Welcome *back* to the

National University of Singapore

LM1303 Animal Behaviour

Lecture 1 Introduction

1. Module Objectives
2. Introduction to Animal Behaviour
3. Module Details
4. The Extinction Game

But first, a story…

An encounter with a bull elephant in
Kruger National Park,
South Africa (2013)

Kruger National Park, South Africa

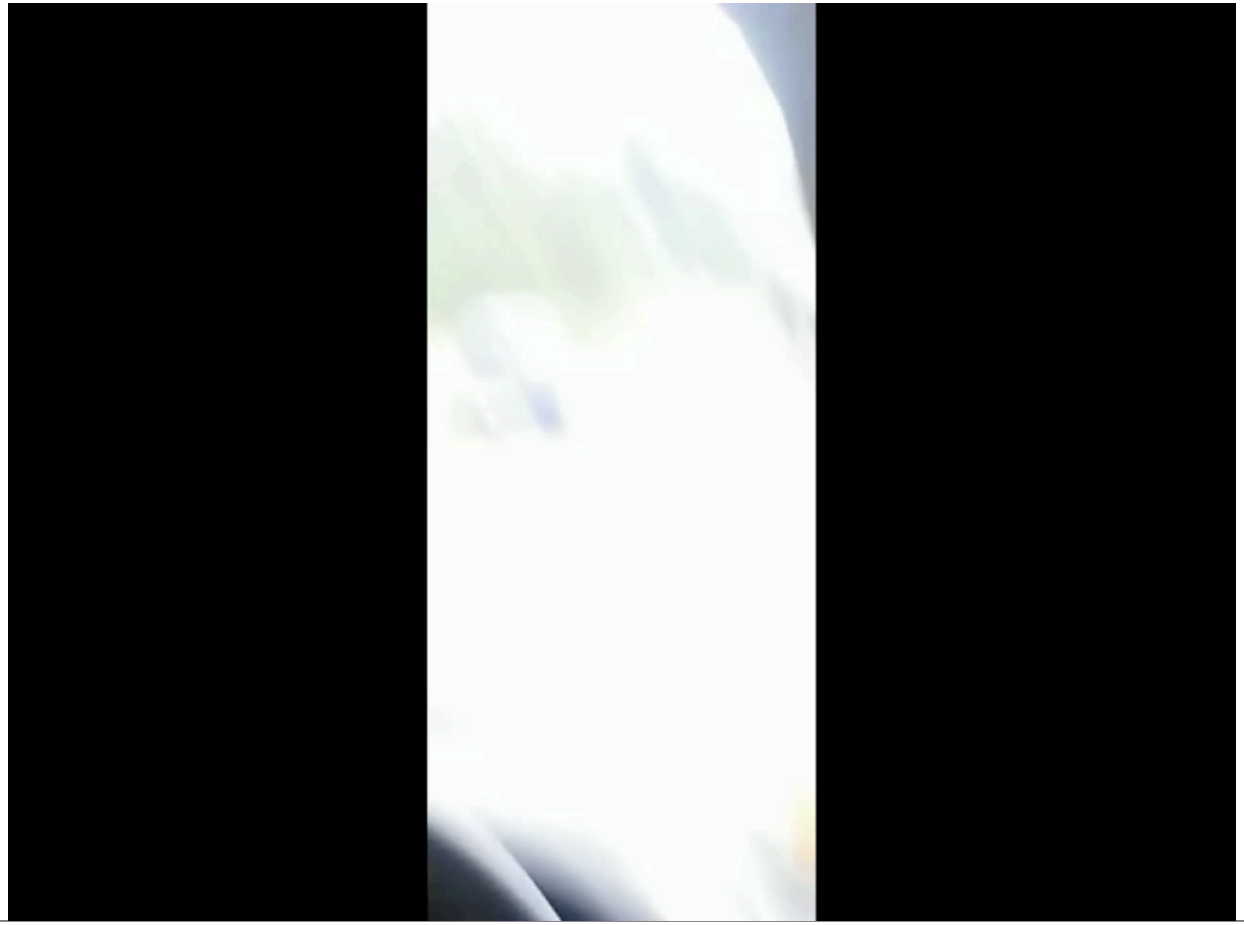
Encounter with a bull elephant in Kruger National Park, South Africa, 30 Dec 2013

- Elephant attacked the rear of car travelling in the park; the pair of occupants survived
- A British teacher was gored by the elephant, her partner escapes unscathed
- The elephant was put down by park management
- Why did this happen?

Encounter with a bull elephant in Kruger National Park, South Africa, 30 Dec 2013

- Observing car, "we have to reverse and go"
- Couple were 30 metres behind the elephant; and followed the elephant as it walked away
- Car is making noise from engine and brake lights were in use
- Agitated the elephant

Encounter with a bull elephant in Kruger National Park, South Africa, 30 Dec 2013



Encounter with a bull elephant in Kruger National Park, South Africa, 30 Dec 2013

- Elephant was in musth
- Was even more aggressive as a result of fights with other bulls
- Park ranger: they were "unlucky"

An elephant in musth

- Musth – a state of heightened sexual tension and aggressiveness due to peak testosterone levels in mature males (20 year old Asian elephants; 25 year old African elephants).
- Musth bulls produce:
  - a distinctive low-frequency vocalization,
  - thick secretions from their temporal glands (opening between eye and ear)
  - continuously dribble urine

An elephant in musth

- Primed to mate, musth elephant fights other bulls, attacks other animals and may destroy inanimate objects in its way.
- “Elephant exhibits a tendency to gore any moving or non moving object that catches its attention.”
- Legendary "rogue" wild elephants were probably musth bulls, redirecting aggression at random objects, including villages and people.
- In captivity, musth elephants are unmanageable and extremely hazardous so are isolated and often chained up.

Practical Elephant Management: A Handbook for Mahouts: Musth (Namboodiri, ed.,1997)

Not every approach is hostile

An encounter with a friendly Asian elephant at Khao Yai National Park, Thailand (2019)

The friendly Due the elephant, at Khao Yai National Park rubs against and sits on a car, which escapes, occupants unhurt; 29 Oct 2019

[Presented by Newsflare, 09 Nov 2019]

10 rules that tourists driving through the park should follow when encountering a wild elephant:

- Stay at least 30 meters away in your car and slowly back up to keep your distance if the elephant approaches.
- No flash photography.
- Do not honk the car's horn or make other loud noises.
- Do not turn off the engine and be ready to drive away at any time.
- Do not get out of the vehicle to take photos.
- Turn off your headlights if encountering elephants at night. Do not flash headlights or other lights at them.
- If surrounded by elephants circling your car, move towards a spot in the circle with no elephants.
- If the car in front of you backs up, please back up as well, as it might be an emergency situation.
- Do not get out of the car and approach the elephant.
- An elephant's best senses are hearing, smell, and vision. If you turn off your engine, the elephant will approach and use these senses to investigate, by looking at, smelling, and listening to your car.

