



Management of the Animal Collection at Colchester Zoo Student Pack

This pack is aimed for students who require information for course work and also for teachers to aid in their visit to Colchester Zoo.

Contents



| Contents | Page |
|--|-------------|
| Colchester Zoo | 1 |
| Zoological Memberships | 2 |
| Role of Zoos in the 21st Century | 3 |
| Collection Planning | 4 |
| Animal Categories | 5 |
| Managing Categories A & B Species | 8 |
| Veterinary Facilities | 9 |
| Preventative Care | 10 |
| Animal Restraint | 13 |
| Zoological Information Management System | 16 |
| Furthering Staff Training | 17 |

Colchester Zoo

Colchester Zoo was established in 1963 by Zoologists Frank and Helena Farrah in the grounds of Stanway Hall Park. The site was around 25 acres in size and contained a small collection of animals ranging from lions to kangaroos.

In 1983, Colchester Zoo changed hands and was taken over by the present owners, the Tropeano family.

Colchester Zoo is a privately owned, family business; Colchester Zoo Ltd, with no financial support from charities or government. All income comes directly from the admission into the Zoo and from the experiences that are offered.

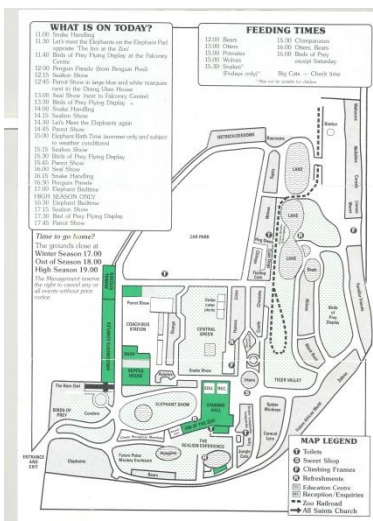
Originally 25 acres in size, the Zoo has grown and developed to cover 60 acres, following the purchase of neighbouring land.

As of 2017, there are 270 different species of animal at Colchester Zoo ranging from poison dart frogs and corals to parrots and elephants.

Colchester Zoo has a charitable arm called Action for the Wild, and since 2004, the Wild achieved charitable status, over £2million has been donated to projects worldwide, including projects in the U.K. Action for the Wild also provides technical assistance to support and raise awareness amongst local people in community conservation and supports conservation research.



Since 2005, Action for the Wild has been working to set up the 6,000 hectare Umphafa Nature Reserve in KwaZulu Natal, South Africa. Work to rehabilitate the land, which was previously managed as separate cattle farms, strives to return it to a healthy state of intensive grazing that took place, as well as to release native animal species back into the reserve.



Map of Colchester Zoo in 1985



Map of Colchester Zoo in 2017

Zoological Memberships

Colchester Zoo, and many zoos in the U.K., are members of national and international groups. Below are some of the associations Colchester Zoo is a member of. These groups coordinate conservation work, education, research and breeding programmes, as well as promote high standards of animal care and welfare.



BIAZA is a conservation, education and scientific wildlife charity, that ensure the principles and practices of animal management are practiced at a high standard. Also aids in increasing knowledge within the zoological community.

<http://www.biaza.org.uk/>



EAZA coordinate conservation work and breeding programmes across Europe. Also aids in increasing knowledge within the zoological community.

<http://www.eaza.net/>



World Association of Zoos and Aquariums | **WAZA**
United for Conservation

WAZA provide leadership and support for zoos, aquariums, and partner organisations of the world in animal care and welfare, conservation of biodiversity, environmental education and global sustainability.

<http://www.waza.org/en/site/home>

Roles of Zoos in the 21st Century

Zoos are now more than just a good day out to see animals, they have a role to play in education, conservation and research.

There are over seven billion people on the planet and 1 in 10 of those people will visit a zoo or an aquarium. This gives zoos an opportunity to help and improve people's understanding of the world, as well as provide support for conservation work.

Colchester Zoo, like other zoos, has four roles:

- A place for recreation
- A place for conservation
- A place for education
- A place for research



Recreation: A day at the zoo should be enjoyable as many zoos, including Colchester Zoo, rely on people visiting as a source of income. Furthermore, visitors who enjoy their day will spread the word to others thus increasing the amount of people who can be educated and providing more funds to support conservation.



Conservation: Zoos are ideally placed to develop and lead their own conservation programmes in the wild or support lesser known projects by providing them with a platform to promote their work. Additionally many zoos are active members of breeding programmes. Zoos work to conserve species on their own doorsteps, as well as across the world.



