# T Level Technical Qualification in Animal Care and Management

# Animal Management and Science Occupational Specialism

## Synoptic Assignment Guide Standard Exemplification Material Threshold Competence

| Version and date | Change detail | Section |
|---|---|---|
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# Contents

# Introduction

The sample evidence within this document refer to the Animal Management and Science Occupational Specialism synoptic assignment. The aim of these materials is to provide centres with examples of knowledge, skills and understanding that attest to a threshold competence grade. The evidence presented here has been developed to reflect a threshold competence grade within each task but is not necessarily intended to reflect the work of a single candidate. It is important to note that in live assessments a candidate's performance is very likely to exhibit a spikey profile and the standard of performance will vary across tasks. The Guide Standard Exemplification Material (GSEM) illustrates linear performance across all pieces of evidence at the grade. A threshold competence grade will be based on a synoptic mark across all tasks.

The evidence in this GSEM is separated into the sections as described below. Evidence is presented against tasks from the synoptic assignment. Assessors using the GSEM may find it helpful to review this document along with the sample assessment materials (SAMs).

**Task**

This section details the evidence to be submitted for marking and any additional evidence required including any photo/video evidence. Also referenced in this section are the performance outcomes and the evidence will be marked against these when completing the tasks within it. In addition, evidence that has been included or not been included in this GSEM has been identified within this section.

In this GSEM there is evidence from:

- Task 1
- Task 2
- Task 3
- Task 4
- Task 5
- Task 6

**Evidence**

This section includes exemplars of evidence, photo/video recordings of the evidence in production (or completed) and assessor observation records of the assessment completed by centre assessors. This will be exemplar evidence that was captured as part of the assessment and then internally marked by the centre assessor.

**Word counts**

Typical word counts/page lengths, as indicated in the SAMs, are used as approximates for guidance to support the production of sufficient evidence. The marking will relate to the quality of the evidence produced and not whether the word count/page length has been met and candidates may be under or over the word count without affecting their grade.

## Commentary

This section includes detailed comments to demonstrate how the evidence attests to the standard of threshold competence.

It is important to note that the commentary section is not part of the evidence or assessment but are evaluative statements on how and why that piece of evidence meets a particular standard.

# Grade descriptors

**To achieve a pass (threshold competence), a candidate will typically be able to:**

Demonstrate an adequate level of performance that meets minimum industry requirements, to be able to enter the animal science industry to begin work in the occupational area.

Demonstrate an adequate understanding of husbandry plans and basic technical skills and techniques for carrying out routine health assessments associated with breeding and rearing animals.

Demonstrate a satisfactory understanding of human-animal interaction, applying safe and welfare orientated techniques when handling, restraining and moving animals, adapting them when necessary.

Interpret technical information to be able to plan and prepare equipment and work areas, assess risk and follow safe working methods appropriately when applying practical skills to a sufficient standard and within relevant legislation and regulations.

Produce basic population management plans for the care and monitoring of animals in accordance with relevant legislation, conservation and evolution.

Carry out adequate planning and research on reproductive technologies and gene manipulation including assessing the validity and reliability of sources.

Carry out basic analysis and evaluation of research to enable presentation of results to targeted audiences.

Demonstrate adequate knowledge and understanding of genetics and evolution of common wild and captive animals, health and nutrition for animals and the effects of disease on the animal with reference to veterinary practice and legislation.

Demonstrate adequate knowledge and understanding of fundamental scientific principles relevant to biology and chemistry for animal scientists.

Mostly use technical terminology accurately in plans, reports and documentation.

# Task 1 Health, accommodation and feeding plan

Evidence contributes to the following:

| Performance outcome(s) |
|---|
| PO2 Observe the behaviour, security and breeding practices of animals<br>PO3 Plan for and manage the good health and welfare of animals<br>PO4 Carry out safe animal handling practices |

| Evidence | Candidate producing | Assessor producing | Included in this GSEM |
|---|---|---|---|
| Task 1b - Health, accommodation and feeding plan for a mammal during pregnancy and lactation | √ | | √ |
| Task 1c - Care plan for the first 0-48 hours of the offspring's | √ | | √ |

## Task 1b) Create a health, feeding and accommodation plan for a mammal during pregnancy and lactation

## Candidate evidence – health, accommodation and feeding plan for a mammal during pregnancy and lactation

Introduction

I am creating a husbandry plan for a pregnant rabbit that is within the Guilds Animal Science Centre. By following this husbandry plan, you can help ensure a safe and successful pregnancy for the rabbit and the birth and care of healthy offspring.

We have to look at the Animal Welfare Act 2006 as this is the most important piece of law that we have to protect the animals and make sure they stay happy. The Animal Welfare Act 2006 has five welfare needs that we need to follow to make sure that the animal has everything that they need. These are:

- Need for a suitable diet
- Need for a suitable environment
- Need to be protected from pain, injury disease and suffering
- Need to be housed with or apart from other animals
- Need to exhibit normal behaviours.

If we do not make sure that these needs are met than we could risk going to prison or getting a large fine.

In the wild, rabbits live in groups of different ages and sexes so it is important that we make sure that a rabbit is not on its own in captivity because rabbits are social animals and prefer to live with another rabbit. Rabbits can reach puberty where they are able to mate with each other, between three to eight months of age depending on size. Does (females) become fertile a month earlier than bucks (males) because they mature early. Rabbits are pregnant for about a month and have an average litter size of five to eight kits (baby rabbits) which they need to look after really well as the kits are not able to look after themselves when they are born. Does can then become pregnant again within hours of giving birth because they store sperm. If a pregnant rabbit has reached 30 days after breeding and still has not given birth, then veterinary attention should be given as this is really serious and she could die. The vet will decide if the pregnant female is okay or if she needs a surgery to remove the babies. The longer the pregnancy, especially after 32 days, the higher the risk of the babies not being alive and she could die. The vet can feel the tummy of the rabbit to see if the rabbit is pregnant as they will be able to feel the kits inside but as a student we cannot do this or tell she is pregnant as we would not be able to tell unless she got fat.

Signs of pregnancy in a doe is difficult to determine until the doe starts building a nest with her bedding material and own fur in preparation a day or two before she gives birth. As the doe can become pregnant straight after giving birth, to prevent the doe from getting pregnant again, it is important to separate the buck and doe as soon as she shows signs of nesting to reduce the risk of further pregnancies.

Health and well being

Doing daily visual health checks for signs of illness or injury is important so that we can pick up any signs of a problem or an abnormality. If we do find an abnormality we would need to write it down on the record sheet and tell our supervisor straight away. The supervisor would need to sort out getting the rabbit to the vet for treatment to stop her being ill. They would need to sort out a good carry cage for the rabbits so that it can be safely taken to the vet and a vehicle for transport. If they do not follow this then it goes against the Animal Welfare Act 2006 and this causes suffering.

The rabbit's teeth and nails should be checked on a weekly basis as these can grow quickly. Rabbits' teeth grow throughout their lives and can grow into funny directions if left and this can cause the rabbit a lot of pain. This would go against the Animal Welfare Act 2006. Only vets should correct overgrown teeth under the Veterinary Surgeons Act 1966 as they are the only people that can legally do surgery on rabbits. We need to monitor the doe for signs of illness or distress, such as reduced appetite, lethargy, or abnormal behaviour and if any of these are seen we need to tell the supervisor straight away. The doe needs to be watched closely for signs of possible labour, such as nesting behaviour, restlessness, and pulling fur from her body to line the nest. This is normal behaviour before giving birth as she gets ready for her kits. It also needs to be quiet so that she does not get stressed and eat her babies.

Rabbits should be vaccinated every year to protect against myxomatosis and other diseases they can catch from each other, wild rabbits and other animals. Rabbits can be vaccinated from five weeks old by the vet. The vet needs to give the vaccination as they are the only ones that can legally do so. There are preventative treatments for rabbits and rabbits should receive care in grooming, nail care and teeth care.

Accommodation and enrichments

Provide a large and secure enclosure with sufficient room for the pregnant doe to move around comfortably so that she is not stressed. We need to have a nest box for the doe in the accommodation with bedding materials like sawdust and soft paper, that will help keep the kits warm and in one place so that they do not die. The nesting box should be slightly larger than the doe and placed on the opposite side of the accommodation from the toilet area to help avoid any cross contamination to the kits as we don't want the toilet area to make the nest box dirty with poo and wee. Use bedding material such as straw, hay, or shredded paper for nesting material because the kits cannot keep themselves warm as they have no hair and this is important so that they don't die. The enclosure needs to be kept clean and dry to stop bacteria and reduce the risk of infections as the kits would not be able to fight infections as they are so young and helpless. The environmental conditions need to be maintained with a comfortable temperature in the enclosure as this should be between 60-70°F, to prevent heat stress or getting cold as heat stress would mean that they would be too hot and their bodies would not be able to cope and getting cold would mean that they would freeze. The accommodation should protect the pregnant doe from drafts as this could give her a chill, and humidity and provide appropriate ventilation so that she can breathe fresh air.