National Parks Thaland

An incident with
a familiar Asian elephant
at the Singapore Zoo (2001)
- also an accident

Malayan elephant Chawang gores keeper Gopal Krishnan, Night Safari, 31 Jul 2001

Elephant Chawang gores keeper Gopal Krishnan, Night Safari, 31 Jul 2001

- Mr Gopal said: 'Chawang's weight is in tonnes but mine is in kilos. To have survived the force of an elephant against my body is a miracle.'
- He said he regarded the attack as an accident.
- 'It's like you walk by and suddenly a falling branch from a tree hits you because you happened to be there.' I. e. unfortunate

Chawang was not in musth

Bulls are unpredictable
so are only walked
only when the zoo is closed
Only females used for rides

What happened to Chawang?

Chawang was rehabilitated, and his keeper returned to care for him in 2005

>> ASIAONE / NEWS / ASIAONE NEWS / SINGAPORE / STORY

Fri, Feb 15, 2008
AsiaOne

Print - friendly Email a friend

Is he the one to take Ah Meng's place?

At about 3m tall, weighing a whopping 3.5 tonnes and with tusks almost 1.5m long, Chawang the Asian bull elephant is a majestic figure.

Both his tusks are symmetrically crossed at their tips, a rare feature that makes Chawang all the more special. No other zoo is known to have male elephants with such a feature.

An orphaned elephant, the Malaysian Wildlife Authorities rescued him in Malaysia, near Perak's Sungei Chawang - hence his name. He was only six years old when he arrived in Singapore Zoo in December 1983. He has since fathered three elephants.

Chawang was transferred to Night Safari when the attraction opened in 1994.

And while undoubtedly a star now at the Night Safari, Chawang has a bit of a dark past.

In 2001, he made news when he suddenly attacked Mr Gopal Krishnan, goring his keeper of 18 years. Mr Gopal suffered fractured ribs and a punctured lung. Till this day, it remains a mystery why Chawang did what he did.

While there was a plan to send Chawang to another zoo, one with bigger facilities to house a big bull elephant, the plan fell through and he remained here.

And despite nearly losing his life to Chawang, Mr Gopal returned to take care of Chawang in 2005, showing the deep affection he has for the elephant.

Eventually, the zoo made a decision to provide Chawang with a larger home and also to engage an animal behaviour consultant to retrain him. The non-contact elephant training method involved using a two-metre long pole with a ball at the end to touch the parts of Chawang's body that a keeper wanted him to move and to indicate the spots he should move to.

Each time Chawang showed the right behaviour, he was rewarded with treats and praises.

Chawang now lives in a vast habitat in the Night Safari. With his status as a stud - a German veterinarian had described Chawang's semen as "beautiful and healthy" - he will continue to father more baby elephants in the years to come and contribute to the captive breeding of the endangered Asian elephant.

What do you think?
Would Chawang be your choice?
Have your say and vote for your next Singapore Zoo icon this weekend on AsiaOne.

Home 〉 Singapore 〉 Story 〉

No more elephant rides, as Singapore Zoo adopts way of caring for elephants

PUBLISHED ON DEC 15, 2014 3:46 PM

3678 459 2 0

A zookeper walking with elephants at the Singapore Zoo. Visitors to the Singapore Zoo will no longer be able to get as close to the elephants there or take rides on these animals, starting from Jan 5. -- PHOTO: BERITA HARIAN

BY CHERYL FAITH WEE

SINGAPORE - Visitors to the Singapore Zoo will no longer be able to get as close to the elephants there or take rides on these animals, starting from Jan 5.

Singapore Zoo stops elephant rides (2014)

An ugly truth behind tame elephants and tourism

Behind the taming of a wild elephant – Phajaan, or "the crush"

Brent Lewin / Redux Pictures

BUSINESS INSIDER

Subscribe

Cambodia's most famous tourist attraction just banned elephant rides

Cailey Rizzo, Travel + Leisure Nov 23, 2019, 1:09 AM

Shutterstock

In 2016, an elephant named Sambo died at the park, due to a heart attack triggered by heatstroke and exhaustion.

Her death prompted an online petition to end elephant riding at Angkor Wat, which earned more than 185,000 signatures.

https://www.businessinsider.com/elephant-rides-now-banned-around-angkor-wat-cambodia-2019-11

"Cambodia announced in June 2019 it would ban elephant rides in early 2020"

"The Khmer Times reports that on November 15, two of the 14 elephants currently at the park, site of the famed Angkor Wat temple, have been relocated to the nearby Bos Thom community forest."

"Cambodia to ban elephant rides at Angkor Wat," by Lilit Marcus. CNN, 18 Nov 2019
https://edition.cnn.com/travel/article/angkor-wat-elephant-ride-ban-intl-hnk/

Learn from Sangduen ‘Lek’ Chailert, Save Elephant Foundation, Thailand

"Assignment Asia: Thailand's elephant whisperer" CGTN, 22 Jan2018 [13'48"]

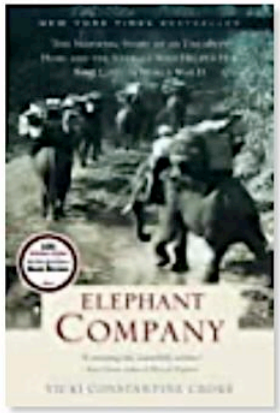
[feat. Save Elephant Foundation, Thailand]

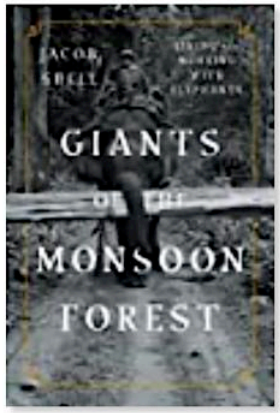
https://www.youtube.com/watch?v=N2qNqgjedRY **Required viewing**

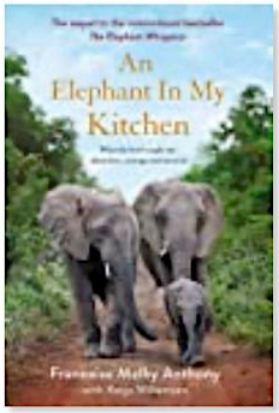
Wild animals in non-natural surroundings

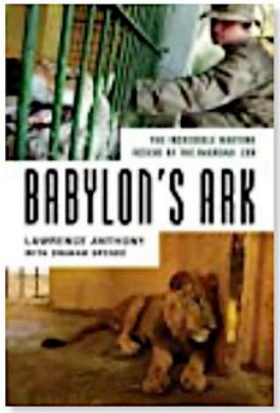
- Compare their life with that in a natural condition
- What is comfortable?
- Are they protected?
- Are there humane traditions which recognise elephant's needs?

