

# The Hive STORYLINE TOPIC

## Overview

This inter-disciplinary 'storyline' project is aimed at CfE Second level - upper primary and perhaps early secondary, consisting of 10-15 whole class lessons, primarily covering outcomes in science, literacy and expressive arts. All 'Suggested Activities' are optional and may be altered or dropped depending on the learning needs of the class undertaking the project and the time available. The main learning approach will be co-operative in order to mimic the teamwork of the beehive. All outcomes covered in the topic are listed in Appendix A and useful websites are listed in Appendix B.

## Key Messages:

- Honeybee numbers are currently declining and people have played a key role in that the decline
- If honeybees were to become extinct, this would have a huge impact on our food supply, our environment and on the food web as a whole
- It is not too late for us to reverse this decline and help to revive honeybee numbers

## Key CfE Outcomes:


I can use my knowledge of the interactions and energy flow between plants and animals in ecosystems, food chains and webs. I have contributed to the design or conservation of a wildlife area. **SCN 2-02a**

I can report and comment on current scientific news items to develop my knowledge and understanding of topical science. **SCN 2-20b**

By investigating the lifecycles of plants and animals, I can recognise the different stages of their development. **SCN 2-14a**

NB: Several other literacy, numeracy, technologies and expressive arts outcomes are covered in this topic and are listed below in Appendix A.

Knowledge	Outcomes	Storyline	Suggested Activities
<p>In certain parts of the world - particularly Europe and the US - bee populations are currently in steep decline. This is true in the UK, where 2 species of bee have already become extinct in recent years.</p> <p>Scientists are not sure exactly why this is happening and are busy trying to identify exactly what is causing this problem.</p>	<p><b>SCIENCE</b></p> <p>Commenting on current scientific news SCN 2-20b</p> <p><b>LITERACY</b></p> <p>Creating characters ENG 2-31a</p> <p>Working with others and sharing ideas LIT 2-02a</p> <p>Describing my experiences ENG 2-30a</p> <p><b>NUMERACY</b></p> <p>Presenting and interpreting data MNU 2-20b</p>	<p><b>Episode 1 - Introduction</b></p> <p>The children are cast in role as a group of brilliant scientists who have been called together by the government for the purposes of a secret mission. Each of them has been told to leave behind his or her research for a few months in order to join a special scientific task force.</p> <p>Their mission control room (<i>the classroom</i>) is code-named 'The Hive' and it is here that they will be carrying out most of their research.</p> <p>A government operative (<i>perhaps a willing member of school staff!</i>) visits, leaving an envelope and instructing the task force to read it carefully. They open and read the 'Mission Statement' to find out what this mission is all about.</p> <p>They study the information that has been sent to them about bee decline and learn that if it continues at this pace, UK bee populations could die out in their lifetimes. The task force has a short time to come up with a solution to the decline of bees or they may be lost forever.</p>	<p>Read out 'Have Your Say' statements, inviting the children to show their opinions on each statement by standing somewhere between 'AGREE' and 'DISAGREE' signs displayed at either end of the classroom. Question children as to why they have chosen to stand in a particular place to open further discussion.</p> <p>Read out <b>Storyline Part One</b> together.</p> <p><b>Develop characters</b> and their back-stories, using 'Scientist ID' sheet. It is important that the class spend time creating characters they really like who reflect their own personality. This will help the children to immerse themselves in the storyline.</p> <p><i>NB: Most of the learning activities take place 'in character'. Whenever the children are in character it would be helpful if they wore a simple signifier to show this eg. a tie, a pencil behind the ear, name tag or similar.</i></p> <p>Read aloud and discuss the 'Mission Statement'. Discuss with the class how their characters feel about this mission.</p> <p><b>Study Info Sheet #1. Decide what type of graph or chart is best and then plot the information clearly. Discuss what it tells us about bee decline - how long until bees die out at the present rate?</b></p> <p><b>Diary entry #1 - Working in the Task Force</b> Children write about their characters, what they have found out so far and express their feelings about the project.</p>