In certain circumstances, the doe may exhibit behaviour that leads to the injury or death of their young (kits). If the doe is stressed, she may harm her offspring and show signs of cannibalism which is abnormal and should be avoided at all costs as it goes against the Animal Welfare Act 2006 as it is not protecting them from pain, injury, suffering and disease. If the doe is unwell, she may reject or harm them. To minimise the risk of harm to the kits, it's important to provide a calm and secure environment for the doe and kits where students do not go in and handle the kits for the first few days after they are born as this could cause stress. Ensure that she has a suitable nesting area with plenty of privacy, nesting material with minimal disturbances to avoid stressing the doe.

Supply a variety of toys, tunnels, and platforms to provide mental stimulation and opportunities for exercise which would prevent the doe from getting fat and obese. Allow supervised time outside of the enclosure for exploring and exercise which would also allow grazing as this is a natural behaviour for the rabbit, but ensure the area is safe and predator-proof. Rabbits chew, which helps wear down their teeth. Providing safe chew toys made of wood, cardboard, or other rabbit-safe materials gives them enrichment. Rabbits enjoy exploring and hiding in tunnels and hideouts. These enrichments reduce stress and means we do not go against the Animal Welfare Act 2006 and meet the need for exhibiting normal behaviour.

Nutrition

Provide a balanced diet which has a lot of fibre, such as hay, grass, fresh vegetables, and a small amount of high-quality rabbit pellets. These pellets can be bought from the pet shop and we should avoid buying muesli even though it is cheaper. Give the rabbit access to constant clean, fresh water at all times as dirty water would have lots of bacteria in it and this could make them ill. Increase the doe's food intake during pregnancy, and whilst nursing her kits as she would need extra food to make milk when she starts lactating. Rabbits also eat their own poo to help digest their food which is normal. Pregnant and nursing does will eat more food because they are feeding both themselves and their kits so will need more fresh vegetables and hay. Scatter feeding or hiding food around the enclosure encourages the rabbit to engage in natural foraging behaviours and moving around more.

Handling pregnant rabbits
You need to be gentle when handling a pregnant doe so as not to hurt her or stress her. Do not pick her up by her ears as this is painful and will go against the Animal Welfare Act 2006. Rabbits are good at jumping so you need to be careful that they do not jump out of your arms whilst you are holding them as they could break their legs and die. Avoid sudden movements or loud noises that could stress the rabbit and cause it to jump. Whilst it is important to monitor the health and well-being of the pregnant rabbit, it is advised to limit handling unless it is required. Too much handling can cause stress and discomfort and go against the Animal Welfare Act 2006. Place one hand under her chest and the other hand under her hindquarters to lift the doe.

Husbandry plan for the pregnant doe
Diet

- An unlimited amount of hay
- 1-2 handfuls of leafy greens, carrots, broccoli
- A small bowl of high-quality pellets (25 grams depending on weight)
- 1-2 pieces of fruit (apple slice)
- A constant supply of fresh, clean drinking water.

Cleaning

- Spot clean daily to remove any wet or soiled bedding, place fresh straw to replace what has been removed
- Full clean: remove all bedding, enrichments, bowls and water bottles. Disinfect the accommodation, enrichments with Safe4 disinfectant (rinse with water after cleaning). Place fresh straw in the accommodation and place all the enrichments, bowls and bottles back into the accommodation
- DO NOT CLEAN THE ACCOMMODATION IF THE DOE IS IN LABOUR.

Consequences to not following the plan
If the plan is not followed, the doe might eat or reject the kits. The doe may become unwell and lose weight or not eat and this may cause her behaviour to change. If the accommodation is not cleaned this could cause infection. If there is no enrichment the doe might get bored and show atypical behaviour.

These go against the Animal Welfare Act 2006 and you could get a fine or go to prison.

## Commentary

The candidate has demonstrated an adequate understanding of husbandry plans by producing a basic and mostly relevant plan for the rabbit, meeting the requirements of the brief and in line with relevant legislations and regulations. The husbandry plan has adequate structure but has missed opportunities to align the diet and cleaning with the nutrition and accommodation sections. For example, the husbandry plan is functional and can be used to look after the animal with reference to the Animal Welfare Act, however, the use of bullet points rather than a tabular format, makes it more difficult to follow quickly and easily and does not include separation between daily, weekly and monthly instructions.

Information about the care of the rabbit shows basic understanding, with an adequate range of accurate and relevant considerations to meet the animal's welfare needs. They have given

specific care instructions for the animal that are adequate for its overall care but missed opportunities to give the reasoning behind their choices. For example, the candidate has listed preventative care such as teeth and nails with when veterinary care is needed. However, there are missed opportunities to give justifications for the preventative care such as the health conditions they could prevent and their link to the five needs.

The candidate has given some adequate justification of husbandry choices throughout the plan to reduce risk of harm to the rabbit or kits but has missed opportunities to explain this further or lost focus where information is not entirely accurate or fully relevant to the brief. For example, the candidate has talked about the importance of reducing stress to the rabbit, however, this is not fully linked this to the consequences of not following the plan.

The candidate has also given examples of husbandry requirements such as the types of bedding like sawdust and soft paper, but these are not fully accurate and there is repetition of the Animal Welfare Act without showing further knowledge and justification of how it could be used appropriately.

## Task 1c) Create a care plan for the first 0-48 hours of the offspring's life

## Candidate evidence – care plan for the first 0-48 hours of the offspring's life

Caring for the Doe and Kits
You should visually check the kits in their nest every day for signs of potential problems, but handling is not recommended until the kits are at least ten days old. There's no need to handle them unless there are concerns about the health and welfare of the kits or the doe. Allow the doe to bond with her kits, and nurse them as soon as possible after birth. It is likely you will not see the kits in the first 48 hours as they will be in the nest – you may just hear squeaking.

A rabbit litter is usually around 6 kits but could be up to 14 kits. Kits are born blind, deaf, and without fur. The kits are dependent on the does milk. It's really important to allow the doe to care for her kits. But you still need to complete a husbandry plan for the doe and kits such as:

- Provide them with a quiet and secure environment to minimise stress
- Give them plenty of fresh water, and a good diet for the doe
- Do not clean the accommodation in the first 48 hours
- Do not disturb the nest area where the kits are as this could threaten the doe which could cause her to harm the kits
- If you see a kit out of the nest, it has probably been rejected and will die.

Provide the doe constant access to food and water. The doe will need constant access to food and water to eat ad-lib whilst she's nursing the kits. Put out plenty of fresh food daily and check her water often, as she'll drink more than normal.

The doe's natural instinct is to stay away from the nest most of the time as this is what they would do in the wild. The doe will only nurse the kits once or twice a day which is normal behaviour. Contact your veterinary surgeon if the mother isn't nursing. If the kits are weak with sunken tummies, then the mother isn't properly nursing them, and you should seek veterinary attention.

Kits can get cold very easily due to having no fur which can cause death. Due to this provide a suitable amount of bedding in the nesting box for extra warmth.

## Commentary

The candidate has demonstrated a basic understanding of husbandry plans by producing an adequate care plan for the kits in line with the requirements of the brief and relevant legislations and regulations. The husbandry plan is written in an adequate order and where the husbandry need is not possible within the first 48 hours the candidate has given some further explanation. For example, where the kits cannot be handled in the first 48 hours, the candidate has explained to listen out for squeaking. However, the candidate has missed further opportunities to explain this further such as what to do if they cannot hear the vocalisations.

Information about the care of the kits is basic with mostly accurate information. They have explained that it is important not to disturb them too quickly after birth. For example, the

candidate has explained a quiet and secure environment will limit stress, demonstrating some understanding of maximising the health and welfare of the animals. However, they have missed further opportunities to discuss these links in detail such as the consequences that stress may cause.

The candidate makes some adequate justifications of husbandry choices to correctly care for the doe and kits, but this is not consistent. For example, the candidate has given recommendations for not cleaning accommodation and explained that this may cause the doe to reject the kits. However, the candidate has missed the opportunity to give similar justification to the feeding and watering requirements where the increase on requirements has not been explained.

NOTE: The GSEM evidence for the Threshold Competence and Distinction candidates is showing one example of a precocial species and one example of an altricial species. This is to give examples to centres of the information a candidate would be expected to produce for the very different levels of care required in these species, especially for the care plan for the offspring where the ability to handle the young is very different.

