Researchers in Schools

How honey bees dance for their dinner

Key Stage 4 Programme

Pupil Name

Coursebook Designed by Dr Kyle Shackleton

Contents

Uni Pathways launch event ... 3
Introduction to Uni Pathways ... 3
Pupils' experience of Uni Pathways ... 4
Virtual campus tours ... 4
Meet university students! ... 5
Reflection ... 5
Timetable and Assignment Submission ... 7
Timetable – Tutorials ... 7
Timetable – Homework Assignments ... 7
Assignment Submission – Lateness and Plagiarism ... 7
Course Rationale ... 8
Uni Pathways Mark Scheme 2020 ... 9
Baseline Assignment: Pupil Feedback Report ... 11
Final Assignment: Pupil Feedback Report ... 12
Subject Vocabulary ... 13
Tutorial 1 – Honey bees as individuals and colonies ... 16
What is the Purpose of Tutorial 1? ... 16
Smart Start: What is a honey bee? ... 17
Fill in the blanks on the honey bee diagram ... 18
Get a job! The different castes of honey bee and their role in the colony ... 19
The resources a honey bee colony need to survive ... 20
Homework: The bare necessities (baseline assessment) ... 21
Notes ... 22
Tutorial 2 – Dancing for your dinner ... 23
What is the Purpose of Tutorial 2? ... 23
Smart Start: Think of two different animals ... 24
Do bees talk to each other? ... 25
Waggle dance communication ... 26
Homework: Data analysis ... 27
Notes ... 28
Tutorial 3 – How to win a Nobel Prize ... 29
What is the Purpose of Tutorial 3? ... 29
Smart Start: Fill in the blanks of the table. Then plot the locations of the food sources on the map ... 30
Recreating the calibration curve of Karl von Frisch ... 31
Behave yourself! The benefits and costs of behaviours ... 32
Homework: Understanding novel behaviours ... 33
Notes ... 34
Tutorial 4 – Are some behaviours 'better' than others? ... 35
What is the Purpose of Tutorial 4? ... 35
Smart Start: Bees are numerous and diverse! ... 36
Diversity in behaviour ... 37

Benefits and costs of different foraging behaviours 38
Homework: Evaluating behaviours 39
Notes 40
Tutorial 5 – Putting it all together: how to study bees 41
What is the Purpose of Tutorial 5? 41
Smart Start: Experiments recap 42
Your own experimental results! 43
How to write and reference in science 44
Homework: The evolution of behaviour (final assignment) 45
Notes 46
Tutorial 6 – Feedback tutorial 47
What is the Purpose of Tutorial 6? 47
Final assignment feedback from your Uni Pathways Teacher 47
Notes 49
Tutorial 7 – Final tutorial 50
Appendix 1 – Referencing correctly 52
How do I reference? 53
Notes 54

Uni Pathways launch event

Welcome to Uni Pathways! We are delighted to be able to launch the Uni Pathways programme with you. We hope that you are ready to embark on your Uni Pathways journey and that you enjoy the video.
You will be asked to pause the video at times to complete some work in this workbook, so make sure you have a pen / pencil to hand when you start the video.

By the end of the video, you will have:

- Learnt about what studying at university means
- Learnt about some of the skills that you will develop during Uni Pathways
- Heard from pupils who have participated in Uni Pathways or The Scholars Programme (which is the same programme!)
- Heard from current university students talking about what life is like at university

If you are in school your teacher will play the video. If you are at home and logged in to a session with your teacher, your teacher will play the video and show it to you. If you are participating independently your teacher will email you the link to the video or the video file. There are opportunities for you to answer some questions, and you will be told when to pause the video to answer them.

Introduction to Uni Pathways

1. Write down what you think a supra-activity is.

_____
_____
_____

2. Independent learning is

_____
_____
_____

3. Write down in your own words what resilience means, and come up with a different example to the one mentioned in the PowerPoint.

_____
_____
_____
_____

4. Why do you think analysis and evaluation skills are useful in your academic career?

_____
_____
_____
_____
_____

5. Why do you think analysis and evaluation skills are useful in life in general?

_____
_____
_____
_____
_____

6. What are the different types of learning that university students do?

Pupils' experience of Uni Pathways

You will now watch some pupils talk about their experience of learning a PhD topic and producing a final assignment. Some may refer to The Scholars Programme rather than Uni Pathways. As you heard in the introduction PowerPoint, The Scholars Programme is a very similar programme to Uni Pathways. Listen carefully and then respond to the questions below. Be prepared to share some of your responses with your peers.

1. How did the pupils describe talking about writing a long essay for their final assignment?

2. Write down something that one of the pupils mentioned was particularly interesting in their course.

3. What were some challenges that the pupils met?

Virtual campus tours

You will now go on a virtual tour of some universities! Once you have seen some of the university campuses, respond to the questions below.

1.Note down something that you liked out of any of the campus tours you saw. It may be a particular building, space, city etc.

2. Were there any similarities between the different university campuses? If so, what are the similarities?

3. If you had to pick one of those universities to go and visit in person, which one would it be and why?

4. Note down some of the societies that you could join at different universities

Meet university students!

You are about to virtually meet or hear from some current university students.
If you are virtually meeting them, think about what questions you would like to ask the students, share your questions with a partner and note those questions down in the space below.

