Harper Adams University

Animals Matters

A degree that matters

Harper Adams University

CREST AWARDS

Reach Out ANIMALS MATTER

How to use this pack

What's included?

This pack includes:
- 3 x research projects that focus around the national curriculum and work within Harper Adams courses
- 3 activities/projects to be completed
- Careers and courses information

Everyone loves animals, right? If you enjoy science, more specifically, biology, at school, then have you considered using your biology brain and applying it to a career working with animals?

The biology you learn doesn't just relate to human biology and there are so many interesting courses and careers around animal (and even plant) biology.

The 3 topics selected for this pack run in line with the national curriculum for KS3 and whilst focussing on biology most heavily, they also look at topics such as geography, literacy, design technology and art.

Some sections of this pack might require you to do a little bit of printing, but all the activities are possible without having to print the instructions.

You won't need any crazy resources to complete these activities.

Curriculum Links:

The following pack has been put together with the national curriculum in mind. The following activities and elements of this pack are linked to core national subjects such as biology, literacy skills, mathematics, and geography.

The 3 topics selected for this pack run in line with the national curriculum for KS3 and cover GCSE topics such as animal adaptation, anatomy and digestion.

Healthy Happy Bunnies

Research

Like humans, whatever a rabbit eats will affect its overall health. As pet rabbits can't forage for food themselves, it is essential that their owners take care about what they feed their pets.

It is recommended that pet rabbits are fed as close to the same diet as a wild rabbit as possible.

Rabbits have the same basic nutritional needs as humans. They require carbohydrates, proteins, fats, fibre, vitamins, minerals and water. Too many or too few of these could have negative effects on a rabbit's health like it would for a human.

A strange thing that rabbits eat is something called **cecotropes.**

Cecotropes is rabbit poo!. Rabbits eat some of their rabbit droppings because they can't absorb all of the nutrients from their food through one digestive process. The cecotropes are softer than their other droppings and they tend to produce and eat them at night. It's probably better for humans that they wait until night time so that we don't get to see it!

As you'll know, rabbits are herbivores. A balanced diet for them includes hay, vegetables and pellets. Pellets are manufactured and contain a mix of vitamins and minerals. Also, the nutritional needs of a rabbit can differ for each rabbit depending on their age, gender, breed and size.

A pet rabbit's daily diet should be:

- Their own body size in feeding hay and grass (imagine if humans had to eat their own body size in food to be healthy!)
- A small handful of fresh greens
- A tablespoon of commercial rabbit pellets (if necessary)
- Rabbits shouldn't be given much fruit to eat because it's high in sugar. Even carrots – which you see famous bunnies eating all the time – contain a lot of sugar so they shouldn't be given to rabbits too often

Just like humans, if a rabbit does not eat the right foods or the right amount of food they can become ill. If they eat too much and move too little, they can become obese.

According to the PDSA, a third of pet rabbits in the UK are overweight. That's around the same percentage of overweight humans in the UK.

Overweight rabbits are at risk of health problems and a shorter lifespan.

The best way to assess rabbits is to **look at their shape**; their weight may fluctuate throughout life, but their ideal shape stays the same. If you, or someone you know, has a pet rabbit, here's the PDSA's advice on how you can tell if they're a healthy shape:

Click here for the AUDIO FILE

Harper Adams University

CREST AWARDS

Reach Out ANIMALS MATTER

LOOK

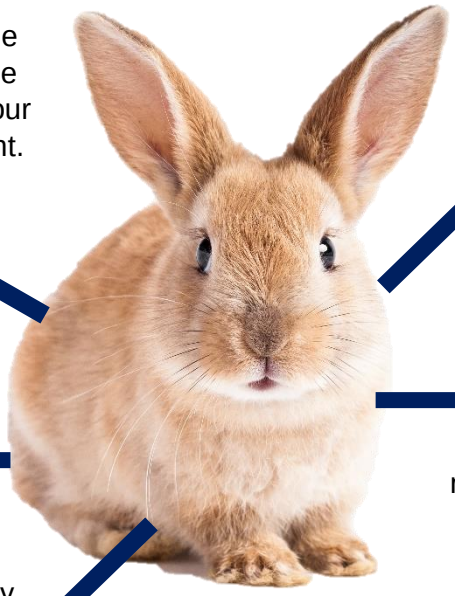
Look at the rabbit from the side and from above, you should be able to see the waist. If not, your rabbit might be a bit overweight.