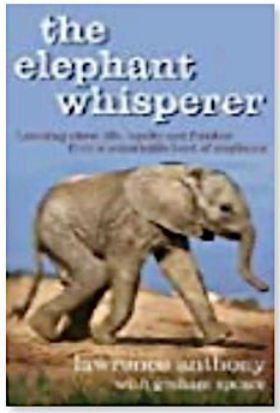
Books I read last year about elephants

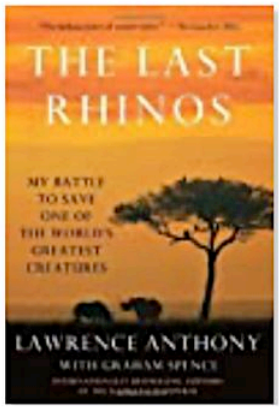












Is this helpful?

"Observe from a distance"

I - Module Objectives

Module Objectives

- Understand, appreciate and protect (empathise)
  - Be introduced to animal behaviour through a diversity of species and situations
  - Appreciate the scientific method
  - Appreciate general and predictive trends about behaviour but also variations

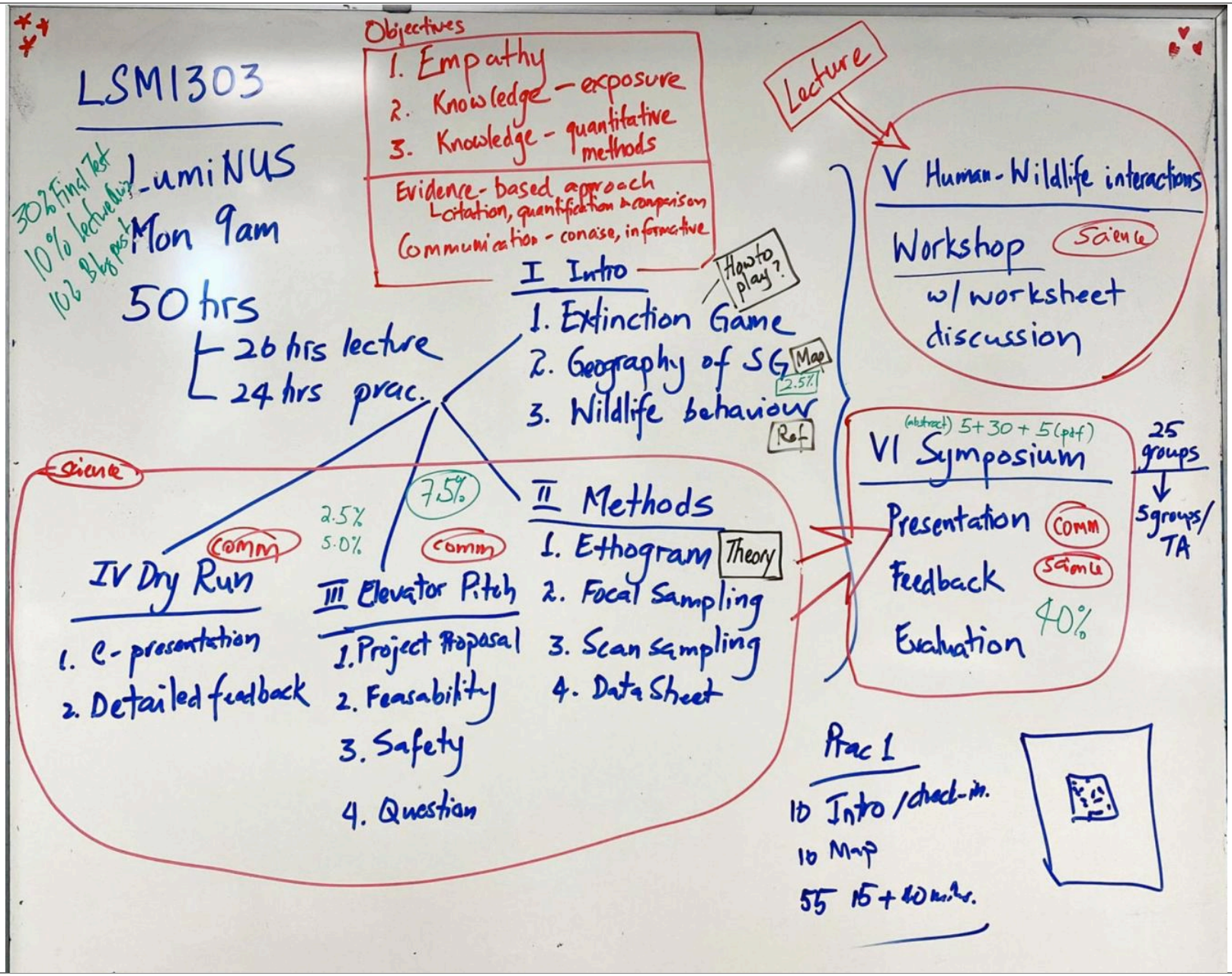
“I just wanna teach them some empathy”

Navjot Sodhi, 1962-2011

https://nusbiodiversity.wordpress.com/2012/01/12/navjot-sodhis-module-objective-i-just-wanna-teach-them-some-empathy/

Considerations

- This is a cross-faculty module
- Appreciate the subject but do not get lost in the details
- Provide a diversity of examples from the animal kingdom
- Learn by doing – the animal behaviour project