If you are not meeting them but watching some videos that they have made, use the space below to note down what else you would like to find out about university. You can then ask your teacher during Uni Pathways tutorials!

Reflection

Congratulations on completing the launch of the Uni Pathways programme. Before you go, take some time to reflect on what you have learnt by answering the following questions:

1. Are there any aspects of university style learning that you would look forward to? If so, what are they?

2. What challenges do you think students face when learning at university? How would you try to overcome these challenges?

3. What skills do you hope to develop during your Uni Pathways course?

4. What part of Uni Pathways seems the most challenging for you?

5. What are you most looking forward to about Uni Pathways?

Timetable and Assignment Submission

Timetable – Tutorials

Tutorial	Date	Time	Location
1			
2			
3			
4			
5			
6 (Feedback)			
7 (Feedback)			

Timetable – Homework Assignments

Homework Assignment	Description	Due Date
Tutorial 1	The bare necessities (baseline assignment, page 15)	
Tutorial 2	Data analysis (page 21)	
Tutorial 3	Understanding novel behaviours (page 27)	
Tutorial 4	Evaluating behaviours (page 33)	
Tutorial 5	The evolution of behaviour (final assignment, page 39)	

Assignment Submission – Lateness and Plagiarism

Lateness	
Submission after midnight on due date	10 marks deducted
Plagiarism	
Some plagiarism	10 marks deducted
Moderate plagiarism	20 marks deducted
Extreme plagiarism	Automatic fail

Course Rationale

Humans can use interpretive dance to tell stories, but bees got there millions of years before us! This course aims to study the ecology and evolution of a remarkable behaviour, the honey bee waggle dance. This is probably the only thing for which a science Nobel Prize has been awarded that you can see with your naked eye!

A good patch of flowers is hard to find, so when a bee finds some, she wants to share the location with the rest of her colony. Back at the nest, she performs a dance in a figure-of-eight pattern, which contains information on the distance and direction to the flowers. The other bees can then follow and find the food themselves.

Through studying the waggle dance, you will gain an understanding of how scientists use simple experiments to manipulate animal behaviours, and what their responses can tell us about the evolution of complex social behaviours. You will get to use some of the real methods used by scientists by 'dance decoding' on a computer.

You will be encouraged to think about behaviours in terms of their costs and benefits, and how this leads to their evolution.

The overall aims of the course are:

- Understand the honey bee as an individual, as a colony, and the complex behaviours of both.
- Experience and develop the skills used by scientists, including analytical thought, experimental design, analysing data and discussing ideas.
- Think critically about the costs and benefits of behaviours and why they have evolved.
- Understand how we can apply scientific knowledge and methods to solve problems.

Uni Pathways Mark Scheme 2020

	Subject Knowledge	Critical Thinking	Written Communication
1st	The work shows a depth of knowledge and understanding of key concepts and scientific methods, through engaging with relevant sources. Knowledge is used to build and support highly effective scientific arguments and explanations.	Analyses key scientific evidence, arguments, and reasoning. Interprets meaning and makes connections. Identifies and critically evaluates key scientific arguments and evidence, deciding on their credibility, strength, and relative significance, drawing convincing conclusions.	The work has a coherent flow and is well structured. The writing style is appropriate; scientific language and key scientific terms are used accurately and effectively to support the arguments and explanations made. There are no, or very few, errors in spelling or grammar. Consistent referencing, appropriate paragraphing and use of correctly labelled tables and graphs matching the style taught in the course.
2:1	The work shows an understanding of key concepts and scientific methods, drawing on relevant sources. Knowledge is used to build and support effective scientific arguments and explanations.	Analyses relevant scientific evidence, arguments, and reasoning. Identifies and critically evaluates relevant scientific arguments and evidence, deciding on their credibility and strength, drawing reasonable conclusions. Shows some understanding of the relative value of evidence and arguments.	The work is well-structured. The writing style is appropriate; scientific language and key terms are used correctly. There are few errors in spelling or grammar. Mostly consistent referencing and use of tables and figures; matching the style taught in the course.
2:2	The work shows an understanding of key concepts and scientific methods, with no major misconceptions. Beginning to apply this knowledge to build and support effective scientific arguments and explanations.	Identifies and uses basic scientific evidence, arguments, and reasoning. Showing some understanding of the quality of scientific arguments and evidence. Not yet showing understanding of the relative value of evidence and arguments.	The work has some structure. The writing style can sometimes be informal; occasionally scientific language and key terms are not used when it would be appropriate to do so. There are some errors in grammar and spelling do not get in the way of communicating the content. Referencing has some consistency; matching the style taught in the course Limited use of tables and graphs.
3rd	Shows a developing understanding of key concepts and scientific methods, with some misconceptions.	Beginning to analyse scientific evidence, arguments, and reasoning.	The grammar, spelling, style, and structure of the work need improving in order

	Does not yet apply this knowledge to build and support scientific arguments and explanations.	Describes evidence and arguments, while not yet evaluating them.	to communicate ideas to the reader. Scientific language, key terms and references are not always used correctly. Limited, or no use of tables and graphs.