FEEL

Run your hands over your rabbit's side. The skin should move freely over the ribs, which ought to be easy to feel.

FEEL

Gently squeeze the base of your rabbit's tail, where it joins the spine. There shouldn't be any build-up of fat.



FEEL

Run your hands along your rabbit's back. You should be able to feel the spine and hip bones quite easily under the skin, but they shouldn't be sticking out.

FEEL

Feel under your rabbit's tummy. It should go in, not bulge out.

As we've seen, a healthy diet is very important to prevent pet rabbits from becoming obese. Exercise, and the ability to burn calories, is also vital for their health and also their happiness.
Rabbits need lots of space to hop, skip, stretch and jump. They need a large run as well as their hutch. Giving rabbits hay to eat and putting it in different areas of their run gives them exercise and an activity to do. Giving rabbits enrichment activities is important to their health and happiness.
A study by one of our students at Harper Adams University showed that stress in rabbits almost halved when enrichment activities were present in their environment.

Amy Johnson is a BSc Bioveterinary Science student. She gave the rabbits four different enrichment activities. They were:

- **A tunnel that they could hide in.**
- **Some balls that they could push around.**
- **A box with soil that they could dig in.**
- **Piled up boxes for them to jump up on and down from.**

The rabbits at Harper Adams live in pairs and have large rabbit runs so that they can get lots of exercise every day. Amy studied 8 of the rabbits for her experiment. She put each of the activities in with each pair of rabbits for 5 days to see if the rabbits became happier and less stressed.

You might be wondering how she could tell that the rabbits were less stressed. To measure their stress level she studied their droppings. When animals (and humans) are stressed, their bodies create more of a hormone called cortisol. This can be present in their faeces. Amy tested the rabbit droppings before and after the enrichment activities to see how much cortisol was there.
Amy found that the amount of cortisol in the droppings had gone down by nearly half when the rabbits had the enrichment activities. This shows that the rabbits felt less stress and were more relaxed and happier when they had activities to do.
Too much cortisol can suppress the immune system and contribute to obesity, so it is important for all animals and humans to not go through long periods of stress.

Research

Adaptation, Environment & Competition

Should wolves and other animals be reintroduced into the UK?

A Harper Adams University student, Georgina, is looking into the public perception of rewilding in the UK.

Rewilding is the reintroduction of animal species, which used to be native but have since disappeared, in the hope it will help with the management of the countryside. It's increasingly being used globally as a conservation tool. Animal species can become extinct within an area for various reasons, like habitat loss, pollution, population growth of other species, and overconsumption by predators. Wolves have been driven to extinction in areas due to hunting by humans; some for sport and others in an attempt to preserve their livestock.

The rewilding of a species can create a trophic cascade in the area, affecting other animal and plant species. A trophic cascade happens when a top predator is added or removed from a food chain. The change this creates cascades down the food chain.

Georgina has looked at rewilding projects around the world. She said, "One of the greatest rewilding success stories is the reintroduction of wolves into Yellowstone Park in America.

"They were reintroduced in 1995 and since then the elk numbers have declined, beaver numbers have increased and willow is surviving longer."

The trophic cascade at Yellowstone following the introduction of the wolves, a top predator, caused the number of other species to increase or decrease. As Georgina said, the number of elk in the park decreased, the number of beavers increased, and the willow survived longer.

Why do you think this happened?

Before the wolves were rewilded

Elk had predators on the park, but they were not in all areas. The elk had more time to browse on plants in the safer areas, particularly willow. They ate the willow down to the nub. The willow did not have time to grow and thrive, especially in winter.