Education: Zoos are able to raise awareness of human impact on the world and improve understanding. This can be done through signage, keeper talks as well as providing school educational trips to help studies. It is also a legal requirement in the U.K. to provide educational opportunities for visitors.



Research: Zoos offer opportunities to aid scientists in gaining close and easy access to animals that would be very hard to observe in the wild. Also students are able to complete research papers to aid their studies.

Collection Planning

Many animals are now kept in captivity not only because they are threatened, but also to ensure we have a genetically viable population in case species go extinct in the wild. EAZA (European Association of Zoos and Aquarium) has Regional Collection Plans to help decide which zoos should house which animals; and also which of these species should be placed onto a breeding programme. To decide which zoos should be doing what, the following factors are addressed:

The status of the species in the wild

Species that critically endangered or have a low population number may be given a higher priority over an animal that already has several successful breeding groups in captivity.

Can they be managed?

It is important that the space available in all zoos in the region is assessed, as this will influence numbers of animals kept or if kept at all. Some animals require a large amount of space (i.e. elephants), whereas other need little (i.e. insects). Also zoos will have to be able to have the finances to keep the species long term.

Husbandry expertise

The keeping staff need to have the knowledge to ensure the health and welfare of species is maintained. To do this staff can go to other zoos to gain experience as well as being given bachelor groups of that species before having a breeding group. If it is not possible for staff to gain experience, that may affect if the zoos take on a certain species.

The educational value of the species

Species which have an interesting story or are of educational value may be factored into the decision to kept a certain species in regional collections.

What are other regions doing?

If another region already has a successful breeding programme, then there may be no need to expand this into Europe. Valuable space can then be given to those species that do not have a successful breeding programme in place or to allow breeding programmes to expand and thus improve them.

The individual zoos also have an Institutional Collection Plan. This follows the Regional Collection Plans of EAZA, but also provides an overview of all the species kept at the zoo, as well as highlighting their role, i.e. the rationale for keeping them in the collection, and finally it is used to help plan for the collection's future.

Animal Categories

All U.K. zoos put animals in different categories in accordance with the level of safety and experience required to work with and around the animal. Some zoos use numbers, others use letters. Colchester Zoo uses letters to categorise the animals in the zoo. Below is a description of each category and the level of experience required to work with that category at Colchester Zoo.

Category A

- Animals and staff are separated at all times
- Locks, doors and the location of the animals are checked twice by two different staff members
- Trainee keepers cannot operate doors or locks
- Trainee keepers cannot double check locks, doors or the location of the animals

On the right are some examples of the animals in Category A.

Clockwise they are: chimpanzee, spotted hyena, Amur tiger and mandrill.



Category B

- Animals and staff kept separate
- Trainee keepers can work with these animals under the supervision of a qualified keeper or higher

On the right are some examples of the animals in Category B.

Clockwise they are: cheetah, warthog, pygmy hippo and buffy-headed capuchin.



Animal Categories Continued

All U.K. zoos put animals in different categories in accordance with the level of safety and experience required to work with and around the animal. Some zoos use numbers, others use letters. Colchester Zoo uses letters to categorise the animals in the zoo. Below is a description of each category and the level of experience required to work with that category at Colchester Zoo.

Category C

- Qualified keeper and above can enter the enclosure with the animal
- Must always be at least two keepers and both must be qualified keepers or above.

On the right are some examples of the animals in Category C.

Clockwise they are: slender-snouted crocodile, gelada baboon and maneless zebra.



Category D

- Senior keepers and above can enter the enclosure alone
- Qualified and trainee keepers can enter when accompanied with a senior keeper or above

On the right are some examples of the animals in Category D.

Clockwise they are: green anaconda (all large snakes are in this category), red river hog, L'hoest monkey and Andean condor.



Animal Categories Continued

All U.K. zoos put animals in different categories in accordance with the level of safety and experience required to work with and around the animal. Some zoos use numbers, others use letters. Colchester Zoo uses letters to categorise the animals in the zoo. Below is a description of each category and the level of experience required to work with that category at Colchester Zoo.

Category E

- Qualified keeper and above can enter the enclosure with the animal
- Trainee keepers can enter with a qualified keeper and above

On the right are some examples of the animals in Category E.

Clockwise they are: meerkats, sloth, squirrel monkey and green iguana.