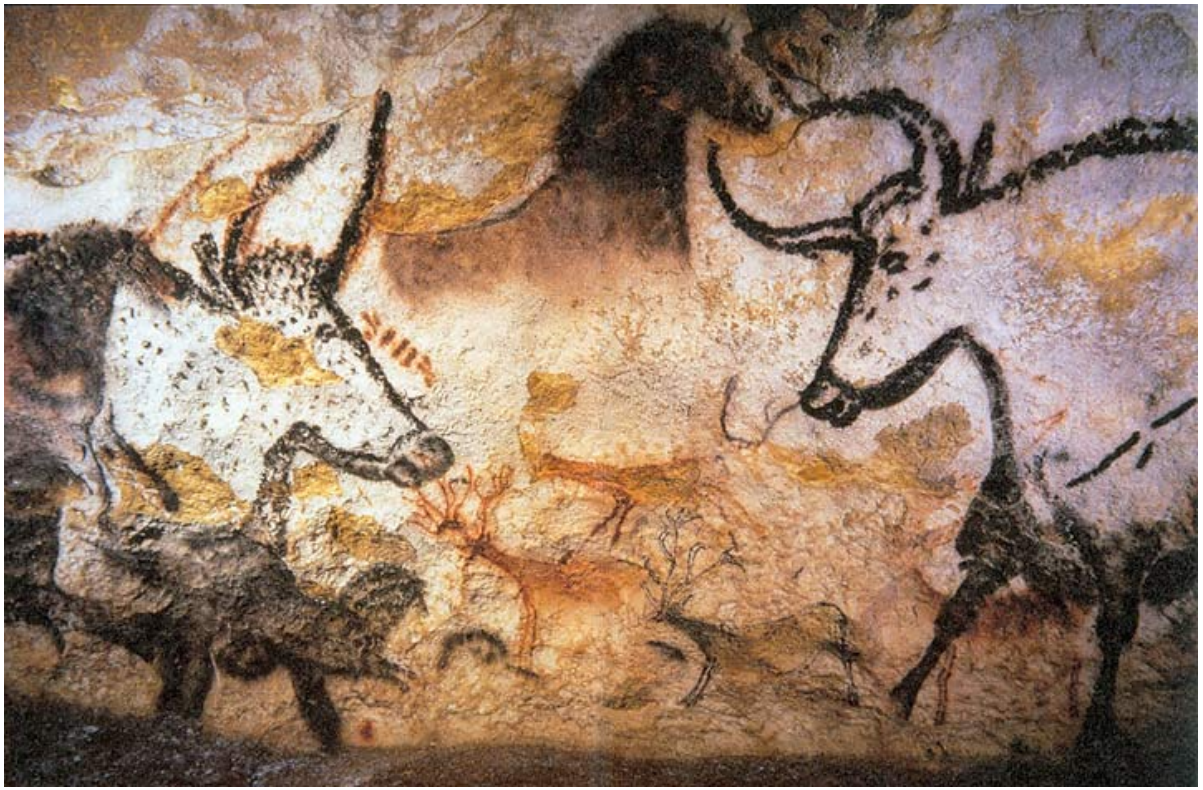

LSM1303
LumiNUS
Mon 9am
50 hrs
26 hrs lecture
24 hrs prac.
30% Final Test
10% lecture
10% Blog post
Objectives
1. Empathy
2. Knowledge – exposure
3. Knowledge – quantitative methods
Evidence-based approach
Citation, quantification & comparison
Communication – concise, informative
Lecture
I Intro
How to play?
1. Extinction Game
2. Geography of SG
Map
2.5%
3. Wildlife behaviour
Ref
V Human-Wildlife interactions
Workshop
Science
w/ worksheet discussion
(abstract) 5+30+5 (ppt)
VI Symposium
25 groups
5 groups/ TA
Presentation
COMM
Feedback
Science
Evaluation
40%
Science
7.5%
2.5%
5.0%
II Methods
1. Ethogram
Theory
2. Focal Sampling
3. Scan sampling
4. Data Sheet
IV Dry Run
COMM
1. e-presentation
2. Detailed feedback
III Elevator Pitch
COMM
1. Project Proposal
2. Feasability
3. Safety
4. Question
Prac 1
10 Intro / check-in
10 Map
55 15+40 min.

II - Introduction to Animal Behaviour

3.1 Why study animal behaviour?

Survival: Hunting

What does hunter need to know?



Lascaux paintings in southwestern France, ~17,000 years ago

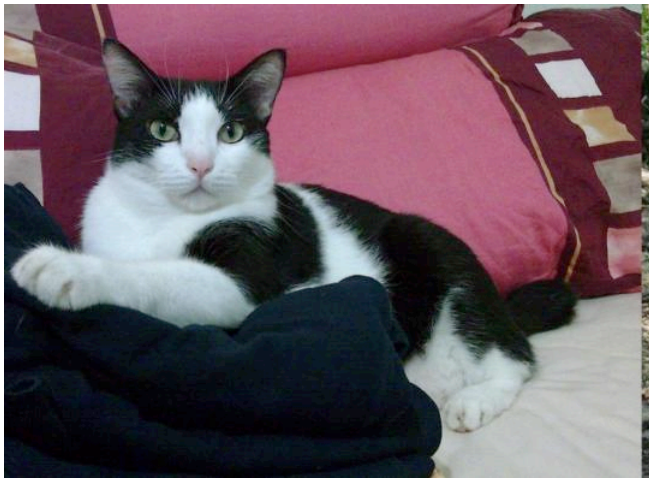
Survival: Domestication

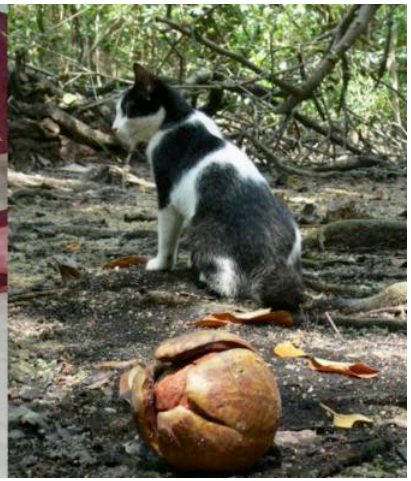
What does a farmer need to know?

- Companionship (dogs, cats)
- Farming for meat and products (seep, cow, pig, turkey)
- Working animals (cats, horses, camel, donkeys, elephants)

Companionship

What does an owner need to know?