# Task 2 Health assessment

Evidence contributes to the following:

| Performance outcome(s) |
|---|
| PO2 Observe the behaviour, security and breeding practices of animals<br>PO3 Plan for and manage the good health and welfare of animals<br>PO4 Carry out safe animal handling practices |

| Evidence | Candidate producing | Assessor producing | Included in this GSEM |
|---|---|---|---|
| Task 2a - Completed risk assessment | √ | | √ |
| Task 2b - Assessor observation | | √ | √ |
| Task 2b - Photo(s) | | √ | √ |
| Task 2c - Assessor observation | | √ | √ |
| Task 2c - Video(s) | | √ | √ |
| Task 2d - Health check form | √ | | √ |
| Task 2d - Written report | √ | | √ |

## Task 2a) Complete a risk assessment for the handling, restraint, movement and health assessment of the mammal

## Candidate evidence – completed risk assessment

## Figure 1 - Candidate evidence - Risk assessment

**This template may be modified by adding items/rows only.**

| | | | |
|---|---|---|---|
| Candidate's name | TC Candidate | Enrolment number | CG12345 |
| Task / Activity | Task 2a | Location | Animal Centre |
| Assessor's name | A N Assessor | Date | 04/04/2024 |

| Item no. | What are the hazards? | Who might be harmed and how? | What control measures are already in place? | Risk rating (high/medium/low) | What further action is necessary? | Action by who and when? | Residual risk rating (high/medium/low) |
|---|---|---|---|---|---|---|---|
| 1 | The animal (ferret) | Self.<br><br>Bitten or scratched by the animal. | PPE.<br><br>Practice in handling the animal.<br><br>Don't frighten the animal.<br><br>Care when handling. | High | Improved knowledge of the animal's behaviour.<br><br>Methods of handling the animal are practiced. | Self | High |
| 2 | The animal (ferret) | Self.<br><br>zoonotic disease caught from the animal. | PPE.<br><br>Hand cleaning. | High | Make sure examination table and hands are cleaned after handling and health checking the animal. | Self | High |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3 | Animal enclosure | Self.<br><br>Falls, injury when getting into or out of the enclosure.<br><br>If the enclosure is damaged, may get an injury - cut or scratch.<br><br>If enclosure floor is uneven may slip or trip. | Taking time not to rush getting onto or leaving the enclosure.<br><br>Watch where I'm going in the enclosure.<br><br>PPE. | Medium | Examine the enclosure before getting in to see if there are any damaged areas.<br><br>Look at where the animal is in the enclosure before getting in.<br><br>Make sure my footwear is suitable. | Self/Manager | Medium |
| 4 | Practical room | Self.<br><br>Slips and falls.<br><br>If floor of the practical room is wet or cluttered, we could slip or fall. | Make sure floor is dry.<br><br>Make sure all clutter is put away or tell the assessor. | Medium | Any equipment I use is put out of the way, so I don't fall over it during the assessment.<br><br>Being careful when in the practical room. | Self/Assessor/Manager | Medium |
| 5 | Chemicals - disinfectant | Self/Assessor.<br><br>Chemical on my skin can burn cause injury.<br><br>Spilling the chemical on floor, make floor wet and easy to slip. | PPE.<br><br>Care when pouring the disinfectant needed to clean the examination table after the health check assessment. | Medium | Tell assessor straight away if any chemicals have spilled - will need a yellow sign.<br><br>Diluted disinfectant should be put into small spray containers for easy use. | Assessor/Manager | Medium |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6 | Equipment (location & weight) | Self.<br><br>Injury from getting temporary enclosure if high up.<br><br>Injury from lifting carrying equipment. | If equipment is on a high shelf, get ladder or stool to help me reach.<br><br>Ask the assessor if they are taller to reach the equipment/enclosure I need. | High | Make sure all equipment and enclosures are not on high shelves.<br><br>Make sure the enclosures are not heavy so we can lift them with the animal in.<br><br>Lifting/carrying training. | Self/Assessor/Manager | High |
| 7 | Waste disposal | Self.<br><br>Injury from lifting and carrying the waste bag.<br><br>Catching zoonotic disease from animal waste in the bag. | Make sure the waste bag/bin is not overflowing or too full so not too heavy to carry.<br><br>Safe lifting from legs not back. | Medium | Training in how to lift items properly.<br><br>Ask for help if too heavy or use trolly to wheel the bin to the disposal point. | Self | Medium |
| 8 | PPE | Self.<br><br>If my PPE is damaged/dirty - can be injured, scratched, catch zoonotic disease. | Check my PPE is clean and not damaged before going to the assessment.<br><br>Make sure I have all the PPE needed for the assessment. | Medium | If PPE is dirty – clean.<br><br>If PPE is damaged - get some new ones. | Self | Medium |
| 9 | | | | | | | |

| | |
|---|---|
| Date: 04/04/2024 | Risk assessment carried out by: *TC Candidate* |

## Commentary

The candidate has sufficiently assessed risk by completing a risk assessment, showing an adequate understanding of the requirements of hazards, risks and control measures that may occur as part of a health assessment within relevant legislation and regulations. The candidate identified an appropriate range of potential hazards and control measures that could be considered but this often lacked detail. For example, they identified PPE as an adequate control measure for many of the hazards. However, they did not give detail as to which PPE would be suitable for each of the hazards.

The risk assessment was completed with a sufficient understanding of the difference between hazards, risks and control measures, and gave reasonable initial risk ratings, but missed opportunities to lower these in response to the further control measures that they identified. For example, the candidate identified some further actions to minimise the risks such as training. However, they did not alter the residual risk ratings as a result showing a lack of understanding of how the measures affected it.

## Task 2b) Handle, restrain and move the mammal

## Assessor evidence – assessor observation

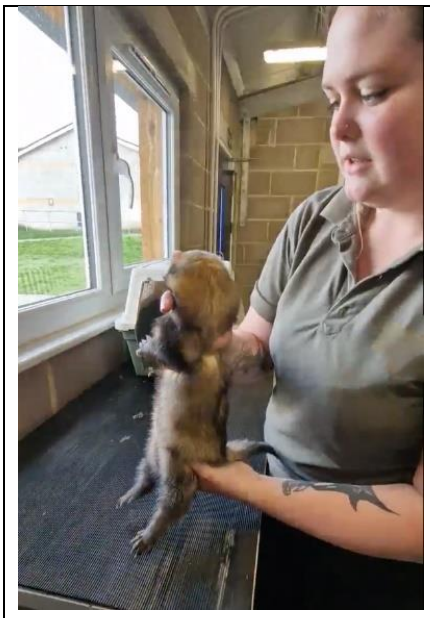
| Task | Assessment component number |
|---|---|
| Task 2 – Health check<br>b) Handle, restrain and move | 8717-409 |
| **Candidate name** | **Candidate number** |
| A Candidate | CG12345 |
| **Centre name** | **Assessor** |
| A Centre | An Assessor |

Complete the table below referring to the relevant marking grid, found in the assessment pack. Do not allocate marks at this stage.

| **Assessor observation** | **Notes –** *detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.* |
|---|---|
| b) Handle, restrain and move | The candidate:<br>• wore appropriate PPE (uniform and boots) and washed their hands before starting the task. While hand washing, they noticed the internal door was open and thus the room was not secure. They closed the door and returned to their hand washing procedure<br>• took around 30 seconds to examine the animal identification details on the front of the ferret enclosure<br>• collected the necessary equipment required, namely a carry basket<br>• examined the carry basket briefly<br>• entered the ferret enclosure, placed the carry basket on the floor and allowed the allocated ferret to enter<br>• lifted the carry basket containing the ferret without adopting manual handling<br>• placed the basket onto the examination table and retrieved the ferret by holding the ferret around the chest, behind the front legs and mostly supported its weight with the other hand<br>• moved with the ferret if it wriggled, using the table to help resecure the grip if necessary. |

| Assessor signature | Date |
|---|---|
| *A N Assessor* | 04/04/2024 |

## Assessor evidence – photo(s)



Ferret handling, supporting under the front limbs and hindquarters

Ferret handling, supporting under the front limbs and hindquarters.

## Commentary

The candidate demonstrated basic technical skills and techniques when preparing for and carrying out their handling and restraint on the ferret using adequately safe and welfare orientated working methods. For example, the candidate did ensure the area was secure and wore appropriate PPE. However, the door was shut after washing their hands which could have introduced contamination to the ferret.

The candidate showed adequate handling and restraint skills, with adequate dexterity when removing the ferret from the carrier by using one hand to remove it safely. The candidate maintained adequate welfare standards but missed the opportunity to show higher level restraint techniques. For example, they handled the ferret appropriately and monitored the animal during the task. However, when the ferret was wriggling, they could have adopted a different restraint such as the backpack restraint which would have increased the security of the ferret during handling.