Baseline Assignment: Pupil Feedback Report

Name of Pupil	
Name of School	
Name of RIS teacher	
Title of Assignment	

How your assignment is graded:

Grade	Marks	What this means
1st	70+	Performing to an excellent standard at A-level
2:1	60-69	Performing to a good standard at A-level
2:2	50-59	Performing to an excellent standard at GCSE
3rd	40-49	Performing to a good standard at GCSE
Working towards a pass	0-39	Performing below a good standard at GCSE
Did not submit	DNS	No assignment received by The Brilliant Club

Lateness	
Any lateness	10 marks deducted
Plagiarism	
Some plagiarism	10 marks deducted
Moderate plagiarism	20 marks deducted
Extreme plagiarism	Automatic fail

Marks

OVERALL MARK / 100		FINAL MARK / 100 (including any deductions)	
DEDUCTED MARKS		FINAL GRADE	

If marks have been deducted (e.g. late submission, plagiarism) the teacher should give an explanation in this section:

Mark Breakdown and Feedback

Subject knowledge	
	mark
Critical thinking	
	mark
Written communication	
	mark

Final Assignment: Pupil Feedback Report

Name of Pupil	
Name of School	
Name of RIS teacher	
Title of Assignment	

How your assignment is graded:

Grade	Marks	What this means
1st	70+	Performing to an excellent standard at A-level
2:1	60-69	Performing to a good standard at A-level
2:2	50-59	Performing to an excellent standard at GCSE
3rd	40-49	Performing to a good standard at GCSE
Working towards a pass	0-39	Performing below a good standard at GCSE
Did not submit	DNS	No assignment received by The Brilliant Club

Lateness	
Any lateness	10 marks deducted
Plagiarism	
Some plagiarism	10 marks deducted
Moderate plagiarism	20 marks deducted
Extreme plagiarism	Automatic fail

Marks

OVERALL MARK / 100		FINAL MARK / 100 (including any deductions)	
DEDUCTED MARKS		FINAL GRADE	

If marks have been deducted (e.g. late submission, plagiarism) the teacher should give an explanation in this section:

Mark Breakdown and Feedback

Subject knowledge	
	mark
Critical thinking	
	mark
Written communication	
	mark
Problem Set	
Comment	*mark*

Subject Vocabulary

Word	Definition	In a sentence
Azimuth (or solar azimuth)	The horizontal angle of the sun from north relative to the observer's position.	
Brood	The immature members of a colony including eggs, larvae and pupae.	
Calibration curve	A line on a graph that enables us to establish the value of variable A given the value of variable B. For the waggle dance, it gives us the distance to the food if we know the duration of the dance.	
Cell	A hollow, hexagonal structure built by the workers in which the queen may lay eggs and the workers store food.	
Colony	The family group of bees that live together comprising a queen, workers and drones (males). This can be tens of thousands of individuals in honey bees.	
Comb	A double layer of cells stacked together in a regular pattern.	
Dance floor	The region of combs in a nest, where most of the waggle dances are performed.	
Drone	The male honey bee, whose task is to mate with a queen.	
Eusocial	A social system where a single female or caste produces the young and other non-reproductive individuals cooperate to care for the young.	
Fitness	The ability of an organism to reproduce and pass on its genes to future generations. A "fitter" organism may possess traits that enhance its ability to survive and reproduce.	

Word	Definition	In a sentence
Forager	A worker bee whose task is to collect food.	
Hive / Beehive	The artificial, man-made structure used to house a colony of bees. Usually made of wood.	
Hymenoptera	The order (group) of related insects that includes bees, wasps, ants and sawflies.	
Nectar	A sugary liquid produced by flowers that is collected by bees to provide energy.	
Nest	A structure built by animals to house the eggs, young, and often the animal itself.	
Observation hive	A hive with a clear glass front allowing us to observe the behaviours of the bees inside.	
Pheromone	A chemical produced by an animal that changes the behaviour of another animal of the same species. Often used in animal communication.	
Pollen	A powdery substance containing the male sex cells of plants, produced by flowers. It is collected by bees to provide protein.	
Queen	The reproductive female who lays all the eggs in the colony.	
Recruit	A forager honey bee that locates food sources by following one or more waggle dances rather than searching independently.	

Word	Definition	In a sentence
Return phase	The part of the waggle dance in which the bee walks in a semi-circle and returns to her starting position.	
Scout	A forager bee that looks for food sources through searching independently, rather than following a waggle dance.	
Vector	A quantity having direction and magnitude (distance).	
Waggle dance	A behaviour performed by worker honey bees that communicates the distance and direction of food sources to nestmates.	
Waggle phase	The part of the waggle dance in which the bee vibrates and shakes her body while moving through a straight line. It contains the information on	
Worker	The non-reproductive females whose task is to clean, raise young, guard the nest and forage for food.	

Tutorial 1 – Honey bees as individuals and colonies

Top: a honey bee worker. Bottom: Workers tend the queen.