Knowledge	Skills	Storyline	Suggested Activities
<p>Bees live in large colonies with complex and well-organised social structures. At the centre of this society is the queen, but each bee has its own specific role to play in making the colony work.</p>  <p>Bees need to find nectar in order to survive. They are extremely good at finding nectar-bearing plants. They have amazing ways of communicating to each other about the location of that nectar.</p>	<p><b>SCIENCE</b></p> <p>Understanding interactions in an eco-system SCN 2-02a</p> <p>Investigating the life cycles of plants and animals SCN 2-14a</p> <p><b>LITERACY</b></p> <p>Working with others and sharing ideas LIT 2-02a</p> <p>Note-making &amp; Report writing LIT 2-25a</p> <p>Selecting and sorting information LIT 2-25a</p> <p>Presentation skills LIT 2-06a</p> <p>Describing my experiences ENG 2-30a</p> <p><b>TECHNOLOGIES</b></p> <p>Using technology to access and manage information TCH 2-03</p>	<p><b>Episode 2 - In the Lab</b></p> <p>The chief scientist (<i>teacher in role</i>) informs the task force that they are asked to become bee experts in order to prepare themselves for their mission. They need to find out a wide variety of facts about bees and how a bee colony works.</p> <p>Each scientist chooses a specialist area about bee colonies to study, then the task force is split into small teams to investigate these different elements of the life of bees.</p> <p>The teams come back together to share what they have found out. They take notes from the research of other teams to help them understand bees. Using these notes, they write up reports for the chief scientist to show their learning.</p> <p>The task force has been working very hard and the chief scientist decides they should be allowed to have some fun with the 'waggle dance game'. The scientists love this and it also reminds them about how smart and generally incredible bees really are!</p>	<p>Read out <b>Storyline Part Two</b> together.</p> <p>Children choose from <b>Research Sheets #1,2,3 and 4</b> and work in small groups to gather information about bees from computers, people and books. All information is first jotted down in note form, using '<b>Note-making Sheets</b>'.</p> <p>Each small group decides how they would like to present their information. Depending upon available time and resources, they might choose to:</p> <ul style="list-style-type: none"> <li>- create a Powerpoint or Sway presentation</li> <li>- record a short video</li> <li>- create and explain an info poster</li> <li>- carry out a question and answer session</li> <li>- give a talk</li> </ul> <p>As each group makes their presentation, children take notes under key headings. See '<b>Note-making Sheets</b>'. Children discuss possible headings to use in a report, then use their notes to create a <b>report about how bee colonies work</b>.</p> <p>Children watch '<b>Waggle Dance</b>' (BBC) and then play '<b>The Waggle Dance Game</b>' to learn more about bee communication.</p> <p><a href="https://www.foe.co.uk/sites/default/files/downloads/bees_schools_waggledance.pdf">https://www.foe.co.uk/sites/default/files/downloads/bees_schools_waggledance.pdf</a></p> <p><b>Diary entry #2 - Starting our Research</b> Children write about what it has been like to begin researching bees. Did they work well with their team? What did they find out? Has anything surprised them? How do they feel about bees now?</p>