Category F

- Trainee keepers can enter enclosures when under instruction from a qualified keeper and above.

On the right are some examples of the animals in Category F.

Clockwise they are: blue tang, domestic guinea pig, Madagascar hissing cockroach and bearded dragon.



Managing Category A & B Species

As previously discussed on page 5, keepers are separated from category A and B at all times. However they must receive the same level of care as those species where contact is permissible.

The way this is achieved, whilst still maintaining the safety of the keeper, is through enclosure design.

The enclosures have separate areas that can be secured, allowing keepers to clean the enclosure in stages, being able to move the animal around them as necessary.



The giraffe house (pictured left), allows the giraffe to be separated from parts of the house to allow cleaning and placement of food.

This is important if the giraffe are unable to go outside due to adverse weather conditions or if their outside areas undergo maintenance.

Enclosures also have training walls to allow training to take place to conduct health checks on feet, ears, eyes and in many cases teeth and gums and other hard to see areas. The training walls allow the keepers to be close to the animal but safe as the mesh prevents the animal gaining any access to the keeper. Crush cages, also known as chutes, further allow the keepers to train the animal and have close up access to them whilst maintaining a safety barrier.



The Chute at the Hyena enclosure (pictured left) is used to administer injections and conduct close up visual health checks.

The training wall at the sun bear enclosure (pictured right) allows a range of health checks to take place, including ultra-sound examinations. There are also built in weighing scales under the platform in front of the training wall which allows regular accurate weigh ins.



Veterinary Facilities

Colchester Zoo has no resident vet or vet nurse. The vets that Colchester Zoo mainly use come out to visit the Zoo from the International Zoo Veterinary Group (IZVG). These vets are highly trained in exotic wildlife medicine and are able to carry out a wide variety of different operations, from spaying big cats to dentals on primates. They undertake these operations in our on-site veterinary room.

Animals such as the rhino, giraffe, orangutan and elephant, are too large to be operated on in the veterinary room, in these cases, the enclosures are designed to allow operations to be conducted.

In addition to this, regardless of whether there are any operations that need performing, one of the IZVG vets will visit once every two weeks to do a 'walk around' the zoo to check on the animals and make sure that they are all healthy.

For more information on the IZVG please use this link: <http://www.izvg.co.uk/>

Zoo staff are able to contact the IZVG at any time for advice and support and, in emergencies, local vets can come to the zoo or the zoo animal can go to the vets, depending on the size of the animal.

Below from left to right are photos of the veterinary room, a sloth sedated and prepped for a dental surgery and a smooth coated otter sedated for microchipping and full health check.



Below from left to right are photos of an orangutan having dental surgery in the enclosure and an elephant having surgery on the one of the tusks in the enclosure.



Preventative Care

Preventative care is vital to any zoological collection, as prevention is better than cure, especially as many animals can mask signs of illness.

Prevention can include the correct dietary provision and supplements when required. When food is stored certain nutrients (vitamins and minerals) are lost, and even with meat the defrosting can result in loss of nutrients. In order to overcome this, supplements are used.

The supplements used vary amongst species and come in either powder, liquid or tablet form.

Below are just some of the supplements used at Colchester Zoo:

- **Aqua vitamin tablets:** used to replace nutrients lost from fish.
- **Vionate powder:** used to replace nutrients lost from fruit and vegetables.
- **Carnivore supplement powder:** used with mainly the canine species to replace nutrients lost from meat.
- **Feline carnivore calcium powder:** used with the meat given to the big cats.
- **Nutrobal powder:** used to replace nutrients lost from fruit and vegetables for reptiles and some birds species, such as the Victoria crowned pigeon.
- **Biotin powder:** mineral supplement used with a number of hoof stock animals, such as giraffe
- **Hoof supplement powder:** used to maintain good hoof and foot condition. Used on the red river hogs
- **Vitamin E supplement liquid:** used to maintain good skin condition. Used on the white rhino.
- Supplements are given in food with some given daily, others weekly, with amounts varying depending on the species as well as the individual needs.

Many animals are fed complete/concentrate food that are specially formulated for that species.