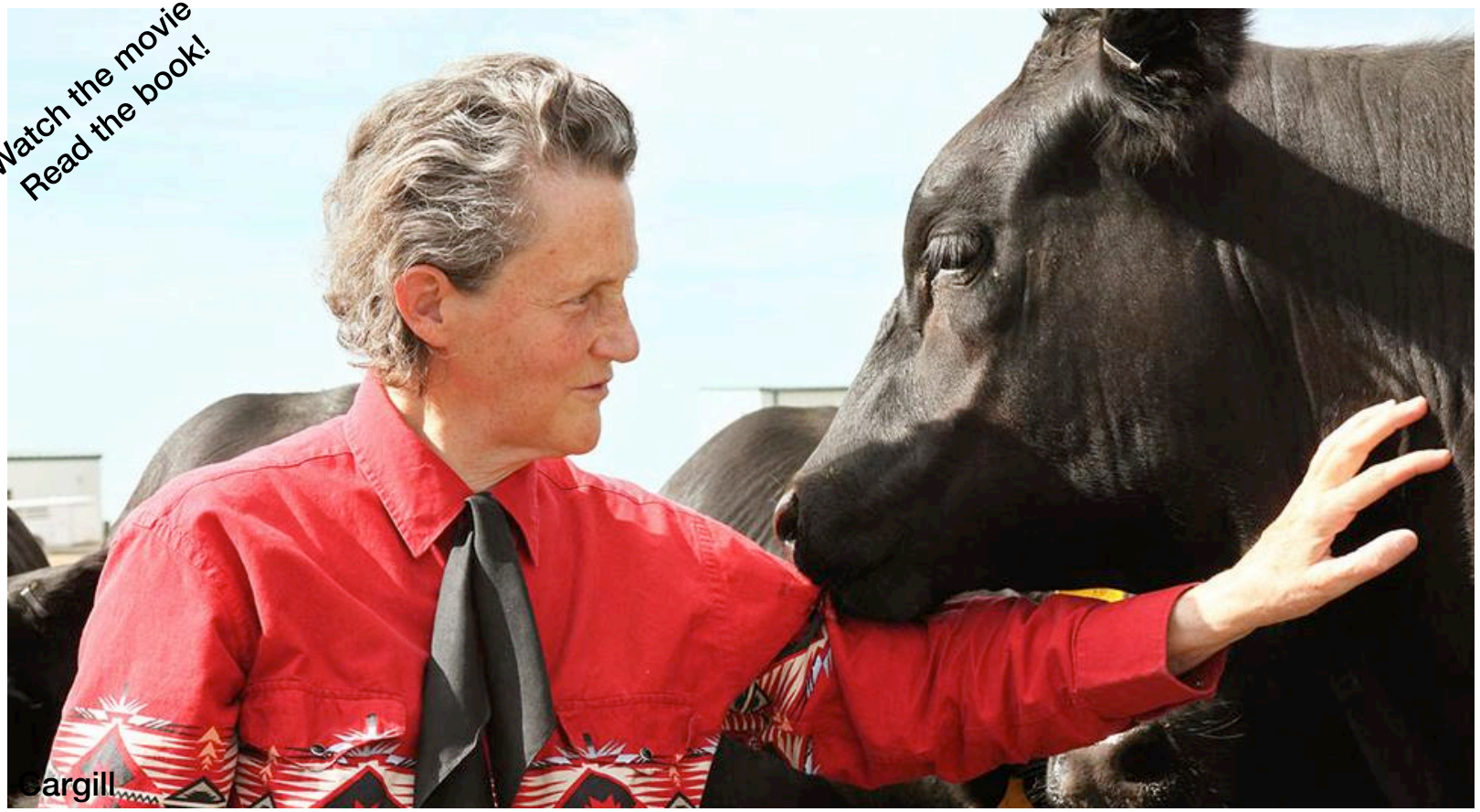


Medical science

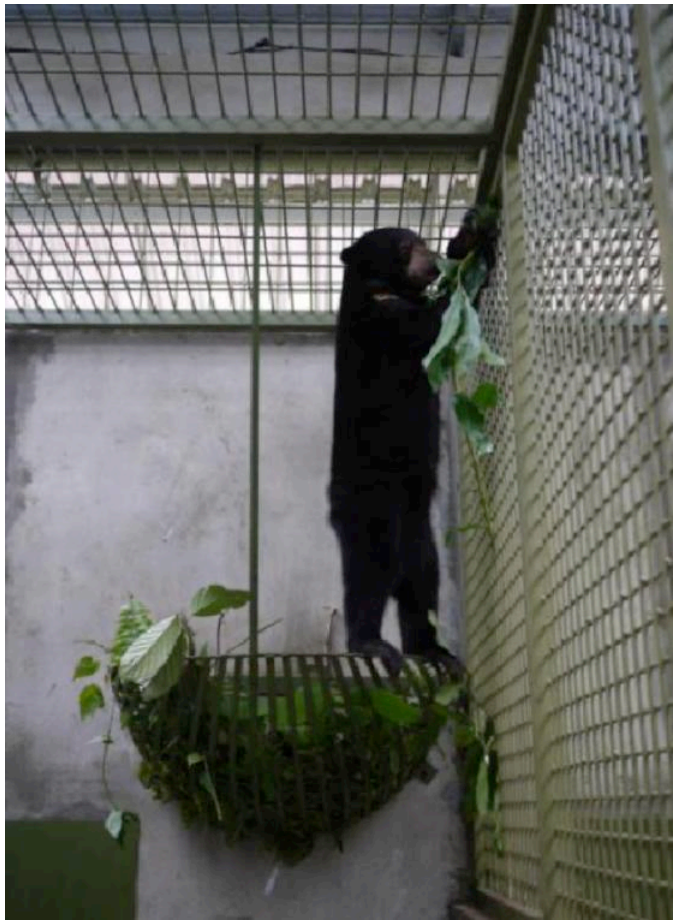
Human health

- Experimentation with animal models
  - biologically similar
  - susceptible to the same health problems
  - shorter life cycle
  - Required that non-human animal research show the safety and efficacy of new treatments first

Animal Welfare – Temple Grandin's vision: More Humane Meat Production



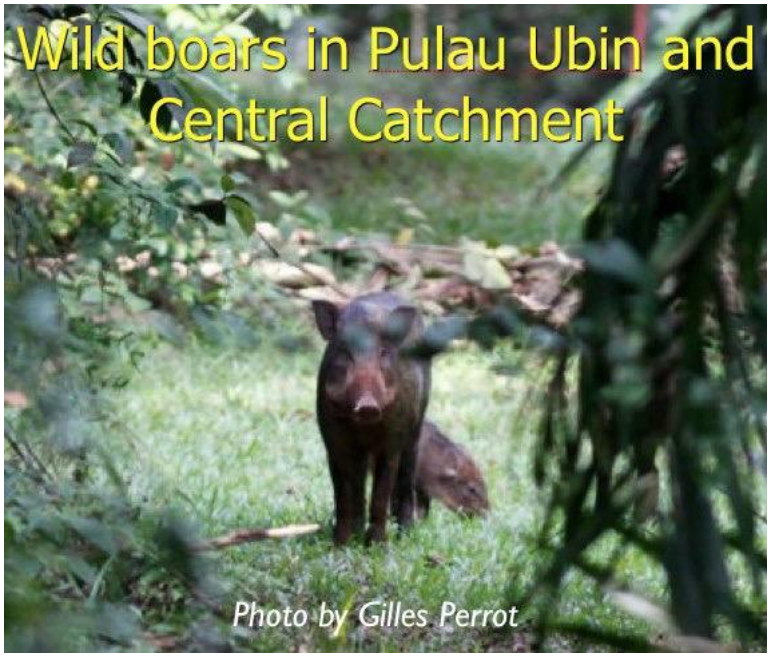
Enrichment in captivity



WONG SIEW TE, BORNEAN SUN BEAR CONSERVATION CENTRE

Management


The case of the
House crow (*Corvus splendens*)
in Singapore, 2003
House Crow, Singapore Botanical Gardens
Paul Huang@2001, www.naturestops.com