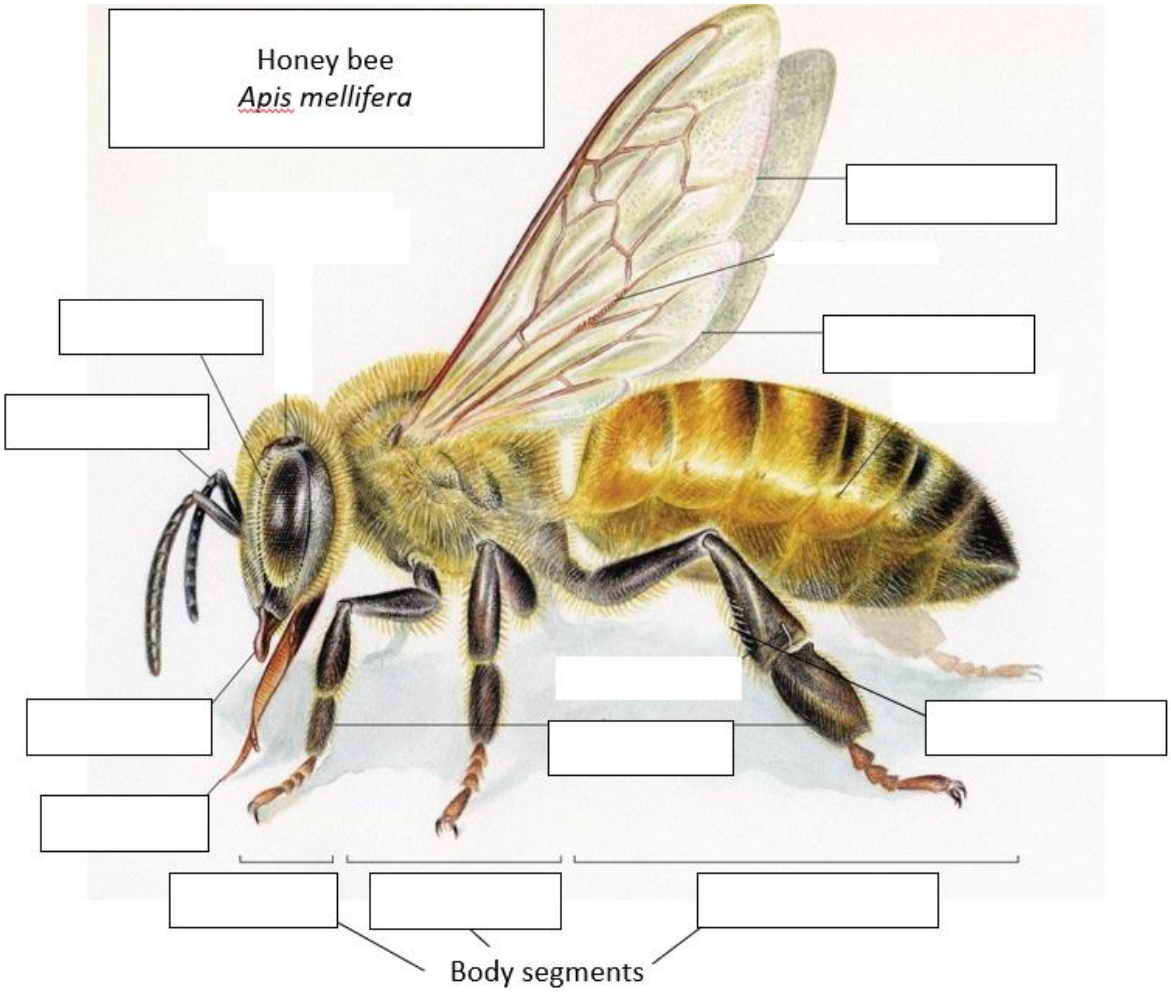
What is the Purpose of Tutorial 1?

- Describe the main features of a honey bee worker.
- Explain the structure of a honey bee colony.
- List the resources a colony needs to survive and reproduce.

Smart Start: What is a honey bee?

Draw what you think a honey bee looks like. Label as many parts of its body as you can

Fill in the blanks on the honey bee diagram



Get a job! The different castes of honey bee and their role in the colony

Caste	Sex (male or female)	How many in a colony?	Jobs or roles in the colony

The resources a honey bee colony need to survive

Watch the video. Think about the following questions and write your answers to the questions in the space below.
What are the bees doing and why?
Are the bees collecting anything?
Does this look easy or difficult and why?

Homework: The bare necessities (baseline assessment)

1. Give three resources a honey bee colony needs to collect and why are each of them important? (75 words).
2. Would it be a good idea for all bees in a colony to collect food and why? (75 words)
3. If a worker bee finds a really good food source, think of a way in which she might increase the amount of food collected for her colony (75 words)

Remember to PEE!

- **Point – make the key point clearly**
- **Evidence – explain the evidence for the point**
- **Explanation – explain why your point is relevant and important**

Notes

Tutorial 2 – Dancing for your dinner

What is the Purpose of Tutorial 2?

- Describe how animals communicate through a variety of modalities.
- Describe the waggle dance behaviour and explain the two key pieces of information it contains.
- Be able to decode a waggle dance from a video and plot it on a map.