## Task 2c) Carry out a physical health assessment on the mammal

## Assessor evidence – assessor observation

| Task | Assessment component number |
|---|---|
| Task 2 – Health check<br>c) Physical health check | 8717-409 |
| **Candidate name** | **Candidate number** |
| A Sample Candidate | CG1234 |
| **Centre name** | **Assessor** |
| Guilds Centre | A N Assessor |

Complete the table below referring to the relevant marking grid, found in the assessment pack. Do not allocate marks at this stage.

| **Assessor observation** | **Notes –** *detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.* |
|---|---|
| c) Physical health check | The candidate:<br>• started the physical health check with examining the nose, eyes and ears. They then progressed to examining the coat condition before examining the ferret's mobility, limbs and feet<br>• when looking at the nose and eyes did not touch the ferret to help them see the body parts more clearly but they did move the ears when needed<br>• did not check some parameters:<br>  ○ weight<br>  ○ respiratory rate<br>  ○ pulse<br>  ○ temperature<br>  ○ body condition<br>• correctly handled the ferret throughout the health assessment, and a change of handling was demonstrated when examining the ventral abdomen and reproductive organs compared to the head area<br>• once the physical health check was completed, returned the ferret into the open carry basket, tipped up the basket and returned the ferret to its original enclosure. The ferret was allowed to leave the carry basket<br>• exited the ferret enclosure and closed the enclosure door |

| Assessor observation | **Notes –** *detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.* |
|---|---|
| | • did not observe the ferret after returning<br>• cleaned the carry basket and returned the cleaned basket to its storage location. |

| Assessor signature | Date |
|---|---|
| *A N Assessor* | 04/04/2024 |

## Assessor evidence – video(s)

AMS_GSEM_Synoptic_Assignment_Task_2_Health_assessment_ferret_TC.mp4

## Commentary

The candidate demonstrated satisfactory practical skills to undertake a health assessment using mostly safe and welfare orientated techniques. The health assessment included both visual and physical checks to assess the health status of the ferret, but they missed opportunity to give a fully thorough check. For example, the candidate checked most of the health parameters for the ferret. However, they missed opportunities to check all of the parameters and things were missed such as weight and body condition which could have an impact on the health and welfare of the animal.

The candidate maintained satisfactory handling throughout the health assessment, using mostly safe and welfare orientated techniques and adapting their handling where necessary to ensure the ferret's welfare was not affected. However, this often meant that the ferret was put onto the table so that they could change their grip, rather than keeping hold of it at all times.

## Task 2d) Health check form and written report

## Candidate evidence – completed health check form

## Figure 3 - Candidate evidence – Health check form

**This template may be modified by adding items/rows only.**

| | | | |
|---|---|---|---|
| Candidate's name | A Sample Candidate | Enrolment number | CG1234 |
| Task / Activity | Task 2d | Location | Small mammal practical room |
| Assessor's name | A N Assessor | Date | 5/4/24 |

| Health check parameter | Findings | Comments |
|---|---|---|
| Nose | Nothing abnormal seen<br>No discharge | Looks normal because there is no discharge |
| Eyes | Eyes are open and clear. Ferret is blinking ok<br>No discharge | All normal because they are open and clean |
| Ears | Both ears are clean<br>Nothing inside ears | Normal because they are clean and not smelly |
| Coat | Coat is clean, not dirty. Looks shiny<br>No problems | All normal with no bald patches or lumps and bumps |
| Movement | Looking at the ferret moving around - not limping | All normal movement and active |

| | | |
|---|---|---|
| Legs | No swelling | All normal and not broken |
| Toes/Feet | All toes are present. Nothing missing. No swelling | All normal and no injuries |
| Tail | Tail is straight, no kinking | All good and normal with no lumps and bumps |
| Underside - female bits | Looks normal | All good normal looking with no discharge |
| Anus | No faeces around | Normal and healthy with no poo stuck to it |
| Body weight | Estimated 1.3kg | Normal |
| | | |
| | | |

| | |
|---|---|
| Date: 01/02/24 | Health check carried out by: A Sample Candidate |

## Candidate evidence – written report

**Handling a pregnant ferret**
When a ferret is pregnant, she needs to be handled with care so as not to hurt her in any way or cause her to lose or miscarry her foetuses. Stress and rough handling should be avoided. Handling should only take place when it is really needed, doing visual health checks should be more commonly done. A lot of information can be collected from doing a visual health check. For example, we can see if her coat has any bald patches, her eyes are bright, how she is moving around, how she is reacting to or playing with the other ferrets in the enclosure and if she's eating and drinking.

If she does need to be handled, it needs to be done calmly and carefully so she is not injured or stressed. One hand can be placed under or around her chest and the other placed under her bottom/back legs for support. Do not scruff her as this can hurt her.

**Handling a breeding male ferret**
Breeding male ferrets have their balls which produce hormones. This hormone gives the male more muscle and strength and is responsible for his aggressive and mating behaviours. Male ferrets are larger and stronger than female ferrets, so when handling you need to be careful not to get bitten and need to be more able to handle them well. Do not handle an aggressive male unless you are really confident and able. Males get more aggressive when the females are in season, they are also really good at escaping the enclosure to get to the female.

For handling the male, thick gloves are important to wear as if they are aggressive, they will bite. When they bite, they hold on and cause the person handling them a nasty bite injury which they may need to go to the hospital for treatment.

**Juvenile animal with congenital condition**

Congenital conditions can be seen in newborn animals such as an umbilical hernia. While doing a health check on the juvenile and something abnormal is seen, report it straight to the manager or supervisor in charge of the centre. The supervisor will then arrange for the juvenile to be taken to the vets for an examination. The vet will then decide what to do. It is also important that the detail of the congenital condition is written in the animal's health record. As it is a juvenile, it may be the mother's health record.

## Commentary

The candidate has filled in the health check form with some accuracy, showing adequate understanding of physical health check parameters used to evaluate and monitor the overall health status of the ferret. For example, the candidate has written down good signs of health for each of the parameters. However, information is not always accurate, the candidate has given a weight for the ferret, but the observation form states that they did not weigh the ferret.

The candidate exhibits an adequate understanding of the adaptations required to handle a pregnant female and breeding male, but with limited explanation and justification for maintaining safe and welfare orientated techniques. For example, the candidate identifies pregnant female ferrets need careful and gentle handling. However, they have missed the opportunity to discuss how or why limiting their demonstration of welfare orientated knowledge.

The candidate shows adequate understanding of the procedure that needs to be adopted in the event a congenital condition is identified in the offspring. The candidate includes a very basic definition, namely ‘’a condition seen in the offspring’’ but does not link to being able to see from birth. For example, they have identified the example of an umbilical hernia. However, there is no explanation of what needs to be monitored to ensure the health of the developing young limiting their demonstration of technical knowledge.

# Task 3 Population management report

Evidence contributes to the following:

| Performance outcome(s) |
|---|
| PO2 Observe the behaviour, security and breeding practices of animals |
| PO3 Plan for and manage the good health and welfare of animals |
| PO4 Carry out safe animal handling practices |

| Evidence | Candidate producing | Assessor producing | Included in this GSEM |
|---|---|---|---|
| Population management report | √ | | √ |

## Task 3b) Population management report

## Candidate evidence – population management report

### Introduction

The Galapagos Tortoise is the largest species of Tortoise in the world and are found only on the Galapagos Islands which can be found off the coast of South America. They were made famous by Charles Darwin as he spent a lot of time there doing research on animals such as the Galapagos Tortoise and Finches. The Tortoises can weigh up to 400kg in weight and live on a diet of vegetation such as leaves, fruit and grasses. The Galapagos Tortoise is a reptile and is ectothermic, meaning cold blooded. They need heat from their surroundings to provide them with energy. According to the International Union for Conservation of Nature (IUCN) Red List they are endangered, this is due to a number of reasons, including being hunted to near extinction.

This report will look at how the Galapagos Tortoise has evolved over 200 years and how conservation, captive management and breeding will maintain the population of Galapagos Tortoises in captivity and in the wild.

### Evolution

The Galapagos Tortoise has evolved different adaptations which include the shape of their shell, the length of their neck and the ability to store water and go without food for long periods of time. Charles Darwin observed these adaptations, and this prompted his theory of natural selection. The Galapagos consists of 13 main islands which include Espanola Island, Isabela Island, Santa Fe Island and Santiago Island. Isabela Island is the largest island and also has 5 active volcanoes on it. The Galapagos Tortoise can still be found on 8 of the

islands. During his observations, Charles Darwin noted the tortoises had different adaptations depending on the Island they inhabited.