Beavers have two uses for willow. They eat it and they use it to build nests and dams. They do not eat as much of the plant as elk do. The elks eating all of the willow during the winter meant that beavers could not make strong and warm nests for winter and so very few could survive.

After the wolves were rewilded

The introduction of wolves, who have a large hunting area, meant that more elk were being eaten.
The elk adapted their behaviour by moving around the park more to avoid the wolves. This meant they spent less time eating the willow.

With fewer elk to eat the willow, and less of it being eaten due to the lack of time the elk had, the willow was able to grow and mature.
More beavers survived the winters because they had more willow to eat and use for shelter and dam building.

Click here for the AUDIO FILE

Harper Adams University

CREST AWARDS

Reach Out ANIMALS MATTER

A lot of scientific studies have been done on the rewilding of wolves to Yellowstone Park and the effect it has had on other species. Georgina said, “There’s no scientific evidence saying what will definitely happen if species are reintroduced. Animals that could be reintroduced into the UK include elk, lynx, wolves and goshawks.”

Although wolves have become extinct in certain areas, they are still one of the most broadly distributed mammals on earth. Wolves can be found in the artic tundra, subtropical forests and desert. They are able to survive in these vastly different environments because of their physical and behavioural adaptations.

Physical adaptations:

- Wolves have a double-layered coat. The outer layer is coarse and deflects water and the undercoat is similar to wool and provides warmth and insulation. Wolves that live in colder climates grow thicker, longer fur.
- Wolves have a big, bushy tail. The large amount of fur on the tail is used for warmth, as they wrap it round their faces when they curl up to sleep.
- Wolves have large paws and long legs, which enable them to cover long distances. They can run at 40mph.

Behavioural adaptations:

- Wolves hunt in packs so they are able to take down much larger prey than they would on their own. This also enables them to hunt over a larger area, which is useful in places where prey is sparse or more sparsely separated.
- As they are pack animals, wolves have a more complex system of communication than lots of other species. They even use their fur to communicate – they bristle the fur on their neck to show aggression.
- Only the alpha female and male have pups in a pack. The rest of the pack help to look after the pups, but do not have their own. This helps to maintain order within the pack, because the hierarchy remains clear and it creates a stronger bond between animals.

References:
Pegler, T (2019) 1995 Reintroduction of Wolves in Yellowstone

https://www.yellowstonepark.com/park/yellowstone-wolves-reintroduction
What adaptations do wolves have?

https://sciencing.com/adaptations-do-wolves-8484750.html

So, how do you think you would feel about wolves being rewilded in the UK?
Would you like to see a wolf pack while you’re out on a walk?
How do you think other species might be affected by their introduction?

Digestion in animals, keeping farming sustainable

Research

Four final year students at Harper Adams University are investigating the effects of using forage crop lucerne in the diets of high-yielding dairy cows.

This programme of work is funded by DairyCo and is being undertaken as part of the DairyCo Grassland, Forage and Soils Research Partnership, a five year research collaboration led by SRUC in partnership with Harper Adams University and the University of Reading.

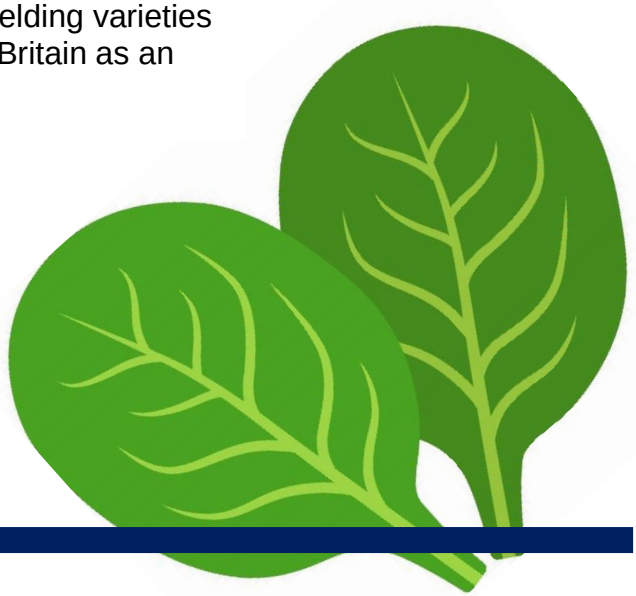
22-year-old Ross Edwards from Tavistock studies BSc (Hons) Agriculture. He said: “A group of students, including myself, are investigating the effects of lucerne on dairy cow performance.