Examples of some of the feeds are:

- Rhino pellets are a complete feed for the white rhinos
- Primate pellets for small to medium primates
- Macropod pellets are for the wallabies
- Trio-munch is used for small primates
- Marmoset gum for marmosets and tamarins
- Flamingo maintenance pellets for flamingos

Most of these foods are created and produced by Mazuri Zoo Foods Ltd. Find out more information on zoo animal feeds at: <http://www.mazurizoofoods.com/>

Fruit and vegetables are also used in combination with the pellets to ensure a balanced and varied diet and every animal has a diet sheet. These diet sheets state which food items are given and which are not, along with quantities, frequency and methods of giving the food. Supplements are also stated as well as how the food is prepared. The pictures on the right show food that has been prepared using both the complete food and fruit and vegetables. Please note the silver dish is the container for the food, not how the food will be given to the animals.



Preventative Care

Colchester Zoo has a vaccination and a worming protocol in place. Animals are also screened for pathogens and parasites and this varies amongst species, for example, giraffes, llamas and lemurs are screened for E Coli, Cryptosporidia, Salmonella and Campylobacter. Macaws are screened for Psittacosis as well.

There are also quarantine protocols in places in the event of an outbreak. Measures include how to isolate an enclosure or area of the zoo, which disinfectants are to be used and the bio-security that is put in place.

Vaccinations are done annually, with boosters if required. Some species only require one vaccination and other species have multiple vaccinations. The list below is some of the pathogens/diseases that are vaccinated against, with some examples of which animal would get the vaccination:

- **Tetanus** (elephants)
- **Clostridia** (goats, sheep, llama, alpaca and reindeer)
- **Orf** (Cameroon sheep and Somali fat-tailed sheep)
- **Feline infectious enteritis** (all cat species)
- **Avian malaria** (Humboldt's penguins)
- **Myxomatosis** (rabbits, twice a year)

There are also animal observation and monitoring protocols in place at Colchester Zoo. These protocols include what staff training is needed to ensure proper animal observations take place, as well as how observations are recorded. All keepers complete daily reports on all the animals on an individual basis.

These reports are sent to the curators and are entered onto an international database called the Zoological Information Management System, which is looked at further on page 12.

The information provided on the reports can be used by vets to aid in assessing and diagnosing an animal and allows for the continuous assessment of the animal's welfare and care.

There are also procedures in places in the event of any concerns towards an animal's health and well being. This ensures the animal is seen and assessed as soon as possible by the relevant staff.

Preventative Care

Many animals at Colchester Zoo are trained using a reward based system known as positive reinforcement. The animal will be asked to perform a behaviour and will be rewarded, usually with food, when the behaviour is done.

Training is done to make the management of the animal less stressful and to reduce the need for more invasive management. For example, if an animal needs to move enclosures, rather than having to catch the animal with a net or sedating it, it can be trained to walk into the transport crate.

Training also makes health checks easier to perform. Training the animal to show their teeth or paws means they won't have to be sedated for a simple check up. Animals can also be trained to accept injections for vaccines.

The process of training keeps the animal focused and provides the type of mental stimulation that they may lack due to being in a safe captive environment.

Training can be used to encourage natural behaviours such as porpoising in sealions, which is performed when evading a predator in the wild; in captivity there is no need to perform this behaviour, however it is a very good form of exercise.



A Komodo dragon trained to walk onto the weigh scales



A gelada baboon being trained to touch the yellow target to get in position for close up health check



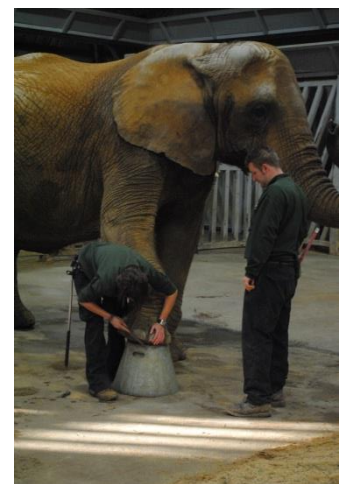
A mandrill opening its mouth to allow a visual inspection of the teeth and cheek pouches



A lion being trained to touch the yellow ball with its nose, to allow the pads of the paws to be seen



An Amur leopard having its heart listened to, while conscious



An elephant trained to present her foot to allow foot care, such as nail filing

Animal Restraint

Restraint refers to reducing or preventing movement and comes in two forms, physical and chemical. With regards to animals there are a number of reasons why an animal may need to be restrained. These include but are not limited to, health checks, moving location, vaccinations, data collection, recapture and health care (i.e. foot care).

Before any restraint takes place, the following needs to be considered.