Some tortoises had evolved longer necks and their saddleback shells were shaped so they could stretch their neck to reach food in higher places, whereas others had shorter necks and a more dome shaped shell. This is probably because they eat more grass instead of reaching up to find leaves.

**Conservation**

There are only 17,000 Galapagos Tortoises left in the wild, we have lost 90% of the Galapagos Tortoise numbers over the last 200 years. As well as being hunted for their meat by both humans and other introduced species, such as cats, dogs and rats, the Galapagos Tortoise have lost a lot of their habitat due to development of buildings, roads and farmland. The active volcanoes may also erupt and affect the environment or cook the eggs that have been laid. Following a review of their numbers, the IUCN have categorised most of the Galapagos Tortoise subspecies as Endangered on the Red List meaning that they could die out and become extinct which would be really sad.

Conservation efforts involved in the population management of the Galapagos Tortoise are classified as direct and indirect. Conservation efforts are important because they will have some effect on trying to stop the loss of Tortoise population and hopefully prevent them from becoming extinct.

Direct conservation includes breeding programmes which take place inside and outside of the Galapagos Islands. Eggs are taken from the Galapagos Islands to somewhere else to incubate and become baby Tortoises. These breeding programmes ensure there are options for the future, so they don't become extinct.

Collections such as London Zoo, hold Galapagos Tortoises as part of the captive breeding programme, although they have not successfully bred them and produced lots of eggs and babies yet they are hoping to as the Tortoises they have are important for their genetics because they are not related to many other Tortoises. Babies from these Tortoises would not be inbred.

Zoological collections will follow recommendations given by associations such as the European Association of Zoos and Aquariums (EAZA) to breed and transfer animals. These recommendations are based on the genetic diversity of the captive population of Galapagos Tortoise within European and non-European zoos. They provide breeding recommendations of individuals who are from the same area and are as genetically unrelated as possible. This prevents inbreeding. These projects are unlikely to reintroduce the Galapagos Tortoise back to their natural habitat, including forests and grasslands, as the purpose of these captive animals is to provide a safety net for the species as well as learning about the captive management of the species.

Indirect conservation focuses on research carried out separately to the animals themselves which helps collections manage the species and projects improve on the methods to support conservation efforts.

The information gained through research is also used to educate the public about the Galapagos Islands, the species which are endemic to the islands, Tortoise morphology,

behaviour and their adaptations. Educating the public is really important so that they know how we can stop the population decreasing and how we can keep them safe and healthy.

**Ethical and legal considerations**

When managing the captive population of the Galapagos Tortoise, the collection needs to consider the Animal Welfare Act 2006, to make sure all these needs are met:

1. The need for a suitable environment
2. The need for a suitable diet
3. The need to be able to exhibit normal behaviour patterns
4. The need to be housed with or apart from other animals
5. The need to be protected from pain, suffering, injury and disease.

To keep a Galapagos Tortoise in captivity, the collection must have a zoo licence as part of the Zoo Licencing Act 1981 which is a legal requirement and if they don't have it they could be given a fine or lose their license. This ensures the collection will be meeting the conditions of the licence by providing a high level of animal welfare, being part of conservation or training and providing education about the species. The local council issues the licence and carries out regular inspections to make sure the collection is fit for purpose.

Because the Galapagos Tortoise is a protected species, transporting this species would be restricted by Convention of International Trade in Endangered Species of Fauna and Flora (CITES). CITES has lots of different appendices and the Tortoises are listed in one of these which prevents their trade. Preventing their trade will stop illegal selling and poaching of the Tortoises.

The Galapagos Tortoise was first placed in captivity in 1965. The oldest Galapagos Tortoise reached 175 years old. However, in this time many individual Tortoises' welfare needs were not met, either due to lack of space, incorrect diet, lighting, temperature and humidity, which improved over time following the knowledge that had been gained.

Ethics is what is right and wrong and what we should and shouldn't do when considering what is best for the animal. Should a wild animal be kept in captivity? There is an ethical debate about the pros and cons of the interference by humans in the conservation of this species. Research showing evidence that if the Tortoises are left alone and there are no human influences in their recovery, they will be able to successfully improve their own numbers. This will have a more natural impact on the environment than what occurs with the removal of the eggs and species for captive breeding purposes.

The Galapagos Tortoise can produce up to 4 clutches of eggs each breeding season. Encouraging this amount of breeding could have serious implications to the general health of the female, particularly if her diet is lacking all the essential nutrients required such as calcium which is important for the shell quality. There is also the question about what happens to the hatchlings once they reach an age where they require more space. It is also an ethical consideration whether captive breeding is preventing appropriate funding and resources from being allocated to maintaining wild populations rather than those in captivity.

**Management strategies for Keeping and Breeding the Galapagos Tortoise**

Just like other Tortoise species, the Galapagos Tortoise requires appropriate heating, ventilation, lighting and humidity which costs a lot of money to keep running. They must have UV light to prevent disease such as Metabolic Bone Disease which would cost a lot to treat. They require a large space as they are very big and move around a lot, with places to hide, deep substrate such as sand and woodchip and furnishings such as wood and rocks in their enclosure to enable them to carry out normal natural behaviours. Regular cleaning needs to be done to stop build up of waste and disease. Regular observations and health checks should take place to make sure the Tortoises are in optimum health and not suffering with any parasites, diseases or injuries. The health check should be carried out in a logical order from the head working down to the tail. This avoids contaminating the sensitive areas such as the eyes with dirt from the rest of the animal.

Their diet should mimic their wild requirements as much as possible and should consist of vegetation as they are herbivorous. They also require access to fresh water daily, even though they can store water internally. Water is essential for life and must be provided to prevent dehydration.

Signage should also be available to educate visitors about the species, to encourage interest and promote indirect conservation. This may also encourage people to give money to conservation charities which will protect their habitat and stop them becoming extinct.

When reproducing, the females dig a large scrap in the earth, bury a variable number of eggs depending on the subspecies, and then provide no further parental care. The soft-shelled eggs incubate for 80-175 days depending on the temperature, which also impacts the sex ratio of the hatchlings. Female babies will hatch at warmer temperatures than the male babies.

In captivity, it is common for these eggs to be removed from the nest site and artificially incubated. They are incubated in temperatures ranging from 22°C – 33°C. Research shows the lower end of the temperature range will produce more males.

## Commentary

The candidate has produced a basic population management report for the care and monitoring of the Galapagos Tortoise in accordance with relevant legislation, conservation and evolution. They have mostly used accurate technical terminology throughout their report.

The candidate has provided a basic introduction with accurate descriptions and information, they have not explored the information further to provide full explanations of diet or adaptations. The candidate has adequately explained the relationship between the adaptations, but again has not explored this in any further detail. The candidate has provided basic discussion of the conservation of the Galapagos Tortoise. For example, they have given some examples of the causes of their Red List status. However, they have missed opportunities to explore these in detail which would have shown a better understanding of human-animal interaction.

The candidate has adequately described the ethical and legal considerations, showing an understanding of the legal requirements of housing and the ethical consideration of captive breeding both as separate entities. For example, the candidate has stated that an ethical

concern is the cost of breeding in captivity where the money could be used for *in-situ* conservation instead. However, they have not explained this further to discuss why it may be more beneficial to concentrate on wild populations. The candidate has also considered the ethical considerations for captive breeding, though they have not explored these in much detail. For example, they have considered the costs involved in breeding. However, they have not considered human intervention within the breeding process such as egg incubation which would have showed a more holistic knowledge of the considerations.

The candidate has provided basic recommendations for the captive management of the Galapagos population, providing basic details in accordance with relevant legislation, conservation and evolution. For example, they have considered the legal aspect of holding the species in captivity separately. However, they have not linked how each welfare need is covered or to the husbandry requirements of the Galapagos Tortoise to give more informed information on the management of the Tortoise in captivity.

# Task 4 Plan an investigation

Evidence contributes to the following:

| Performance outcome(s) |
|---|
| PO3 Plan for and manage the good health and welfare of animals<br><br>PO5 Plan, perform, record and communicate findings of scientific investigations in animal science |

| Evidence | Candidate producing | Assessor producing | Included in this GSEM |
|---|---|---|---|
| Task 4a - Scientific plan | √ | | √ |
| Task 4b - Equipment list | √ | | √ |
| Task 4c - Risk assessment | √ | | √ |

## Task 4a) Create a scientific plan for conducting an investigation

## Candidate evidence – scientific plan

Culturing and identification of an unknown bacteria.

Introduction

The bacteria causing the symptoms in the animals at Guilds Animal Science Centre needs to be identified because it could cause worse symptoms for the animals and result in death if it's not treated. To identify the bacteria, the swab that has been collected will need to be cultured, which will be done under aseptic conditions. Once that has been done, the cultured sample will need to be gram stained and then put under the microscope, so that it can be looked at and identified. After that, the sample will need to be tested to see which antibiotics work against it.