Wild boars in Pulau Ubin and
Central Catchment
Photo by Gilles Perrot

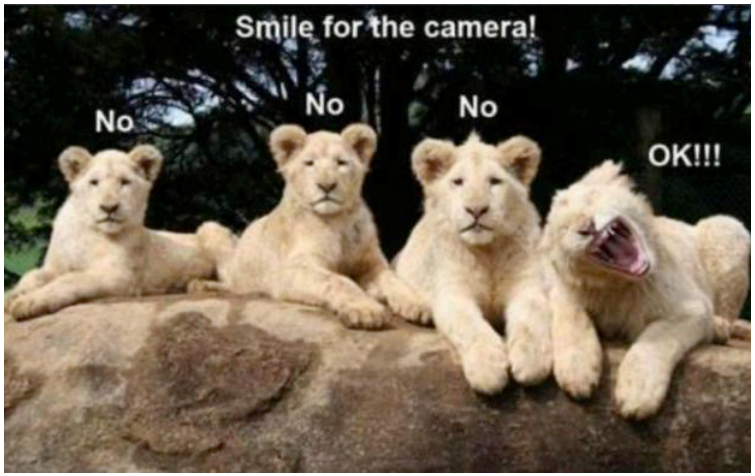
Management

Human-Wildlife interactions in Singapore (Week 10 or 12)

3.2 The scientific study of animal behaviour

The problem of Anthropomorphism

- descriptions and interpretation in terms of human mental processes – what an animal is filtered through aliens of human-centered biases



Ethology

- Ethology is the scientific study of animal behaviour,
- usually with a focus on behaviour under natural conditions,
- and viewing behaviour as an evolutionarily adaptive trait.

Origins of the modern discipline of ethology

- Begun in the 1930s with the work of
  - Dutch biologist Nikolaas Tinbergen
  - Austrian biologists Konrad Lorenz, Karl von Frisch
- Awarded the 1973 Nobel Prize in Physiology or Medicine

Objectives of ethological research

- Investigating the relationship of animals to their physical environment as well as to other organisms.
- How do animals find and defend resources, avoid predators, choose mates and reproduce, and care for their young.

causes, development, functions and evolution

- People who study animal behavior are concerned with understanding the causes, development, functions and evolution of behavior.

causes, development, functions and evolution

- The causes of behavior: both the external stimuli that affect behavior, and the internal hormonal and neural mechanisms that control behavior.

  The development of behavior pertains to the ways in which behavior changes over the lifetime of an animal, and how these changes are affected by both genes and experience.

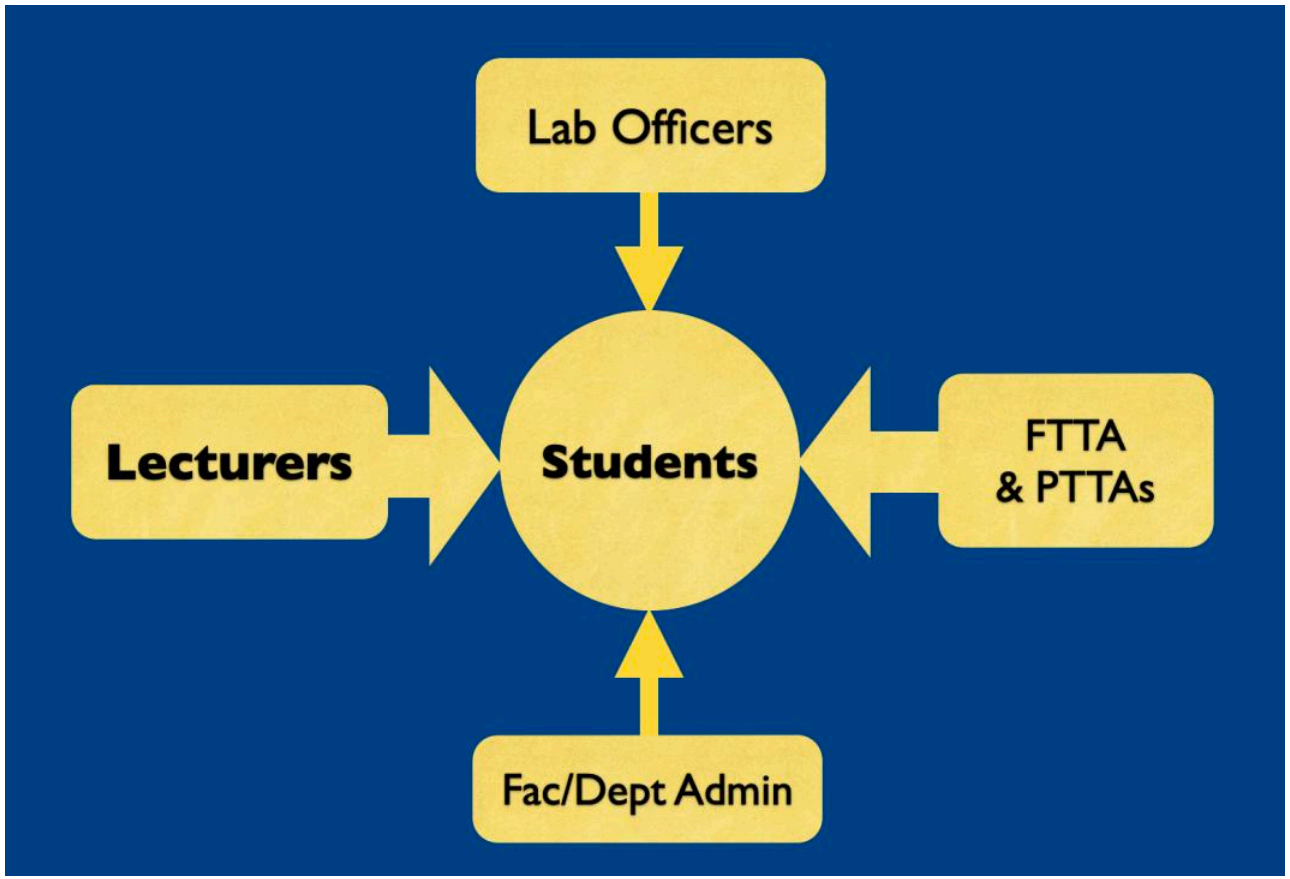
causes, development, functions and evolution

- The functions of behavior include its immediate effects on animals and its adaptive value in helping animals to survive or reproduce successfully in a particular environment.
- The evolution of behavior relates to the origins of behavior patterns and how these change over generations.

How will you learn
about animal behaviour?

III - Module Details

Your Teaching Ecosystem



FTTA Cai Hongxia,
your problem solver!