Smart Start: Think of two different animals

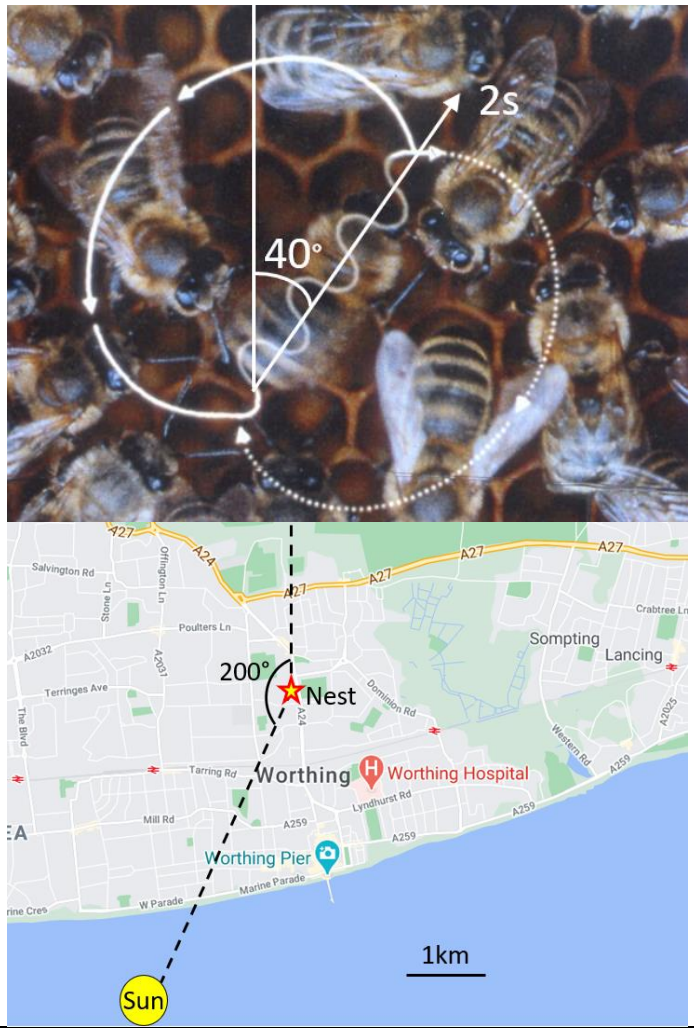
- Describe a way they communicate.
- Why do they do it?
- Follow the example of the peacock below.

Animal	Behaviour	Why does it do it?	Mode of communication
Male peacock	Fans its tail	Attract a female	Visual / sight

Do bees talk to each other?

Watch the video. Try to answer the following questions in the space below.
What pattern is the bee in the middle making?
What are the bees around the central bee doing?
Is communication occurring? If so, what is being communicated?

Waggle dance communication

1. A honey bee worker performs her waggle run for 3 seconds, how far away is the food she is dancing for?
2. A honey bee worker finds food 1600 metres from the nest, how long will her waggle runs have to be?
3. A honey bee worker returns to the nest and dances at an angle of 90 degrees from vertical. The sun's azimuth is currently 180 degrees from north. Which direction (in degrees) is the food from the nest?
4. Calculate the distance and direction of the food from the diagram below. Try to mark the position of the food on the map.


Homework: Data analysis

- Fill in the blanks of the table below
- First calculate the distance indicated by each dance.
- Then calculate the averages.

Bee / dance number	March dance duration (s)	March distance flown (m)	August dance duration (s)	August distance flown (m)
1	0.5		2.8	
2	1.0		3.0	
3	1.3		1.2	
4	0.8		7.5	
5	1.4		5.2	
Average				

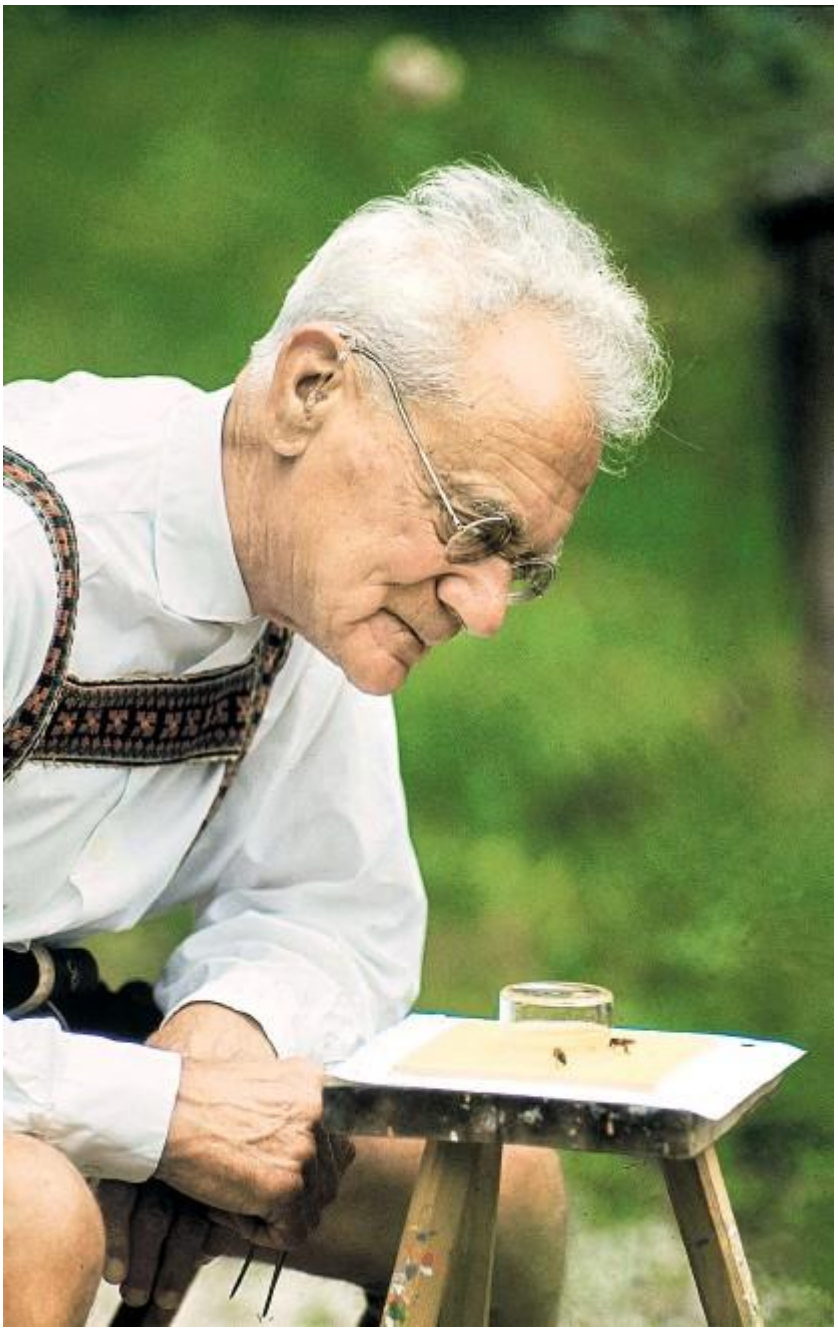
Using your data above, draw a **bar graph** to compare the **average distance** flown between March and August. Your graph should have:

- A title
- Labelled axes with units
- If you feel confident, you can make your bar graph in Excel.

Briefly describe what you think your graph shows. Why do you think that is? (50 words)

Notes

Tutorial 3 – How to win a Nobel Prize



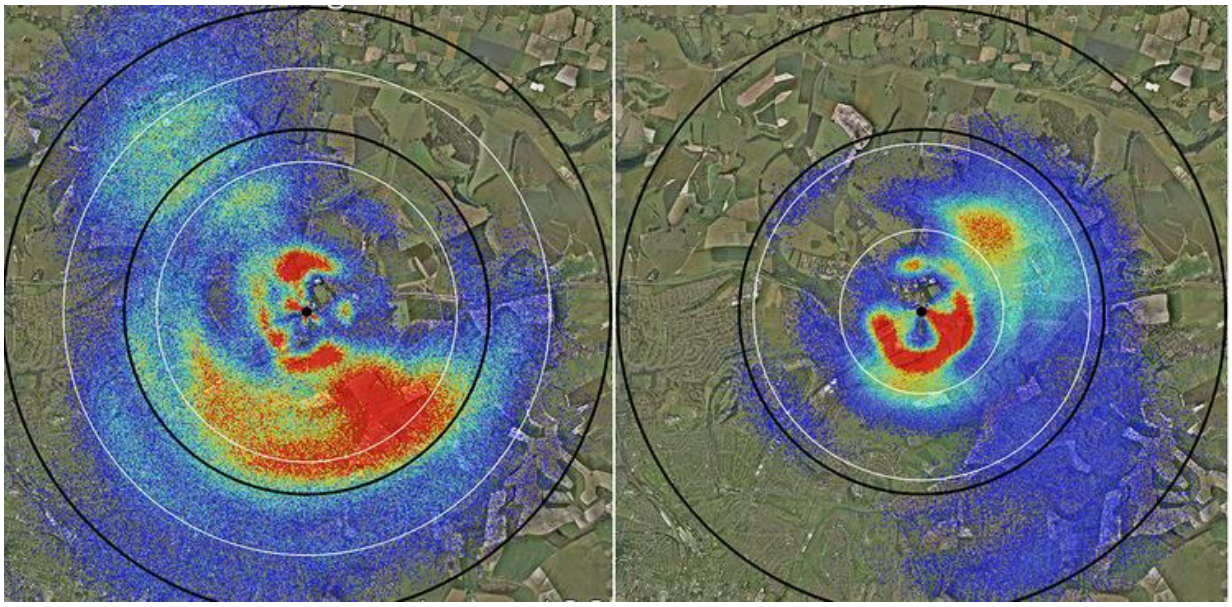
Nobel Prize winner Karl von Frisch studying honey bees.

What is the Purpose of Tutorial 3?

- Describe how the function of the waggle dance behaviour was discovered.
- Understand that animal behaviours all have costs and benefits.
- Explain how a scientist could use an experiment to measure the benefits of the waggle dance.

Smart Start: Fill in the blanks of the table. Then plot the locations of the food sources on the map

Waggle dance duration (s)	Distance to the food (m)	Angle of dance from vertical (degrees)	Solar azimuth (degrees)	Direction of the food from North (degrees)
2.7		10	150	
7.0		180	250	



Scientist Margaret Couvillon used heat maps to visualise waggle dance locations.

Recreating the calibration curve of Karl von Frisch

Distance to feeder (m)	Duration of waggle dance (s)
500	0.6
1000	1.3
2000	2.3
3000	3.6
3500	4.0

Make a scatter graph with distance to the feeder on the x-axis and duration of the waggle dance on the y-axis. Remember your units.

- Plot the data from the above table on the graph.
- Draw a line of best fit through the points.
- Answer the two questions using your line of best fit.

Dance duration for feeder 2500 metres away:

Distance of feeder for a dance of 1.5 seconds:

Behave yourself! The benefits and costs of behaviours

Write down some potential benefits and costs of behaviours below		
Behaviour	Benefits	Costs
Male peacock fanning its tail	- More likely to attract a female and reproduce.	- Energetically expensive to fan his tail. - Conspicuous to predators and more difficult to flee. - Costs energy and nutrients to grow and maintain the tail.
Honey bee stinging		
Honey bee performing the waggle dance		

Honey bees die when they sting. Why would such a behaviour evolve?