Aims

- Identify the bacteria causing illness at Guilds Animal Science Centre.

Objectives

- Culture the sample to identify what the bacteria is.

Methodology

Culture

- Collect equipment and set out
- Set the Bunsen flame to an orange flame
- Change the Bunsen flame to blue
- Put the inoculation loop through the flame to sterilise it
- Take the lid off the sample
- Use the inoculation loop to collect the sample
- Move the loop over the agar plate, to streak it
- Put loop back onto flame, to sterilise between changing direction
- Do this once more
- Put the lid on the plate and turn upside down
- Turn the Bunsen burner off
- Incubate the culture for 48 hours at 25°C.

Justification

Aseptic technique is important, because it stops the culture from being contaminated by other bacteria or viruses, this is why the Bunsen burner is used with the inoculation loop.

Gram staining

- Put the Bunsen burner on a safety flame
- Use saline to clean the slide
- Put the Bunsen onto a blue flame and put the inoculation loop through it
- Use the prepared agar plate to take a swab from
- Put the inoculation loop on the slide, to get the bacteria onto it
- Air dry the slide
- Pour Methanol over the slide to fix it
- Air dry the slide
- Pour Crystal Violet solution
- Use deionised water to wash the slide
- Pour Gram's Iodine solution over the slide
- Pour decolouriser over the slide
- Pour deionised water over the slide
- Pour over Safranin
- Wash with deionised water
- Dry the slide with blotting paper.

Identification

- Put slide under microscope
- Put immersion oil onto the slide
- Put the microscope onto 100x zoom
- Identify the bacteria under the microscope.

Justification

Gram staining lets you identify whether bacteria are gram positive or gram negative. If they are gram negative, then they will look pink. If they are gram positive, then they will look purple. This will make it easier to identify what the bacteria are.

Antibiotic testing

- Put the Bunsen burner on a safety flame
- Now put the Bunsen flame to a blue flame
- Use the flame to sterilise the inoculation loop
- Use the loop to collect the sample from the culture
- Pass the loop over the solution in two different directions
- Use tweezers, to place antibiotic standards onto plate
- Leave for 48 hours
- Measure zones of inhibition.

Justification

Sterilising the loop is important, because it will stop other bacteria or microorganisms from contaminating the agar and changing the results. Using tweezers allows for the antibiotics to be placed where they are needed.

## Commentary

The candidate has produced an adequate plan with an ordered structure and sufficient step by step methodologies with some detail for their investigation, however they have missed opportunities to explain the steps fully to improve useability. For example, when writing out the methodologies, they are simple and can be followed by anyone using the plan. However, a greater level of detail would have supported the functionality of the plan such as justifications for why steps are carried out.

The plan is mostly accurate and the candidate has used adequate scientific terminology throughout. Some correct terminology has been used when identifying equipment, but they have missed opportunities to use better terminology in the methodology. For example, they have correctly named the techniques as a whole such as sterilisation and aseptic technique. However, when gram staining, the candidate has stated the chemicals are ‘poured’ over the slides rather than using more technical terms such as ‘flood’, which would have demonstrated greater detail and accuracy.

The candidate has made some adequate justifications for each stage of their scientific plan, but they have missed opportunities to show more depth of knowledge. They have explained that aseptic technique prevents contamination of the sample by other bacteria or viruses but have not further explained the impact of this. For example, when justifying several parts of the investigation such as loop sterilisation, a single reason of preventing contamination is given. However, further explanation of why this is a concern such as meaning that they would have the potential to identify the wrong bacteria, would better demonstrate their ability to ensure a safe and fair test.

## Task 4b) Produce a list of equipment needed to carry out an investigation

## Candidate evidence – equipment list

| Item | Number Required for bacteria identification | Number required for antibiotic investigation | Item | Number Required for bacteria identification | Number required for antibiotic investigation |
|---|---|---|---|---|---|
| Safety goggles | 1 | 1 | Gloves | 1 | 1 |
| Lab coat | 1 | 1 | Safety cabinet | 1 | |
| Stirring rod | | | Retort stand, boss and clamps | | |
| Sterile water | | | Measuring cylinder | | |
| Scales | | | Bunsen burner | 1 | 1 |
| Heat proof mat | 1 | | 100ml beaker | | |
| 250ml beaker | | | 500 ml beaker | | |
| Incubator set to 25C | 1 | | Incubator set to 37C | | |
| 1cm3 pipette | 1 | | 5cm3 pipette | 1 | |
| 15cm3 test tube | 1 | | Test tube rack | 1 | 1 |
| Sterile swab | | | 'L' spreader | | |
| Agar plate with nutrient agar | 1 | 1 | Agar plate with sensitivity agar | | |
| Agar plate with MacConkey agar | | | Agar plate with blood agar | | |
| Filter paper | | | Marker pen | | |
| Elastic bands | | | Spatula | | |
| Forceps/tweezers | | | Inoculation loop | 1 | |
| Sticky tape | | | Paper towels | | |
| Ruler | | | Graph paper | | |
| Disinfectant | | | Handwash | | |
| Antibiotic stamp | | | Deionised water | 1 | |
| Microscope slide | 1 | | Microscope | 1 | |
| Slide rack | 1 | | Crystal violet | 1 | |
| Gram's iodine | 1 | | Decolouriser | 1 | |
| Safranin | 1 | | Immersion oil | 1 | |
| Bacteria identification sheet | | 1 | | | |
| **Other item** | | | | | |
| Unknown bacteria solution | 1 | | Cultured sample | | 1 |
| | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

## Commentary

The candidate has filled in the centre devised equipment list with required numbers of each piece of equipment in line with their plan, but has missed the opportunity to show better planning and preparation. For example, asking for multiple numbers and for equipment not already listed on the form such as the antibiotic discs, which although they are to be provided by the assessor, should be requested from the lab technician to show good practice. This shows a sufficient knowledge for the preparation of a scientific investigation with equipment for control methods and repeat tests that contribute to a fair test.

## Task 4c) Complete a risk assessment

## Candidate evidence – risk assessment

## Figure 2 - Candidate evidence - Risk assessment

**This template may be modified by adding items/rows only.**

| | | | |
|---|---|---|---|
| Candidate's name | Candidate Y | Enrolment number | ABC 1234 |
| Task / Activity | Task 4c | Location | Laboratory |
| Assessor's name | Assessor B | Date | 01-02-2024 |

| Item no. | What are the hazards? | Who might be harmed and how? | What control measures are already in place? | Risk rating (high/medium/low) | What further action is necessary? | Action by who and when? | Residual risk rating (High / Medium / Low / Trivial) |
|---|---|---|---|---|---|---|---|
| 1 | Bacteria | Candidate<br>Peers<br>Assessor | PPE. | High | Fume cupboard. | Candidate<br>Before practical | High |
| 2 | Chemical burns | Candidate<br>Peers<br>Assessor | PPE.<br>Follow lab rules. | Medium | Check safety sheets. | Candidate | Medium |
| 3 | Burns from Bunsen burner | Candidate | PPE. | Medium | Use safety flame. | Candidate<br>Before practical | Medium |
| 4 | Slips, trips and falls | Candidate | PPE.<br>Check workspace. | Medium | Tidy workspace throughout | Candidate<br>Before practical | Medium |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5 | Fire | Candidate<br>Peers<br>Assessor | Training on the appropriate use of a Bunsen burner. | Medium | Conduct a visual inspection of the workspace.<br>Report all faulty equipment. | Candidate<br>Prior to investigation | Medium |
| 6 | | | | | | | |
| 7 | | | | | | | |
| 8 | | | | | | | |
| 9 | | | | | | | |
| 10 | | | | | | | |

| | |
|---|---|
| Date: 01-02-2024 | Risk assessment carried out by: Candidate Y |

## Commentary

The candidate has adequately assessed risk by completing a sufficient risk assessment, which would mostly keep themselves and others safe, showing some understanding of the requirements of health and safety and safe working methods in a laboratory environment, but they have missed the opportunity to give more relevant detail. For example, they have identified PPE as a control measure but identifying specific PPE would have further demonstrated their understanding of the task and the relevant hazards and risks.

The risk assessment was completed with an adequate understanding of the difference between hazards, risks and control measures, and given some risk ratings. The candidate has always considered personal safety control measures for each hazard. For example, the candidate has recognised PPE and lab precautions are important controls for chemicals. However, they have missed the opportunity to discuss safety sheets as per legislative requirements which would show a more holistic understanding of the risks.