Coordinator

Sivasothi N.
Owner

Email: dbssn@nus.edu.sg
Other Information:

Cai Hongxia
Co-owner

Email: dbscaih@nus.edu.sg
About Me:

My master's degree research project was on population ecology of red-bellied squirrel (*Callosciurus erythraeus*). I also have research experience on phylogenetic study on torrent frogs (*Amolops*) in China.

Currently, I am a Full-time Teaching Assistant, the modules I teach including: LSM2251 Ecology and Environment, LSM2252 Biodiversity, LSM3254

Teaching Team

Sivasothi N.
Owner

Coordinator

Email: dbssn@nus.edu.sg
Other Information:

Cai Hongxia
Co-owner

Tutor

Email: dbscaih@nus.edu.sg
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Tutor

Xu Weiting
Co-owner

Email: dbsxuwt@nus.edu.sg
About Me:
I am passionate about mammals, human-wildlife conflict issues and science communication. As a Full-Time Teaching Assistant, I teach in many of the biodiversity and ecology Life Sciences modules.

Others

Goh Poh Moi
Manager

Email: dbsgohpm@nus.edu.sg
About Me:
Lab Technologist
S2-03-01 Lab 7
Tel: 65162705

Teaching Assistant

TIMOTHY LEONG TZE IAN
Manager

Email: e0406678@u.nus.edu

Teaching Assistant

ANNIE CHEW ANN NEE
Manager

Email: e0201578@u.nus.edu

Scope in this Module

- WIldlife in Singapore & Module objectives
- Diversity, Ethology & Ethics; How to observe animal behaviour?
- Innate Behaviour & Learning
- Living in Groups I & II
- Foraging
- Territoriality I & II
- Human - Animal Interactions
- Communication I & II
- Courtship & Mating
- Animal Welfare

Wk	Month	Practical	Lecture
		Monday	Friday
1.	Jan	10	14 Wildlife and Wild Places in Singapore Introduction to Animal Behaviour Course Objectives
2.		17 Extinction Game, Wildlife & Wild Places in Singapore	21 Diversity, Ethology, Observing Animal Behaviour About the Symposium Project Presentation
3.		24	28 Innate Behaviour & Learning I
4.	Feb	31 Research Methods, The Project Proposal & Risk Assessment	04 Learning II
5.		07	11 Living in Groups I
6.		14 Elevator Pitch & Final Design Consultation	18 Living in Groups II & Foraging I
	Recess Week: Sat, 19 Feb – Sun, 27 Feb 2022 (1 week)		
7.	Mar	28	04 Foraging II & Territoriality I
8.		07 Submit group video presentation by 13 Mar 2022 (Project Critique Feedback)	11 Territoriality II
9.		14	18 Human-Wildlife Interactions
10.		21 Human-Wildlife Interaction Workshop	25 Communication I
11.		28	01 Communication II
12.	Apr	04 Animal Behaviour Symposium	08 Courtship & Mating
13.		11	*15 Good Friday (Public Holiday)*
	Reading Week: Sat, 16 Apr – Fri, 22 Apr 2022 (1 week)		
	Examination: Thu, 28-Apr-2022, 9am		
	Vacation: Sun, 8 May – Sun, 31 Jul 2022 (12 weeks)		

Why a group project observing wildlife?

- To understanding animal behaviour, scientific observations of wild animals are a fundamental skill.
- Working in a group builds on each other's strengths and adds up observation data effectively n a short time.
- We will guide you set by step of the way

Example of an abstract

Group No. 5: "Do Red Weaver Ants (*Oecophylla smaragdina*) remain stationary and autogroom more in groups as compared to when they are alone?"

Cheng Ke Jing (SOC4), Koh Wai Kit (SOC4), Tng Xin Jie Jordon (FASS3), Venetta Angeline Ho Li-Min (FASS3), Aaron Seow Chengyi (FoE4)

Symposium I (20 March 2017)

Red Weaver Ants (*Oecophylla smaragdina*), a eusocial species of ants, can be found among vegetation around Singapore. We investigated the differences in stationary and autogrooming behaviours between group and lone ants. Focal sampling were conducted using footages of 10 minutes each taken along Rivervale Drive on 22nd, 24th and 27th of February 2017 at 9am, 11am, 1pm, 3pm at Berlayer Creek Boardwalk on 28th and 29th at 2pm and 3pm. Ants that remained motionless for longer than two seconds were considered as stationary and ants rubbing antennae against each other's bodies were considered autogrooming. Results showed that group ants remained stationary for a larger proportion of time compared to lone ants (40% vs 3%). Additionally, group ants displayed lesser autogrooming behaviour (7% vs 23%). In accordance to the theories on group size, this could be the result of lower individual vigilance when social animals are in groups.

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1. Where and what to observe

2. Project Example

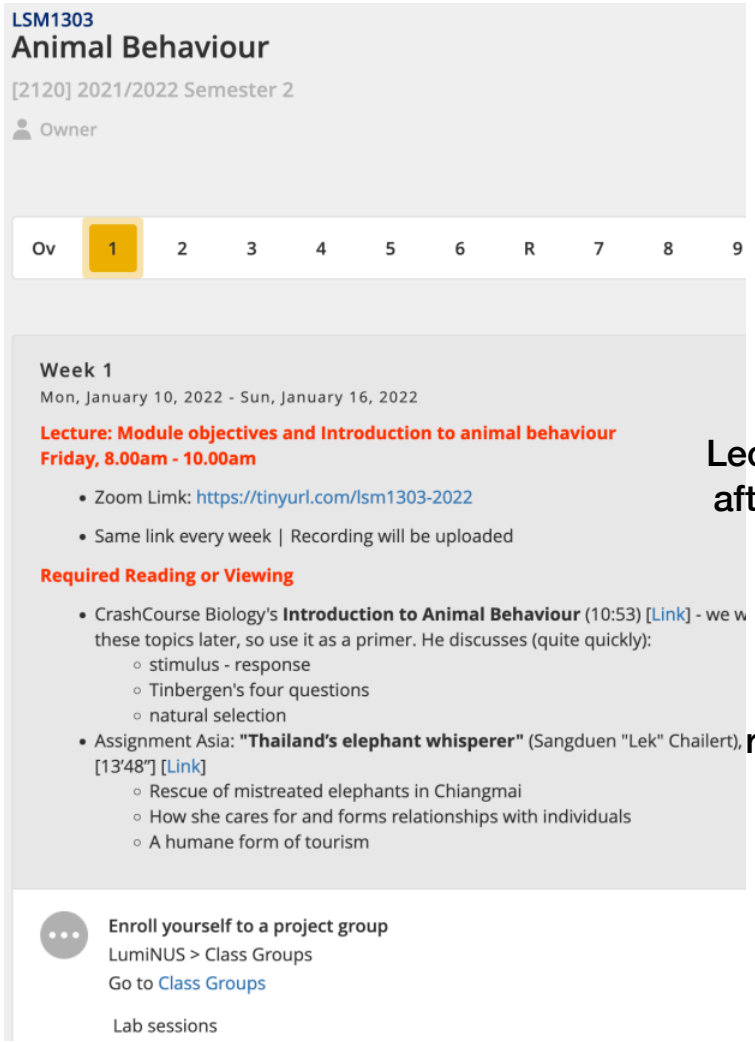
3. How to observe

4. Proposal approval?

5. Dry Run (feedback)

Show Time!