Homework: Understanding novel behaviours

Watch the video on nuptial gifts on Google Classroom. Give one potential benefit and cost of this behaviour (50 words).
Watch the video of the antelope 'stotting' on Google Classroom. Give one potential benefit and cost of this behaviour (50 words).
Describe an interesting animal behaviour you have seen in real life or on a nature documentary. The behaviour might concern hunting/foraging for food, avoiding predators, reproduction or raising young (50 words).
Give one potential benefit and cost of this behaviour (50 words).

Notes

Tutorial 4 – Are some behaviours ‘better’ than others?

What is the Purpose of Tutorial 4?

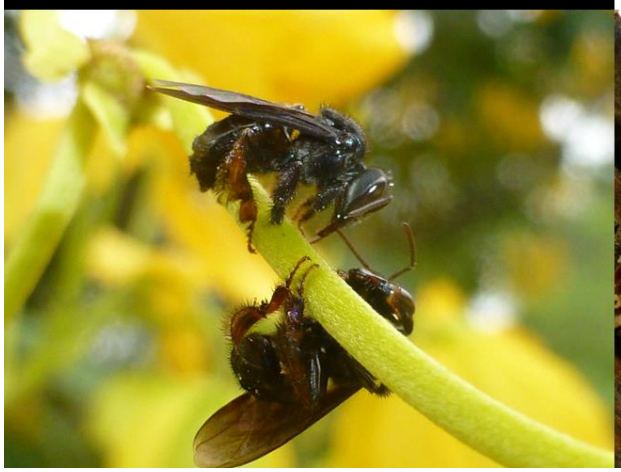
- Recognise that bees are a diverse group with many species and behaviours.
- Compare and contrast the waggle dance with foraging behaviours in other species.
- Evaluate the benefits and costs of different behaviours.

$$b > c\ ?$$

A behaviour may evolve if its benefits outweigh its costs.

Smart Start: Bees are numerous and diverse!

1. Write down the names of as many different bees as you can. Feel free to use Google.
2. Look at the specimens under the microscope. Write down something unique about each.
Species 1: Species 2: Species 3:



Diversity in behaviour

Watch the video presentation and work through the slides on bee behaviour. Research and then describe three unique behaviours of bees you think are interesting. Think about why they do it and what the advantages are (50 words per behaviour).
Behaviour 1:
Behaviour 2:
Behaviour 3:

Tetragonisca angustula bees are unique in having guards that hover around the entrance (top). They defend their nest tenaciously against much larger opponents such as the robber bee *Lestrimelitta limao* (bottom).

Benefits and costs of different foraging behaviours

Write down three foraging behaviours used by bees and a benefit and cost of each.	
Behaviour 1:	
Benefit:	Cost:
Behaviour 2:	
Benefit:	Cost:
Behaviour 3:	
Benefit:	Cost:

Martin Lindauer performing experiments on bee foraging behaviour in Brazil.

Homework: Evaluating behaviours

Read the presentation on the chemical trails used by some stingless bees. Compare the waggle dance of honey bees with the chemical trail behaviour and answer the following questions. Use full sentences in your answers.
How are they similar? (30 words)
How are they different? (30 words)
Give two advantages of the waggle dance over chemical deposition (30 words)
Give two advantages of chemical deposition over the waggle dance (30 words)
Which behaviour do you think is better? Why? (50 words)

Notes

Tutorial 5 – Putting it all together: how to study bees

You could study bees here!

What is the Purpose of Tutorial 5?

- Collect and analyse data from a scientific experiment.
- Evaluate your experimental results in the context of other scientific work.
- Be able to write and present work scientifically.

Smart Start: Experiments recap

What variable or quantity is a measure of foraging ability?
What method would you use to compare honey bee foraging with and without the waggle dance?
What benefit did previous experiments show that the waggle dance gave? Was this benefit consistent?

Your own experimental results!

In the experiment where Dr Shackleton compared foraging distributions, what differences do you think occurred between oriented and disoriented bee colonies? There is no wrong answer here! Think about: • How far the bees might fly. • How spread out they might be.

Watch your dance disorientation video. Decode three dances (three different bees) and fill in the table.					
Waggle dance duration (s)	Distance to the food (m)	Angle of dance from vertical (degrees)	Solar azimuth (degrees)	Direction of the food from North (degrees)	Oriented or disoriented?

How to write and reference in science

Read each piece of example text, write down one good thing and one thing that could be improved about each.
Example 1
Example 2
Example 3
Give two reasons why it is important to reference your work.

Homework: The evolution of behaviour (final assignment)

Why does a behaviour evolve? Write a 1500-word report on how we can use experiments to discover the function, benefits and costs of a behaviour such as the waggle dance. Include 2-4 graphs/diagrams and use the following structure:

1. Introduce the honey bee colony and its needs (3-4 paragraphs).
2. Describe the experiments used to discover the function of the waggle dance (4-5 paragraphs and a diagram).
3. Use evidence to evaluate the potential benefits and costs of waggle dance communication (4-5 paragraphs and a graph).
4. Discuss what collecting more food means for an animal's fitness and why this might have allowed the waggle dance to evolve (2-3 paragraphs).

For part 3, you will have to draw upon evidence from previous experiments covered in the tutorials, and you will also be provided with a dataset of waggle dances from which you can produce your own calculations and graphs to draw conclusions.