“I’ve been looking at the intake and performance of the 20 cows taking part in the trial. We’re using four different diets that replace grass with lucerne at different ratios. The cows then eat from special RIC feeders which allow the animals to only eat from the correct bin, and how much they do eat is then measured.

“Hopefully, lucerne will give farmers an extra forage crop to use in the cows’ diets, which is a proven protein source and an alternative to grass silage.”

Weather conditions in the UK are not generally suitable for growing high-yielding protein crops, which has led to soya being imported. The British dairy industry is now looking to develop better-yielding varieties of protein crops, such as lucerne, that can be grown in Britain as an alternative to soya.

Click here for the AUDIO FILE



Harper Adams University

CREST AWARDS

Reach Out ANIMALS MATTER

Activity 1 – Animal MOT

This activity will talk you through the stages of giving your pet an 'Animal MOT' - You should then be able to carry out these observations at home with your own pet, ideally with the help of an adult. Remember to wash your hands before and after the MOT and treat your animal with care – they have feelings too!

STEP ONE - COAT

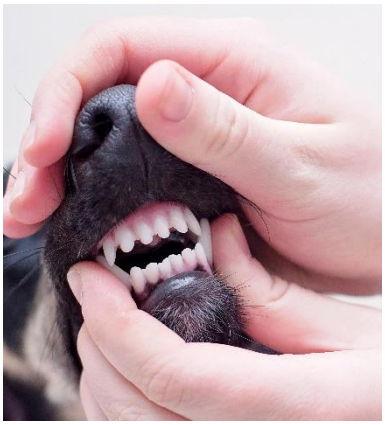
Is their fur smooth and glossy?
Is it clean from mud, ticks and fleas?
Is it free from any grease and/or dandruff?

STEP TWO - BODY

Gently run your hands all over your pet and check for things that shouldn't normally be there, such as any debris stuck in their paws, anything stuck in their fur, such as sticky weeds or mud from outside

STEP THREE – FACE

NOSE – Your pet should have a healthy nose, with no snot! Dogs' noses should be moist, and cats' noses will vary from being wet or dry throughout the day
EYES – Your pets' eyes should be shiny, bright and clear, not red or weeping.
EARS – Very carefully look at your pet's ears, they should be clear from wax and mites and they shouldn't smell.



STEP FOUR - TEETH

Just like us, our animal should have nice pink gums, no swelling and clean, white teeth. Yellow teeth in animals can mean too much plaque.

STEP FIVE

Dogs need plenty of exercise, such as lovely walks with their owners. Ideally two walks a day if this is possible. Your dog should enjoy these walks and not find them difficult, so warning signs that your dog may be struggling with its exercise are:

- Excessive panting when returning from the walk
- Showing signs of aches or stiffness
- Refusal/lack of interest in walks

STEP SIX

Usually, it's easy for us to see whether your pet looks overweight or underweight. But it helps to do a more thorough check, especially if you don't come across many other pets for a comparison. The next page gives step by step instructions on how to check your animal's body weight health.

Activity

A healthy diet and lifestyle is important for humans.

We know that humans get their energy from food and that it's vital we eat as healthy as possible.