- **The goals** – Why is this animal being restrained?
- **The animals behavioural and physical characteristics** – How many points of attack does the animal have? Are they naturally placid? Do they climb? Etc.
- **The conditions and location** - How much space is there? Is it on show to the visitors? What safe areas are there? What furniture is in the enclosure?
- **The skill of the handler(s)** – What knowledge do they have? How much experience?
- **The availability of equipment** – Pre check what is needed. Is it in working order? Can it be used?

There are also several factors that need to be considered.

- **It should be done quickly** - Utilising the minimum number of personnel that are required to safely and efficiently perform the task and ensure there are experienced staff.
- **Darkened boxes or blindfolds** - Alleviate stress and subdue animals.
- **Consider the time of year / season** –For example anaesthetics can make it harder to control temperature. Which means counter measures are needed if using on a hot day to stop over heating. Is it breeding season? This may result in males being more aggressive.

Furthermore, there are some factors to remember, such as avoid restraining pregnant animals if possible and being aware of group behaviours. If the species is a social species, it is easy to cause excess stress on the whole group even if only one individual needs to be restrained. This is due to the fact that all members of the group will possibly experience the restraint process. This can be reduced through enclosure design and management by allowing the keepers to separate individuals quickly and easily, thus reducing the number exposed to the restraint.

Even if the goal is to restrain and catch up all individuals, for health checks for example, it is important to reduce stress as much as possible. An effective way this can be done is by separating the group into smaller groups. This in turn makes it easier for the keepers to restrain and catch them, making the process much quicker. By creating smaller groups the keepers reduce the number of individuals exposed to the restraint and catch up.

For example if there is a flock of 30 flamingos, and they are not separated into small groups, each flamingo is exposed to 30 catch ups, where as if they are separated into groups of 5 individuals they are only exposed to 5 catch ups, greatly reducing the possible stress experienced.

Animal Restraint - Physical Restraint

This form of restraint does not involve the use of any chemicals and can be done using a variety of equipment.

Nets

Can be used with fish and birds as well as small mammals. The holes in the net should be small enough to prevent escape and from getting limbs caught that could result in injury. Can also be used to extend a persons reach making it effective to use as a barrier to corral animals and move them to a more suitable location to be restrained.

Hoods

Used with a number of birds of prey. Birds are calmer in low light, and for birds of prey, the hood prevents the bird from seeing potential distractions that may lead to them trying to fly off, i.e. other birds.

Snake Hooks

Used when handling venomous snakes, to allow the handler to keep the head away or control the head of the snake to allow health checks, taking venom samples or administer medication.

Crush cages / chutes

Often built into the enclosure, these allow keepers to get up close to large and dangerous species such as big cats. Animals are often trained to be shut in and present certain body parts for injections as an example.

Hand restraint is also a form of physical restraint. When restraining by hand there are some points to consider.

- **Support the whole animal** - If the animal is supported it will struggle less and be calmer.
- **The body of the handler is used** – This makes supporting the whole animal easier. For some species, two people may be needed.
- **Secure their head** – Reduces the risk of biting.
- **Secure tails and limbs** - Helps to prevent injury to keeper and animal
- **Be confident** - If the handler isn't confident the process can take longer and result in more stress to the animal, but comes with practice.
- **Have an experienced handler involved** – It is important to have one or more people who are experienced to make the process as quick as possible but also to pass on skills and support to new people.

There are pros and cons to physical restraint, these are listed below.

| Pros | Cons |
|-------------------------------------|---|
| Quick | More people needed |
| Reduce risk of medical complication | Increased risk of injury to animal and people |
| Minimal equipment | Increased stress |

Animal Restraint - Chemical Restraint

This form of restraint uses chemicals to allow keepers to interact with the species. Can either be delivered through injection or with a dart.

Due to the use of potential fatal dosages to humans, there are a number of key points to consider.

Only essential people nearby – This also means no visitors in the area

The area should have few obstacles – Best to have the animal in a smaller space or remove certain furniture, such as ropes

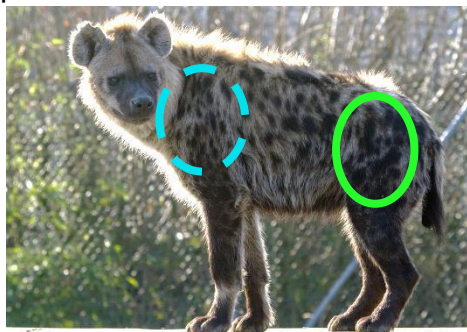
Bodies of water should be drained – The anaesthetic is not instant, pools are a drowning risk to animals going under and under anaesthetic. If impractical to drain, the animal should be moved to an area of no water.

