SEAK FFE Kelly Tarlton's, Auckland



education

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Introduction

At SEA LIFE Kelly Tarlton's we have two different species of penguins: Gentoo and King penguins.

The Gentoo penguins are the third largest penguins in the world, while the King penguins are the second. Our colony was born in captivity; the King penguins arrived from San Diego Zoo in 1994 and the Gentoo colony arrived from Edinburgh Zoo in 1995.

Penguins are highly social animals and exhibit a wide variety of different behaviours including social interactions and interactivities. Currently in our enclosure we have approximately 103 penguins. However please be aware that this number may fluctuate according to season due to breeding. By having this large colony size (the largest in the southern hemisphere!) the birds can experience partnerships and bonding behaviours like they would in the wild.

Penguins have evolved to be able to live in one of the harshest places on earth. At the end of the observational study students should be able to identify unique penguin behaviours, social interactions, and adaptations to life in the water and on the ice.

Because penguins live in extremely remote areas on the Sub-Antarctic Islands which surround Antarctica, it is often extremely difficult to study and conduct research on these animals. The Sub-Antarctic and Antarctica is one of the harshest environments on the planet for animals (even humans!) to live. Temperatures plummet below -80 degrees and wind speeds often reach 250 km/h. This is just one of the reasons why it is so important to have a captive global population of penguins; so that we can study and collect information on these amazing animals, which may assist us in future conservation efforts.

Materials

- 1. Record sheet
- 2. Pencil
- 3. Eraser
- 4. Camera (optional)
- 5. Stop watch or timer
- 6. Clipboard
- 7. Table of behaviours
- 8. Diagram of zones
- 9. Notebook (for taking notes on behaviours that may not be listed that you witnessed)

Methodology

Before commencing, ensure that you have all the materials needed to complete your observations. This pack has been designed so that there is flexibility in the method; there are several different approaches you can take:

- **I. Take one set of observational data from one zone.** This will provide the smallest data set, but will allow comparison between the two species, as well as between the two genders. The data will not be impacted by temporal or spatial factors (i.e. changes that occur due to changes in time or location).
- **II. Take multiple sets of observational data from the same zone.** This will increase the size of the data set and allow comparison between species and gender, as well as changes over time (e.g. in the lead up to, or after the feeding event that occurs at 11.30am)
- **III. Take multiple sets of observational data from different zones.** This will provide the largest data set, which will allow the most comparisons to be made. Possible comparisons include between species and gender, changes over time and differences between zones.

It should be noted that data from different zones should not be combined to create a larger data set. This is due to the fact that the zones encapsulate areas of the enclosure that are used by the birds for very different activities. For example, around October of each year, Zone W7 is used by the Gentoo penguins for nesting, Zone W1 and W2 are used by King penguins for their moulting period and Zone P1 is the pool. The penguins in these areas will be displaying very different behaviours dependant on their current state (breeding, incubating, moulting, etc.) and the data should not be pooled.

Observe the different behaviours of the penguins in one zone for at least 15 minutes. Use the table of behaviours to identify specific behaviours and record these on the record sheet.

Some behaviours are a single action that can be recorded as they occur (i.e. biting, bowing, feeding), while others must occur for a longer duration for the behaviour to be considered valid (i.e. sleeping, porpising, resting). Please refer to the tale of behaviours for guidance on each behaviour.

Behaviours are to be tallied in the appropriate areas of the record sheet – keeping observations separate for male Gentoo penguins, female Gentoo penguins, male King penguins and female King penguins. To identify males and females, look at the band around their wing. Males have this band on the right hand side, while females have the band on the left hand side.

If taking multiple data sets, repeat the above procedure using a new and clearly labelled record sheet.

For any really interesting or persistent behaviour here is a space on the record sheet to note the identity of individuals. This is optional information that can be included, it is not necessary for data analysis.

Methodology Discussion points for teachers

I. When conducting research, why is consistency in the method important.

When collecting data, the method needs to be consistent so that the data sets are comparable. If the data is collected in different ways, then it is possible that the different methods have caused a variation in the data that is not a true difference displayed by the animals.