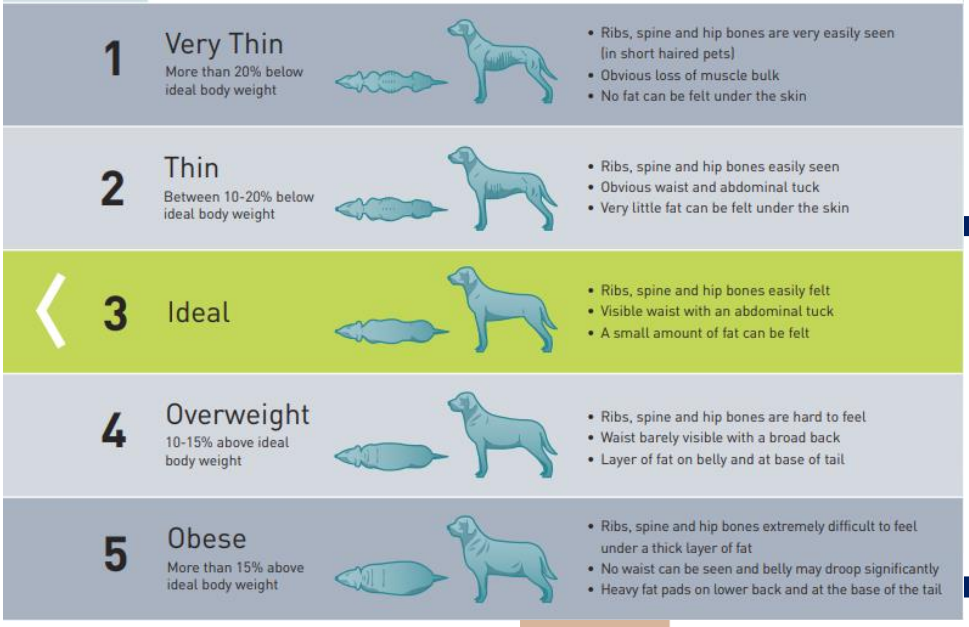
If we eat too much, we can get overweight, and if we eat too little, we can get underweight.

This is the same for our pets!

The animals that live with us need to eat a correct, balanced diet just as much as we do.

So it is up to us to keep them healthy.

Dog Size-O-Meter



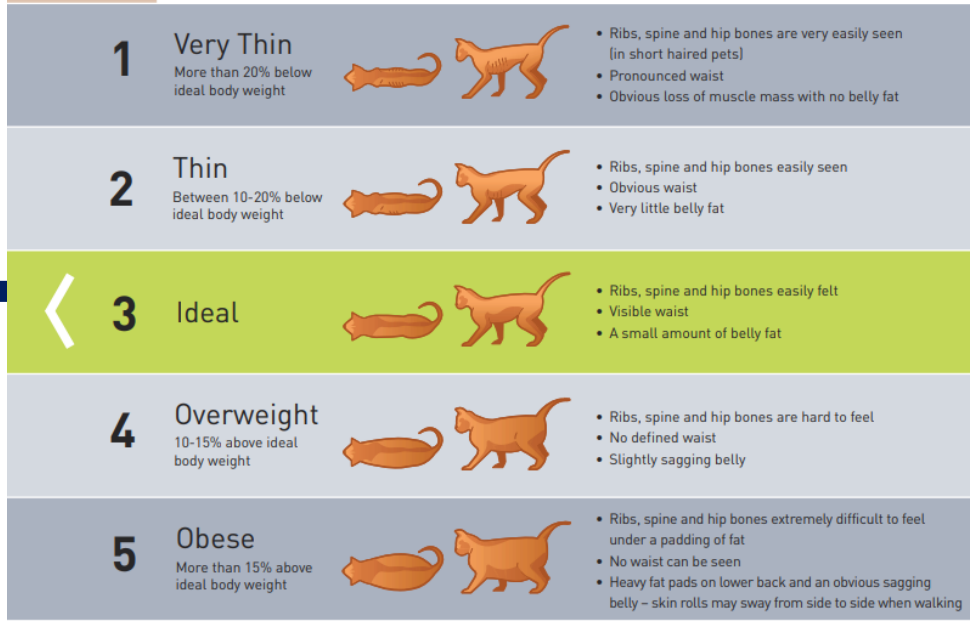
The images below are from a website from the extremely informative Pet Food Manufacturers Association 'PFMA'. You can find a wealth of information via their website, including the Pet Size-O-Meters for various animals, nutrition fact sheets and pet fitness initiatives
- www.pfma.org.uk

Activity

https://www.pfma.org.uk/_assets/docs/pet-size-o-meter/pet-size-o-meter-dog.pdf

Please refer to the full document via the link above for full descriptions, notes and tips for assessing your animal's weight.

