includes live feed animals.

UNREGULATED VISITOR FEEDING

Unregulated feeding is where animals are being given food by visitors without a competent member of staff present to monitor how the animals are being fed.

Feeding methods should be safe for animals and staff/visitors at all times.

Feeding animals can be a great visitor experience, however, to protect animal health and welfare, unregulated feeding of animals by visitors should not occur. Visitors can get involved in other ways. Encouraging guests to make feeding enrichment tools and providing zoo talks while animals are being fed by animal care staff is engaging and interesting whilst promoting better welfare for the animals.

Unregulated feeding such as throwing food for these bears, can encourage unnatural begging behaviours, as well as aggression, and has the potential to cause obesity.

Q. How can you encourage your zoo to ensure visitor feeding activities are safe, appropriate and regulated?

SUMMARY

A species-specific, nutritionally balanced diet is essential for a good standard of health and mental well-being in captive wild animals. Effort and time should be given to ensure your zoo is catering for all its animals' nutritional needs.

Utilising diet sheets and documenting an animal's diet in a daily food record is a good way of assessing whether nutritional needs and individual preferences are being met. Diet sheets ensure consistency but should be reviewed regularly in case of changes. Documenting feeding frequency, food selection and waste are useful tools in monitoring a diet.

Different species have many different behavioural needs in relation to feeding. It is a fundamental part of their behavioural activity patterns. How food is presented is extremely important to an animal, and ensuring that competition between animals is mitigated with enough feeding stations, is also very important.

Food preparation and hygiene is important for an animal's health. A good zoo will ensure it has appropriate food preparation areas which are clean, and staff that understand the importance of hygiene,

Good safety protocols should always be considered when feeding animals, and experienced staff members should always oversee all types of animal feeding, especially if visitors are involved.

IMPORTANT POINTS TO REMEMBER

- Providing an appropriate diet is extremely important to an animal's health and welfare.
- Nutritional requirements will differ between species and will also differ depending on an animal's life stage and activity levels.
- Individual animals will also have food preferences.
- Different species will have very different feeding behaviours. Appropriate food presentation is important to encourage natural, rewarding behaviours.
- Always provide enough feeding stations to avoid competition and fighting, as well as to encourage foraging and exploration.
- The feeding of vertebrate live prey is strongly discouraged and alternatives should be sought under the oversight of a veterinarian.
- Unregulated visitor feeding is discouraged. Instead provide alternative programmes such as talks given by animal care staff to engage the visitors.
- High standards of food hygiene are very important for good health and animal welfare.

QUICK QUESTIONS

Nutrition Basics

- **Why is appropriate nutrition important for a good standard of animal welfare?**
- **Define the terms 'carnivore,' 'omnivore' and 'piscivore.'** Give an example of each one.
- **How would you go about designing a diet for a particular species?** Look at the diets for the species you care for. Do you think anything needs changing?
- **If your animal was leaving a lot of food uneaten, what two things might this indicate?** What would you do to investigate this further?
- **Think about a species you work with. List all the food items that make up its diet**. Why does it need those particular types of food?
- **Why is a clean and hygienic food preparation area so important?** What ways could you improve the standards where you prepare food in your zoo?
- **Why do you think it is important to change an animal's water at least once a day, even when it looks clean?**

Natural Feeding Behaviours

- **Why is providing opportunities to display natural feeding behaviours important for a good standard of animal welfare?** Do you see your animals displaying these behaviours? How could you encourage it more?
- **What are three examples of different feeding devices?** What species would these work best for and why?
- **What biological and behavioural adaptations can you see in one of your animals that helps it to gain access to food?** Do you think those adaptations are being utilised in the current way that the animal is being fed?
- **Why should visitors not feed animals without appropriate supervision?** Can you think of any alternatives to visitor feeding?
- **Pick a species you work with and design a feeding device for it.** What type of behaviours are you wanting the device to encourage?
- **How can you change the way in which food is presented to your animals without using bowls?** How many bowls do you use every day? Why are bowls bad?
- **When do you think hand feeding an animal is appropriate?** How often do you hand feed your animals and do you think they benefit from it?

ACTIVITIES

A) Choose a species and create a weekly food diary. consider the species' nutritional needs and include how the food will be presented to encourage natural and rewarding feeding behaviours. Things to Consider:

- What nutritional needs does this animal require?
- What foods could provide those needs? Does your zoo currently feed those foods?
- Would this animal benefit from supplementation? How would you ensure they received it?
- How varied could the diet be? Do you feed the same food every day?
- What would you record in the diary?
- What feeding behaviours would you observe in the wild from this species?
- How can you encourage wild behaviours in the animal's current enclosure? what might you change to encourage these behaviours?
- What social interactions need to be considered, if any? How does that affect how you present the food?

B) Visit an animal enclosure. find out how this species is currently fed. How could you change the feeding presentation to better suit the animal's natural behaviours? Things to consider:

- What feeding behaviours would you observe in the wild from this species?
- Does the current enclosure have any restrictions on the feeding behaviours for this species?
- What can you change to encourage positive feeding behaviours in the current enclosure?
- What adaptions to the enclosure <u>infrastructure</u> do you think you can do? for example, more feeding stations up in the trees if the species is arboreal.
- Are there safety procedures in place for feeding that animal?
- If a feeding device is being used, is it safe?