Additionally, if the method of data collection is not consistent you cannot pool date together to create a larger data set.

II. What are some factors that can influence the consistency of the method for this particular research

The "effort" made during observations. If in one zone/time period there are 2 people making observations, then there should be the same 2 people making observations for all zones/time periods. If the number of people observing increases or decreases then this will impact the number of behaviours being observed (not because of a change in behaviours, but because of a change in the capacity of the observers to actually witness them).

The time spent making observations for each zone/time period. It is crucial that observers spend the same amount of time in each zone/time period. More/less time spent will result in more/fewer observations, which would skew the data when different zones/time periods, are compared to each other.

III. When observing behaviour in one particular zone, what are some factors to take into consideration when analysing the data? How can these be accounted for in the methodology?

There are a number of factors to consider, these include (but are not limited to) the following:

- a. Penguins are not confined to the zones that have been defined for this research. Penguins will enter and leave the zones as observations are occurring.
- b. When comparing behaviours within different zones, it is important to consider any differences that may be due to changes in time (e.g. behaviours will change immediately before and during the scheduled 11.30am feed).
- c. Keepers from time to time enter the enclosure at random times. The presence of people in the enclosure can alter the penguins behaviours.
- d. Enrichment objects present in a zone, or introduced during a time period. These devices are placed in the enclosure by the keepers to stimulate the birds. They can therefore change the birds behaviours when present.

These factors can be accounted for by good record keeping (e.g. noting how many penguins were present in a zone at the start AND end of a time period). It may not be able to eliminate every influencing factor, but they can be accounted for during analysis and discussion if there are accurate records.



Methodoloy discussion points for teachers continued...

If comparing data sets from different zones/time periods, records from zones/time periods that are influenced by a temporary factor (such as keepers entering) should be discarded, and zones that include enrichment items should be avoided. Having said that, collecting data before, during and after these influencing factors (while not comparable to other zones/time periods) may provide interesting data on the exact effect these factors have on penguin behaviour.

V.Why is it important to keep data sets separated into as many categories as possible?

Data can always be combined after collection, however once collected if it has not been divided into categories during collection it is impossible to separate data afterwards. Separating data into categories allows more comparisons to be made. For example, if you did not separate data for male and female penguins then it would be impossible to compare differences in behaviours between genders.

VI. Observational data can be objective (i.e. different observers may have different opinions on what constitutes a behaviour). How can methodology account for that?

Observational data will always have an element of objectivity; however this can be reduced by ensuring that all observers are aware and in agreeance as to what constitutes a behaviour. For this reason, the parameters of each behaviour have been outlines in the table of behaviours included in this pack.

VII. What are some specific factors to consider and take note of during this research?

During certain times of the year the penguins behaviours are influenced by natural processes. These include:

- a. Breeding season
 - i. Initial phases of courtship
 - ii. Establishing territory (nest building for Gentoo penguins, establishing standing space on rookery for King penguins)
 - iii.Incubation of eggs
 - iv. Rearing of chicks
- b. Moulting season

These should be noted on the observation sheet and taken into consideration when analysing results.

Classroom Discussion Topics

Below are some basic discussion points students should consider. Basic data analysis and statistics will provide results, and the information contained in this pack will enable students to interpret those results.

Students are encouraged to think of their own questions, as well as to conduct independent background research to assist in interpretation.



Species

Was there a difference in observed behaviours between species? What were the 3 main observed behaviours conducted by

- a. Gentoo penguins?
- b. King penguins?

Why do you think these differences occurred?

Genders:

Was there a difference in the observed behaviours between genders of each species?

What were the 3 main observed behaviours conducted by

- a. Male Gentoo penguins?
- b. Female Gentoo penguins?
- c. Male King penguins?
- d. Female King penguins?

Why do you think these differences occurred?

Time:

Was there a change in observed behaviours over time

- a. Between Gentoo penguins?
- b. Between King penguins?
- c. Overall?
- If so, what could have influenced this?

Classroom discussion topics continued...

Zone:

Between different zones, was there a difference in observed behaviours

- a. Between Gentoo penguins?
- b. Between King penguins?
- c. Overall?