Cat Size-O-Meter



https://www.pfma.org.uk/_assets/docs/pet-size-o-meter/pet-size-o-meter-cat.pdf

Please refer to the full document via the link above for full descriptions, notes and tips for assessing your animal's weight.

Some hints and tips from a Harper Adams animal studies lecturer on fun ideas to keep your pet active and healthy

Scatter food in the garden/patio for your pet to find

Use biscuits to train your dog to do tricks

You can buy and make treat rollers, slow food dispensers to encourage slower eating

Make their food a little harder to reach/hide it as a game for them to find it

MAKE SURE that for any additional treats you substitute with extra exercise

Harper Adams University

CREST AWARDS

Reach Out ANIMALS MATTER

Activity

Activity 2 – Animal Adaptation

Having read a little about animal adaptation, you will know that learning about this subject falls under the topic of habitats and ecosystems. The activity below will give you an opportunity to think further about possible animal adaptations and you will even get to make up a hypothetical adaptation process.

Animals in hot climates
We are going to be referring to a video clip resource on BBC Bitesize for this activity. But before you watch the video, I want you to think about the three animals below, that live in hot climates.

List 4 ways these animals survive in the Australian heat

Kangaroo

Crocodile

Emu

Now watch the short video about these 3 animals and see if the 4 points you listed per animal are mentioned...

https://www.bbc.co.uk/bitesize/clips/zndyr82

On a separate piece of paper, or the back of this page, list all the extra adaptations these animals have made to survive living in intense heat.

Hypothetical design challenge:

Just imagine, that hypothetically, these animals appeared in a cold climate, this could be a cold winter's day in England, or a normal chilly day at the North Pole. *How would they adapt to survive?* You can choose all 3 of the animals above or focus on just one. You might need to research or talk to others about animals that live in cooler climates and what they do to survive.
Then you can apply that knowledge to your chosen animal.

How can you present your work?

You can either write a piece of work on your findings and ideas, or you can draw a picture of the animal and its new adaptations. If you're feeling creative, you could even demonstrate your ideas through craft, music or even drama!

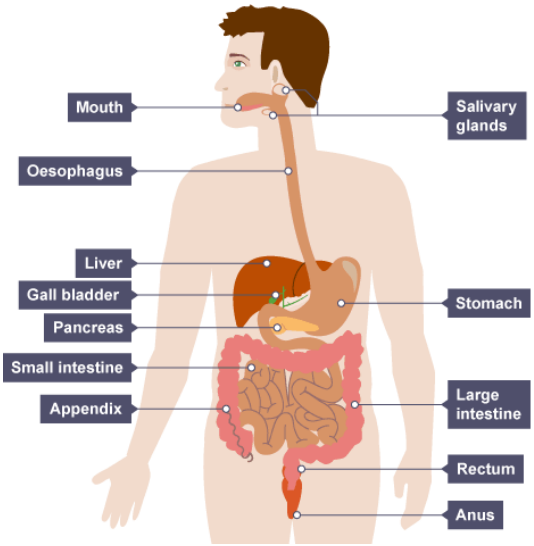
Activity 3 – Digestive systems. Humans vs animals

You will probably already know quite a bit about the human digestive system; that it has 2 main functions

1 To break down food

2 To provide a large enough surface area for maximum absorption of food

But did you know that animals digest differently to humans? And do you know how? Let's use a cow as an example…



Picture from
https://www.bbc.co.uk/bitesize/guides/zwqycdm/revision/1

Humans have an alimentary canal, which is all the organs of the digestive system.