Avoid darting animals at height – Falling can result in severe injury

Dosage based on: age, body weight, and health – Having accurate weights of the animals aids greatly to reduce over or under dosing an animal

Work quickly – The longer the animal is sedated the greater the risk of complications. The anaesthetic will also only be effective for a short time.

Where to dart? The best place to dart an animal is the top of the back leg or rump area, as indicated by the green solid line circle on the picture below. If that is not possible due to the position of the animal, the top of the front leg leading to the neck, as indicated by the blue dash circle, is an acceptable second option.



When darting an animal, rather than injecting an animal there are some key points to remember.

- **Wind affects the flight of darts** – Best to dart indoors or on calm days.
- **Darts have a short range** – Darts don't move as quick as bullets and are heavier.
- **The dart may not penetrate the skin** - If the force of the dart isn't strong enough, the dart may fail to discharge its contents.
- **Separate individuals from the group** – Prevents accidental darting of the wrong animals.
- **Area should be as quiet as possible** – Reduces the amount of stimuli which can aid in a quicker reaction to the anaesthetic

There are pros and cons to chemical restraint, these are listed below.

| Pros | Cons |
|------------------------------|-------------------------------|
| Less likely to have injuries | Longer prep and recovery time |
| Reduce stress | Special training needed |
| Fewer people needed | Risk of complications |

It is important to remember, that if the animal has a lot of adrenalin due to stress, anaesthetics will take longer to work and in some cases not work at all.

Zoological Information Management System

The Zoological Information Management System, which is more commonly referred to as ZIMS, is a real-time computer database used by over a thousand zoos and aquariums across 90 countries. ZIMS is operated by Species360 (formally known as the International Species Inventory System) which is an international non-profit organisation that maintains online databases of animals in captivity. At present there are 21,000 species, with records for 6.8 million animals and 74 million veterinary records, currently on the database.

The aim of the database is to aid in regional and global animal management and conservation goals.

Each individual animal is recorded on ZIMS detailing birth/hatch date, sex, place of birth/hatching, identification numbers and names. Deaths are also recorded including reason for death as well. There is also Medical ZIMS (formally known as MedArks) which holds medical history, such as any medications and operations.

Zoos and aquariums that are on these databases are able to view animal records from other zoos and aquariums. This allows zoos to look up medical history of new animals easily and quickly and allows structured collection planning to maintain effective management of animals. It also allows animals to be tracked if they move to new collections throughout their lives as well as record and monitor family history to help in preventing inbreeding.

There is also an Available and Wanted List. This is a list of animals that are able to transfer to new zoos and aquariums to breed as part of breeding programmes.

For further information please use the link to Species360 website: <https://www.species360.org/>



Further Staff Training

Animal keepers can have a range of qualifications, such as a degree in a number of animal science subjects such as animal welfare, animal behaviour, conservation and zoology. Other animal keepers have college level qualifications in animal care and animal management. Some animal keepers have long term practical experience in either the field, working in conservation centres or with animals in general. In most cases an animal keeper will have a mixture of the three.

There are a number of training courses available to staff, ranging from sign language and customer care to the safe use of veterinary medicines and the safe use of chainsaws. First aid training, as well as diving qualifications, are also offered to staff and all training courses are supported by the zoo.

One of the most recognisable qualifications animal keepers can get in the U.K. is Thein Management of Zoos and Aquariums Animals (DMZAA). This is a job specific, level 3 course offered to all animal keepers.

DMZAA is a two year course, which is delivered by distance learning. The course cover subjects relevant to modern zoos and aquariums such as research methods, education, conservation, enclosure design, breeding, nutrition, animal health and horticulture. The course is designed to be completed by people already working in a zoo or an aquarium.

When a new animal is due to join the zoo and there is minimal experience with that species, keepers will be sent to a zoo which has experience to learn and train with those keepers and animals.

Through BIAZA, EAZA and WAZA there are a number of workshops and conferences which are offered to staff. These include zoo horticulture conferences, research conferences and education conferences There are species specific workshops and conferences, as well as specific day courses run through out the year. A list of conferences and workshops can be found on the BIAZA, EAZA and WAZA websites.

The BIAZA website has a careers page with additional information. Please use this link to find this page: <https://biaza.org.uk/training-courses>