Success criteria

- Include an introduction that describes the honey bee and the challenges it faces in finding food.
- Make good use of evidence to back up your statements and explain things in a logical order: What did the scientists do? What did they find? Why is it significant?
- Draw upon a variety of information sources. Complement the information from tutorials with sources discovered by you outside of the tutorials. All information sources should be properly referenced.
- Give reasons and evidence to back up the points that you make. You might find the PEE structure helpful:
    - Point – make the key point clearly
    - Evidence – explain the evidence for the point
    - Explanation – explain why your point is relevant and important
- Write in clear, concise sentences. Make sure your spelling and grammar are correct.
- Organise your report in structured paragraphs. A paragraph need not be long, 50-150 words.
- Use a standard font such as Times New Roman or Calibri in size 12 font with 1.5x line spacing.
- Use scientific terminology including the terms in the glossary but be careful not to use overcomplicated language.
- Choose an appropriate style of graph that is easy to interpret and has clearly labelled axes.
- Use appropriate scientific diagrams to help make your points. Make sure these are appropriately labelled.
- Make sure your graphs and diagrams have titles and refer to them in the text.
- Don't be afraid to be creative!

Notes

Tutorial 6 – Feedback tutorial

What is the Purpose of Tutorial 6?

- To receive feedback on your final assignment
- To respond to the feedback from your Uni Pathways teacher
- To write targets for improvement on your final assignment

Final assignment feedback from your Uni Pathways Teacher

(Remember to look at the mark scheme to help you understand what you have done well so far, and how you can do even better in your final assignment)

Here are three things that my Uni Pathways Teacher thought I did well in my draft assignment
•   •   •

Here are three things that my Uni Pathways Teacher thinks that I could do to get a higher mark in my final assignment
•   •   •

Tasks from my Uni Pathways Teacher to do during the feedback tutorial to help me improve
•   •   •
My response:

Actions I will take to improve my final assignment after this tutorial…
•   •   •

Hand in date for my final assignment:	

Notes

Tutorial 7 – Final tutorial

What is the Purpose of Tutorial 7?

- To receive feedback and a grade on your final assignment.
- To reflect on the programme including what you enjoyed and what was challenging.
- To ask any questions you may have about university.

Final assignment feedback from my Uni Pathways Teacher

Final mark:	University style grade:
Feedback: Here are three things that my Uni Pathways teacher thought I did well in my final assignment ● ● ●	

Here are three things that my Uni Pathways teacher thinks I should remember for when I am doing this kind of study in the future
● ● ●

University

What questions do you still have about University after taking part in Uni Pathways?
● ● ●

Reflecting on Uni Pathways

What did you most enjoy about Uni Pathways?
● ● ●

What did you find challenging about the programme?	How did you overcome these challenges?
● ● ●	● ● ●

Appendix 1 – Referencing correctly

When you get to university, you will need to include references in the assignments that you write, so we would like you to start getting into the habit of referencing in your Brilliant Club assignment. This is really important, because it will help you to avoid plagiarism. Plagiarism is when you take someone else's work or ideas and pass them off as your own. Whether plagiarism is deliberate or accidental, the consequences can be severe. In order to avoid losing marks in your final assignment, or even failing, you must be careful to reference your sources correctly.

What is a reference?

A reference is just a note in your assignment which says if you have referred to or been influenced by another source such as book, website or article. For example, if you use the internet to research a particular subject, and you want to include a specific piece of information from this website, you will need to reference it.

Why should I reference?

Referencing is important in your work for the following reasons:

- It gives credit to the authors of any sources you have referred to or been influenced by.
- It supports the arguments you make in your assignments.
- It demonstrates the variety of sources you have used.
- It helps to prevent you losing marks, or failing, due to plagiarism.

When should you use a reference?

You should use a reference when you:

- Quote directly from another source.
- Summarise or rephrase another piece of work.
- Include a specific statistic or fact from a source.

How do I reference?

There are several different ways of referencing, and these often vary depending on what subject you are studying. The most important to thing is to be consistent. This means that you need to stick to the same system throughout your whole assignment. Here is a basic system of referencing that you can use, which consists of the following two parts:

1. **A marker in your assignment**: After you have used a reference in your assignment (you have read something and included it in your work as a quote, or re-written it your own words) you should mark this is in your text with a number, e.g. [1]. The next time you use a reference you should use the next number, e.g. [2].
2. **Bibliography**: This is just a list of the references you have used in your assignment. In the bibliography, you list your references by the numbers you have used, and include as much information as you have about the reference. The list below gives what should be included for different sources.

    a. **Websites** – Author (if possible), title of the web page, website address, [date you accessed it, in square brackets].

    E.g. Dan Snow, 'How did so many soldiers survive the trenches?', http://www.bbc.co.uk/guides/z3kgjxs#zg2dtfr [11 July 2014].

    b. **Books** – Author, date published, title of book (in italics), pages where the information came from.

    E.g. S. Dubner and S. Levitt, (2006) *Freakonomics*, 7-9.

    c. **Articles** – Author, 'title of the article' (with quotation marks), *where the article comes from* (newspaper, journal etc.), date of the article.

    E.g. Maev Kennedy, 'The lights to go out across the UK to mark First World War's centenary', Guardian, 10 July 2014.

Notes

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