The difference is mostly because of diet. Humans eat both plants and meats, whereas cows only eat plants. Plant material is more difficult to digest, so takes time.

Activity

The teeth take part in the initial stage of the digestion process. Humans have incisors, canines and molars.

Food is ingested and peristalsis happens when muscles contract and push the food to your gut

Enzymes are produced and food is broken down ready for absorption into the body

Digested food molecules are absorbed through the walls of the intestine and into the blood

Digested and undigested molecules have two different outcomes after passing through the gut

Assimilation – providing energy and proteins to repair

Egestion – semi-solid waste of water, bacteria and indigestible food is removed from the body through faeces

Based on your knowledge of the human digestion system, see if you can put the following facts below about a human and a cow's digestive system into the correct areas on the next page – I've started the first one…

Harper Adams University

CREST AWARDS

Reach Out ANIMALS MATTER

Human

Cow

Digestive process performs regurgitation

Small intestine is 6.1m long

Has a single stomach

Digestive process doesn't make it possible to regurgitate

Herbivore – only eat plant material

Lacks enzymes to digest proteins

Produces 1 – 1.5 litres of saliva a day

Produces enzymes to digest proteins

Small intestine is 46m long

Omnivore – eat plant and animal material

Teeth chew laterally (side to side)

Produces 65 litres of saliva a day

Has 4 stomachs

Teeth chew vertically

Answers

Answers

Human

Cow

And just to confuse matters further, not all animals have the same digestive system! Cows are 'ruminants' as are sheep, goats, deer and giraffes!

Other animals are monogastric, meaning they have one compartment in their stomach like humans, such as rhinos, dogs, cats and pigs.

Then there is also the avian digestive system, which covers all birds.

Harper Adams University

CREST AWARDS

Reach Out ANIMALS MATTER

Animals Courses and Careers

Veterinary Nursing

- Veterinary Nursing – BSc/BSc (Hons)
- Veterinary Nursing with Small Animal Rehabilitation – BSc/BSc (Hons)
- Veterinary Nursing with Companion Animal Behaviour – BSc/BSc (Hons)

Entry Requirements:
96 - 112 UCAS points (CCC – BBC)
A2 Biology – C
BTEC D*DD (Minimum 13 Units at D)
2 weeks work experience in a Veterinary practice required (with supporting references)

Veterinary Physiotherapy

Veterinary Physiotherapy – BSc (Hons)

Entry Requirements:
Veterinary Physiotherapy BSc (Hons):
A level – ABB (A2 Biology A/B + another science)
BTEC D*D*D*
5 GCSEs at grade A/B 7/6 (including Science and English) and Maths at grade B/6

Zoology

Applied Zoology – BSc/BSc (Hons)
Zoology with Environmental Management – BSc (Hons)
Zoology with Entomology – BSc (Hons)

Entry Requirements:
104 UCAS points (BCC)
BTEC D*DD

Animal Sciences

Animal Behaviour and Welfare – BSc (Hons)
Animal Health and Welfare – BSc (Hons)
Animal Production Science – BSc (Hons)
Veterinary Bioscience – BSc/BSc (Hons)

Entry Requirements:

Animal Health and Welfare/Animal Behaviour and Welfare:
88-104 UCAS points (CCD – BCC)
BTEC MMM - D*DD

Animal Production Science / Veterinary Bioscience:
104-120 UCAS points (BCC – BBB)
BTEC MMM - D*DD

Harper Adams University

CREST AWARDS

Reach Out ANIMALS MATTER

Thank you for completing your activities around Animals.

We hope you enjoyed learning more and getting creative.

If you would like to have a look at more of our education packs, please visit our website for more information.

VIDEOS PRODUCED WITH DOODLY

Harper Adams University

Harper Adams University
Newport
Shropshire,
TF10 8NB
T: 01952 815 000

Follow us on:

@harperadamsuni
@HarperAdamsUni
@harperadams

harper.ac.uk