The candidate considered some further control measures that could be applied but has missed the opportunity to make appropriate changes to the level of risk for each hazard. They have identified use of the safety flame on the Bunsen burner as an additional precaution but not reduced the risk as a result. For example, the candidate has included the use of a fume cupboard in order to protect against pathogenic spread. However, the candidate left the residual rating at high showing a lack of understanding of how these ratings work.

# Task 5 Carry out the investigation

Evidence contributes to the following:

| Performance outcome(s) |
|---|
| PO3 Plan for and manage the good health and welfare of animals<br><br>PO5 Plan, perform, record and communicate findings of scientific investigations in animal science |

| Evidence | Candidate producing | Assessor producing | Included in this GSEM |
|---|---|---|---|
| Task 5a - Assessor observation | | √ | √ |
| Task 5a - Video(s) | | √ | √ |
| Task 5a - Results | √ | | √ |
| Task 5b - Assessor observation | | √ | √ |
| Task 5b - Photo(s) | | √ | √ |
| Task 5b - Results | √ | | √ |

## Task 5a) Determine the bacteria

## Assessor evidence – assessor observation

| Task | Assessment component number |
|---|---|
| Task 5 – Carry out the investigation<br>a) Identify the bacteria | 8717-409 |
| **Candidate name** | **Candidate number** |
| A Candidate | CG12345 |
| **Centre name** | **Assessor** |
| A Centre | An Assessor |

Complete the table below referring to the relevant marking grid, found in the assessment pack. Do not allocate marks at this stage.

| **Assessor observation** | **Notes –** *detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.* |
|---|---|
| a) Identify the bacteria | For the preparation of the culture, the candidate:<br>• began with a mostly prepared working area - the lid of the swabbed sample was not loosened, and the agar plate was unlabeled<br>• the Bunsen flame was set to safety<br>• attempted to sterilise the inoculation loop on the Bunsen's safety flame then changed the Bunsen burner to a blue flame and sterilised the inoculation loop again<br>• with the inoculation loop still hot, inserted the loop into the provided sample<br>• began to streak the agar plate. No starting square was evident and the candidate made incomplete streaks across the agar<br>• sterilised the inoculation loop between passes but placed the hot loop back on to the agar with streaks made very close together<br>• placed the loop back down on to the surface, replaced the lid on the swabbed sample, and turned the Bunsen burner back onto a safety flame<br>• placed the lid on the agar plate and stored the plate upside down.<br>For the identification of the bacteria the candidate:<br>• commenced gram staining, with a partially prepared workspace, but with some reagents outside of immediate reach and the Bunsen on a safety flame |

| **Assessor observation** | **Notes –** *detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.* |
|---|---|
| | • used a pipette to drop several drops of saline onto the slid<br>• sterilised the inoculation loop in a blue Bunsen flame. Whilst the inoculation loop was still hot, the candidate swabbed the edge of the bacterial colony, from the prepared agar plate<br>• made one pass over the slide, the slide was then allowed to air dry and then flooded with methanol and air dried again<br>• crystal violet was then poured over the slide, with a lot of excess spilled. The spillage was left<br>• rinsed the slide with deionised water. Gram's iodine was used to flood the slide, with the excess washed away with deionised water. The candidate again made some spillages<br>• placed the slide on the sink and flooded it with decolouriser, with some violet still visible in the runoff, when the candidate stopped. The slide was again rinsed with deionised water<br>• moved on to flood the slide with safranin. The candidate flushed the slide with deionised water. The slide was then blotted partially dry<br>• viewed the prepared slide under the microscope, using the 100x oil immersion lens, after adding immersion oil to the slide. It took the candidate some time to locate the cells having not used lower magnification first<br>• correctly identified that the slide contained E.coli cells, citing the pink appearance of the E.coli rods. |

| **Assessor signature** | **Date** |
|---|---|
| **An assessor** | **22.04.24** |

## Candidate evidence – results

| Sample | Gram Stain Colour | Microscope shape |
|---|---|---|
| 1 | Pink | Rod |

## Assessor evidence – video(s) and photo(s)

AMS_GSEM_Synoptic_Assignment_Task_5_Scientific_Investigation_TC


The unlabelled, streak for isolation

## Task 5b) Determine the best antibiotic

## Assessor evidence – assessor observation

| Task | Assessment component number |
|---|---|
| Task 5 – Carry out the investigation<br>b) Best antibiotic | 8717-409 |
| **Candidate name** | **Candidate number** |
| A Candidate | CG12345 |
| **Centre name** | **Assessor** |
| A Centre | An Assessor |

Complete the table below referring to the relevant marking grid, found in the assessment pack. Do not allocate marks at this stage.

| **Assessor observation** | **Notes –** *detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.* |
|---|---|
| b) Best antibiotic | The candidate:<br>• used their prepared agar plate, which showed only partially separated colonies<br>• sterilised their inoculation loop, by passing it through the Bunsen burner, and swabbed the prepared agar plate, causing some minor gauging where too much pressure was used<br>• the inoculation loop was then lawned over the new agar plate, in two directions, with no sterilisation made in between<br>• used tweezers to place the antibiotic standards on to the agar plate and pushed down to ensure they stuck, but with inconsistent spacings between them. One disc still fell off and was not replaced by the candidate<br>• the plate was then stored with no labelling (the assessor added a small label for identification during incubation)<br>• when measuring the zones of inhibition to obtain results, the candidate used a small plastic ruler. |

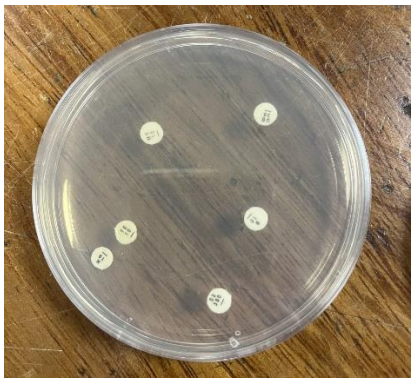
| **Assessor signature** | **Date** |
|---|---|
| **An Assessor** | **22.04.24** |

## Candidate evidence – results

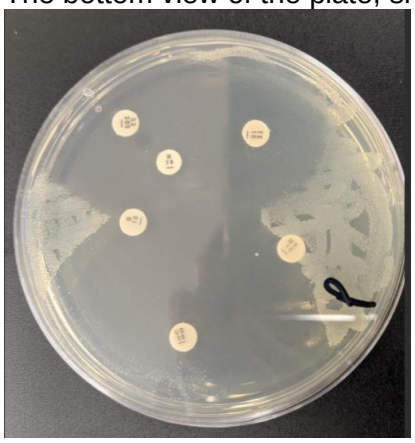
| Sample | Zone of Inhibition |
|---|---|
| UB 30 | 44mm |
| B 10 | 3mm |
| S3 300 | 27mm |
| TE 10 | 20mm |
| N 10 | No result available |
| MY 10 | 0mm |

## Assessor evidence – photo(s)

The antibiotics stuck onto the agar, with one fallen off to the side



The bottom view of the plate, showing no labelling



Zones of inhibition, showing the labelling added by the assessor when incubated

## Commentary

The candidate used their plan from Task 4 to inform the steps of their investigation, plan and prepare the equipment and work areas to a sufficient standard and inform any decisions made during the process demonstrating sufficient safe working techniques which can be seen from the method stated in the observation form.

The candidate carried out the investigation with basic technical skill throughout but missed opportunities to show higher levels of technique. For example, the inoculation loop was sterilised between passes over the agar. However, it was not left to cool before each use demonstrating limited knowledge of the effect of heat on bacteria.

The candidate mostly followed safe working practices throughout and generally considered their own safety when applying practical skills. For example, keeping the Bunsen on the safety flame before and after use which demonstrated use of adequate control methods to ensure safe working practices in line with their risk assessment.

The candidate showed basic aseptic technique but missed some examples of good practice such as not showing a labelled starting square on the plate. Handling of chemicals and microscope technique was adequate showing a moderate level of practical skill. For example, the gram staining process was undertaken correctly and in order to achieve an adequate result. However, using too much chemical during the gram staining process and causing spillages demonstrates some carelessness for their practical ability.

The candidate continued to use their methodology for the second part of the investigation ensuring that mostly accurate measurements were taken and recorded in a suitable table for use in the scientific report in the next task. However, they could have improved accuracy by using an electronic calliper and recording the measurements to 1 decimal place.

The candidate placed their antibiotic discs with tweezers to ensure they were stuck on however this was not thought out to allow for correct space allowance or accuracy. For example, the discs were placed at a reasonable distance from each other to start. However, the full agar dish was not utilised, one disc fell off and one disc was then stuck in the middle, meaning no result was visible and preventing a valid result for this antibiotic sensitivity.