Learning Flow is populated for each week



Lecture link and after, recording

Required readings or viewing

50% Project, 30% Exam

Assessment

Symposium preparation and presentation (50%)

1. Week 5 CA2 [5%] - Group Project Proposal Submission
2. Week 6 CA3 [5%] - Group "Elevator Pitch"
3. Week 11 CA4 [5%] - Symposium Group Abstract
4. Week 12 CA5 [30%] - Group Presentation
5. Week 12 CA6 [5%] - Presentation slides pdf

Week 13 - A Peer Review Exercise will be conducted to evaluate individual Group Members performance.

Individual (50%)

- Week 2 CA1 [5%] - Individual Map Exercise
- *2.5% bonus marks for asking questions in symposium*

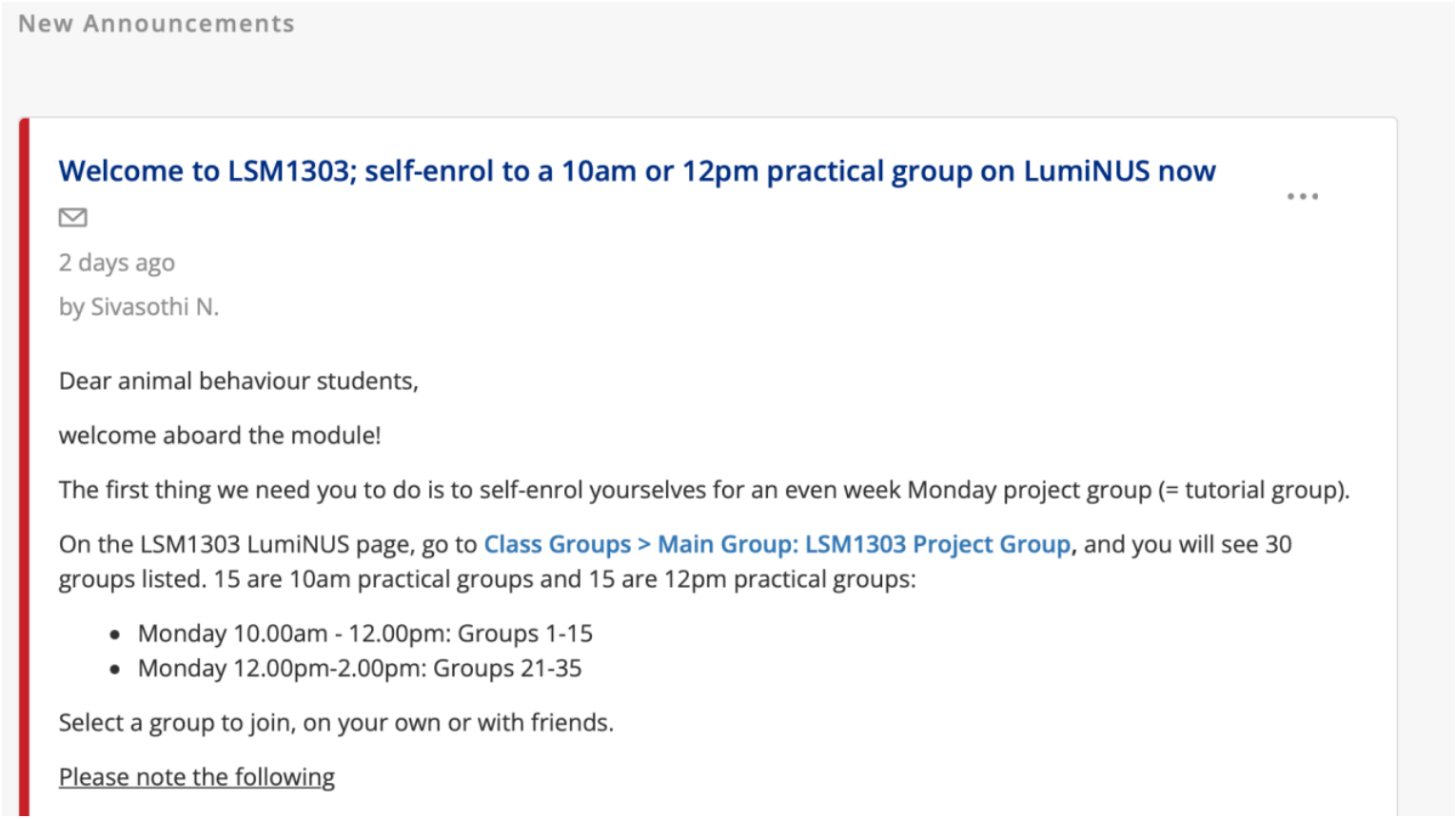
Lecture Quizzes (CA7) - 15% (3-days to attempt MCQs; open book)

- Week 6, Quiz 1 (5%) – Lectures 2 – 5: Ethology, Learning & Living in Groups
- Week 9, Quiz 2 (5%) – Lectures 6 & 7: Foraging & Territoriality
- Week 11, Quiz 3 (5%) – Practical 4 & Lecture 10: Human Wildlife Conflict

Exam

- 30% Online LumiNUS Quiz: MAQ & SAQ
- Two hour exam

Always announced, so you won't miss emails



IV - The Extinction Game, an introduction to ecological processes

Ecology

- the branch of biology that deals with
- the relations of organisms with *each another*, and their *environment*
- You will play the Extinction Game to acquire a taste of ecological mechanisms (your TAs will discuss this with you)

Read the rules before Practical

Extinction: The Game of Ecology

Stephen Hubbell & Carolina Biological Supply Company

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Rules

You play the part of a species whose goal is to survive while rivals become extinct. Extinction simulates several ecological events, some natural and others caused by man. You may play until all but one species become extinct, or you may set a time limit. The first approach often takes three hours or longer.

Figure 1. Game overview.

Ecology concepts you will encounter in the Extinction Game

- Optimal Habitat - where is an animal best suited to live and reproduce?
- Fecundity (reproductive potential) - how much does an animal reproduce?
- Competition - how animal competes directly and/or indirectly for space and food

Ecology concepts you will encounter in the Extinction Game

- Territoriality - how an animal protects a space enough to ensure it has the resources it needs
- Predation versus Prey defense
- Environmental change (often unexpected)