If so, what could have influenced this?

Other influencing factors:

Was there any notable influencing factor that occurred while observations were taking place? If so, what were these?

The bigger picture:

How would you rate the complexity of conducting behavioural surveys?

Could behavioural surveys of captive animals provide insight into behaviours of wild populations?

What benefits can be derived from behavioural surveys of captive animals?

How can behavioural surveys of captive animals assist in conservation efforts for the wild population?

Can you think of a practical way to use the information gained through your survey (i.e. a change in the enclosure that would benefit the birds, a change in how they are cared for, how you might apply something you have observed to the wild population)?



Record Sheet

for Penguin Behaviour Observations

Please print multiple for observations to be taken within different zones of the enclosure.

Zone (see map): START TIME:	END TIME:					
Total number of penguins in zone: King Gentoo						
Individual(s) observed (include name, gender, behaviour observed):						

Gentoo M Gentoo F King M King F **Fighting/threatening** Sleeping **Stealing Pebbles Approaching humans** Feeding Swimming Bowing Singing **Courting/Nest Building** Porpoise Resting

Penguin Enclosure Zones

for Penguin Behaviour Observations

Each zone is the width of the window where the zone is located, and to a length of 5 metres going back into the enclosure. Measurement of length will be approximate.



Table of Behaviours

for Penguin Behaviour Observations

Behaviour	Description	
Approaching humans	This behaviour consists of the penguins approaching you or other guests. It may occur up on the ice or in the water. This approach needs to occur for more than 30 seconds to be considered an actual approach and interaction. The penguin will cease all other behaviour and give you their attention, appearing to be interested.	The
Feeding	Feeding may occur by other individuals feeding each other (dependant on the time of year i.e. breeding season) OR keepers who are actively feeding the penguins. This may occur on the ice or in water. One timed feed per day at 11:30AM. Different modes of feeding include hand feeding, pool feeding, scatter feeding and parental feeding.	
Swimming	This behaviour consists of the penguins entering the water for more than 3 minutes to be classified as swimming.	
Bowing	Both species undertake this behaviour. This behaviour consists of a penguin lowering its head to another penguin and then being reciprocated. Often Gentoo penguins will open their mouths while lowering their heads and crouching down. Bowing is a mutual acceptance of individuals in the colony who they share a close bond with.	
Singing	Singing is a behaviour which can be identified by penguins pointing their beaks in the air and producing a loud trumpet like noise. You may also see the top of their chest (where it joins directly to the neck) appear to inflate and deflate.	

Table of Behaviours

for Penguin Behaviour Observations

Courting	Courting is a behaviour which involves two penguins who are either mimicking or mirroring each other. Penguins will stand up tall stretching their bodies and may lean toward their partner- relying on cues from the other bird. Courting may also involve nest building (where both or one penguin is gathering stones, pebbles or ornaments and building a nest site), singing to each other and chattering their beaks together.	
Porpoising	Porpoising is the act of leaping in and out of the water in a rapid series of short, shallow arcs while swimming, creating an undulating or wave-like path. This behavior needs to be recorded for more than 3 minutes in order to be valid as porpoising.	
Resting	Penguins can be witnessed laying, flat on their stomach with wings outstretched for balance. They can also exhibit this behaviour when they are too hot; laying on the ice brings their body temperature down.	
Sleeping	Sleeping can occur both on the ice and in the water. It is not unusual to see penguins sleeping standing up but they also lay down flat on their bellies. Penguins can often be found sleeping in a variety of different positions. Often penguins have their beaks tucked under or into one wing to keep warm. Penguins may be seen taking short naps	
Fighting/ Threatening	Penguins may be seen biting and chasing each other. They may also threaten without actually making contact. This is usually done by opening the beak and mimicking biting actions.	
Stealing Pebbles (Gentoos only)	During the breeding season, Gentoo penguins will attempt to steal pebbles from each other's nests. This is normally done by sneaking up from behind and slowly attempting to take a pebble. The result is often threatening behaviour or biting from the penguin who owns the nest.	