# Task 6 Present your findings

Evidence contributes to the following:

| Performance outcome(s) |
|---|
| PO3 Plan for and manage the good health and welfare of animals<br><br>PO5 Plan, perform, record and communicate findings of scientific investigations in animal science |

| Evidence | Candidate producing | Assessor producing | Included in this GSEM |
|---|---|---|---|
| Task 6b - Scientific report | √ | | √ |

## Task 6a) Research notes

The research notes provided are one side of A4 exemplar notes of the expected standard to be produced by the candidate but are not marked so no commentary has been provided.

## Candidate evidence – research notes

**Research Notes**

E.coli

**What antibiotics are:**
Antibiotics help by stopping bacteria from growing or by killing them.

They can break the bacteria's cell wall, stop them from making proteins, or mess with their DNA. This stops the bacteria from spreading, so the body's immune system can fight the infection better. This helps get rid of harmful bacteria and makes us feel better.

Antibiotic resistance is a big threat to human health.

**What stops antibiotics from working:**

Antibiotic resistance is the name given to when antibiotics stop working. This can be down to lots of reasons, these are some: Over prescription for non-bacterial infections, unfinished courses, use as a preventative in livestock

Bacteria that a left when this happens are resistant and then pass on these resistant genes to their offspring.

Superbugs are the biggest problem – MRSA – antibiotics don't work against them and really hard to treat.

Be clean and tidy to help stop infections to start with.

**Antibiotics that we used:**

**Neomycin (N10)**
Mechanism: causes errors in protein synthesis.

Effectiveness: Generally effective.

**Flumequine (UB30)**
Mechanism: stops DNA replication.

Effectiveness: Very effective against E. coli. Good in reptiles.

**Bacitracin (B10)**
Mechanism: Interferes with cell wall synthesis.

Effectiveness: Less effective against E. coli.

**Sulfonamide (S3 300)**
Mechanism: Inhibits folic acid synthesis.

Effectiveness: Effective. Good for pregnant animals.

**Tetracycline (TE10)**
Mechanism: blocks protein synthesis.

Effectiveness: Effective, but resistance can develop.

## Task 6b) Scientific written report

## Candidate evidence – scientific report

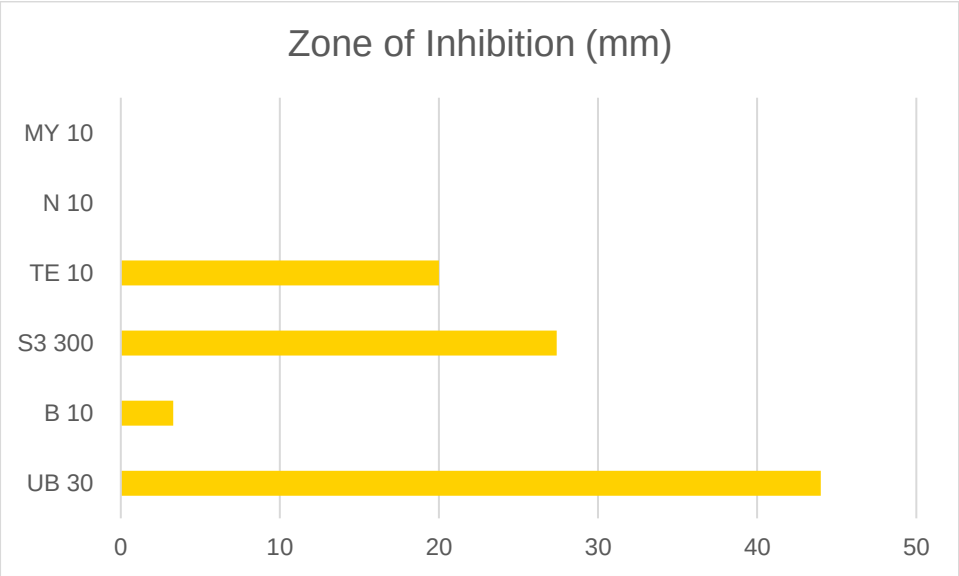
Introduction

The Guilds Animal Science Centre found a health problem within one of its enclosures where several animals exhibited symptoms of illness, including diarrhoea and lethargy. An investigation has been carried out to find out what the cause of the illness is using the sample that has been provided. This report will discuss the methods used to identify the bacteria in the sample, including how it was grown, what staining was used and what antibiotics might work against it. I will also make recommendations for future research.

Analysis of results

The sample provided was cultured by streaking the sample over an agar plate. Once this was done, I gram stained the sample. I then looked at this sample under the microscope, after it had been grown, to identify it. Once the bacteria had been identified, it was exposed to six different types of antibiotics to see which was the most effective.

| Sample | Zone of Inhibition |
|---|---|
| UB 30 | 44mm |
| B 10 | 3.3mm |
| S3 300 | 27.4mm |
| TE 10 | 20mm |
| N 10 | No result available |
| MY 10 | 0mm |




The sample provided was put onto an agar plate and given time to incubate. Once this was ready, the cultured bacteria was gram stained and viewed under the microscope. It was identified as E.coli. The best type of antibiotic to work against E.coli was then identified by putting the bacteria onto another agar plate, and using some standard antibiotics. Then I measured between the bacteria and the antibiotic to see where the biggest gap was.

The results showed big differences in effectiveness of antibiotics with certain antibiotics able to better stop the growth of bacteria compared to others. Specifically, UB 30 (Flumequine) displayed the best effect, while Bacitracin (B 10) exhibited the least effect.

Antibiotic resistance

Antibiotic resistance is a big threat to animal and human health. The appearance and spread of resistant bacteria can make antibiotics ineffective leading to worse and longer illnesses, a bigger chance of death, and more care costs. Antibiotic resistance is when bacteria become immune to the effects of an antibiotic. This can happen when antibiotics aren't responsibly used, like when courses aren't finished or they are used to prevent sickness too much. Within the Guilds Animal Science Centre, the effects of antibiotic resistance are big because there are lots of different types of animals there it could affect. If the right antibiotics aren't used on the right animal, then this can cause problems. One of the biggest problems with antibiotic resistance is superbugs, which animals can catch when in the veterinary hospital, including diseases like MRSA. MRSA is dangerous because normal antibiotics don't work against it, making it really difficult to treat. Flumequine had the biggest zone of inhibition and is good to use with reptiles. For other animals, like pregnant ones, Sulfonamide is a good choice, because it is safe.

Evaluation of practical

In all, my laboratory technique proved to be good because it gave me a set of results to analyse but there are improvements that I could have made. In future, I would need to be more careful to make sure that the loop is cool, when I am culturing a sample. This is really important between passes over the agar plate because heat can kill bacteria, which can cause issues with the results. In future experiments, I would also make sure that the Bunsen burner was on a blue flame when trying to sterilise the loop, to make sure that it was hot enough to destroy any bacteria that might contaminate the sample. In addition, I would make sure that I used a stamp to place the antibiotic samples onto the agar plate, as one of the antibiotics that I used dropped off. There were also issues with the spaces between the antibiotics, which made the zones of inhibition difficult to measure so I should have spaced these out more.

Conclusion

In conclusion, the investigation carried out on the sample provided from the Guilds Animal Science Centre has identified the cause of illness among the animals as E. coli. By identifying Escherichia coli as the bacteria and assessing the antibiotics, the Centre can now implement treatment to reduce the impacts of the disease on the animals in its care, and potentially reduce the risk of it spreading to more animals. This investigation has also highlighted the importance of being clean and tidy when working with animals and being aware of the impacts of antibiotic resistance. Moving forward, it will be important for the centre to continue to monitor this outbreak and make sure that they pay attention to what their vet tells them when they prescribe antibiotics.

## Commentary

The candidate has produced an adequate report with some structure and reasonable headings. However, the headings given are basic and could be more detailed which would allow for easier navigation through the report. Examples of this would be to include headings of antibiotic resistance in the bacteria and also how antibiotic resistance affect the Centre.

The candidate's analysis of their results mostly meets the requirements of the brief and the centre, but they have missed opportunities to explore this further. For example, they have stated that the investigation is being done due to a known health issue in the Centre in their introduction. However, they have not linked to this when analysing the results, demonstrating a limited consideration of the scenario.

The candidate's conclusions and recommendations are basic, demonstrating a basic understanding of the issues in their methodology, but with little explanation of how these may have impacted their results. For example, they identified that using hot inoculation loop may have damaged the bacteria affecting results. However, they missed the opportunity to explain how or why this may affect their results.

The candidate has mostly used adequate technical terminology throughout the report. For example, they have given the correct terms for zones of inhibition and when explaining why antibiotics might be chosen. However, there are some times when terminology is simple, such as putting rather than lawning, which would have made the report more effective and scientific.

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