Knowledge	Skills	Storyline	Suggested Activities
<p>Although some plants can reproduce without assistance from pollinators, bees help pollinate a wide variety of our crops and flowering plants. Around a third of our food crops are pollinated by bees and other insects. The pollination of plants by bees is estimated to be worth £265bn worldwide. (<i>Greenpeace, 2016</i>)</p> <p>The process of pollination involves bees first finding plants carrying nectar - bees will take this nectar back to the hive and show other bees how to find the plant so they can do the same. As bees gather nectar from each plant, sticky pollen attaches itself to the bee and is carried from plant to plant. When this pollen rubs against the stigma of a new plant, this pollinates the new plant - it allows the plant to create new seeds.</p>	<p><b>SCIENCE</b></p> <p>Understanding interactions in an eco-system SCN 2-02a</p> <p>Investigating the life cycles of plants and animals SCN 2-14a</p> <p><b>LITERACY</b></p> <p>Note-making &amp; Report writing LIT 2-25a</p> <p>Describing my experiences ENG 2-30a</p> <p><b>EXPRESSIVE ARTS</b></p> <p>Observing and recording from my experiences EXA 2-04a</p>	<p><b>Episode 3 - What Bees Do For Us</b></p> <p>It is time for the task force to start finding out exactly what bees do for us and why they so important to the future of humanity. The chief scientist informs them that they now need to understand what pollination is and how bees have an essential role in producing our food.</p> <p>The task force leave their 'Hive' headquarters and head out to watch bees in action. On their field trip, they witness the miracle of bees spreading pollen from plant to plant. They also look out for any plants that pollinate in different ways. When they come back to 'The Hive', they document what they have seen and learnt.</p> <p>To complete their education on pollination, they look at other types of pollination and discover how significant bees are to our agriculture. They find out that without bees and other pollinators there are many types of crops we could not grow.</p>	<p>Read out <b>Storyline Part Three</b> together.</p> <p>Children use '<b>Info Sheet #2</b>' to find out some of the main crops that are pollinated by bees and some other ways plants can be pollinated.</p> <p><b>Class Trip</b> to see bees in action. This might be a visit to a local beekeeper or botanical gardens. It might just be a walk to a local field or garden where bees are at work. The children should try to take <b>photos</b>, make <b>sketches</b> and record <b>video</b> of bees pollinating plants, so this can be looked at and discussed back in the classroom. (<i>NB: Please take care in selecting your location to minimize any risk to your class. It is worth checking whether any children are allergic to bee stings in case of emergency.</i>)</p> <p>Look over a <b>slide-show</b> of what we observed on our trip (photos, videos, sketches). What have we learnt from this about how bees are involved in pollination? What questions do we still have? Write down and display questions.</p> <p><b>Watch video or slideshow</b> on pollination (see suggested websites below) and discuss how this answers our questions.</p> <p>Create <b>cartoon strips</b> to demonstrate children's understanding of the process of pollination by bees. These should include annotated diagrams of the reproductive parts of plants.</p> <p><b>Diary entry #3 - Our Research Trip</b> Children report back about the trip, what they have seen and what they have found out about bees as pollinators.</p>

Knowledge	Skills	Storyline	Suggested Activities
<p>Scientists have begun to notice a steep decline in the numbers of wild bee colonies and managed beehives since the late 1990s. This includes a 45% reduction in the number of commercial honeybees in the UK since just 2010. (<i>Greenpeace, 2016</i>)</p> <p>There are several factors that may be contributing to this decline such as: the use of insecticides in farming; loss of habitats for pollinators; parasites like the varroa mite and climate change. Scientists are in discussion about which of these (and other) factors are doing the most damage to bees. This is an ongoing discussion between scientists.</p>	<p><b>SCIENCE</b></p> <p>Understanding interactions in an eco-system SCN 2-02a</p> <p>Commenting on current scientific news SCN 2-20b</p> <p><b>LITERACY</b></p> <p>Working with others and sharing ideas LIT 2-02a</p> <p>Note-making &amp; Report writing LIT 2-25a</p> <p>Describing my experiences ENG 2-30a</p> <p><b>EXPRESSIVE ARTS</b></p> <p>Expressing ideas and feelings through drama EXA 2-13a</p> <p>Observing and recording from my experiences EXA 2-04a</p>	<p><b>Episode 4 - What's Going Wrong?</b></p> <p>The chief scientist informs the task force that they have now come to the saddest but most important part of their research. They must try to find out why so many bee colonies have begun to disappear in the last few decades. Is this something that is happening naturally, are humans to blame or is there something else happening that we are not aware of?</p> <p>The task force now have the chance to listen to the opinion of experts and come to their own conclusions. They find out what scientists are saying about bee decline today. Having finished their research, the groups come back together and share their findings with the task force as a whole.</p> <p>It becomes clear that there are quite a few theories as to what might be damaging bees. The task force debate which causes they think are most likely and how this will affect the plan they make.</p>	<p>Read out <b>Storyline Part Four</b> together.</p> <p>As a whole class, watch videos and read websites (see below) explaining the recent decline in bee numbers. Children should take notes using <b>Note-making Sheets</b>'. As a class discuss the key reasons for the decline of bees.</p> <p>Create <b>mind-maps</b> showing the main causes of bee decline. Children should work with a partner, using their notes to put detailed information and illustrations into their mind-maps.</p> <p><b>Drama activity</b> - Children work in small groups to create short mime sketches showing one of the key causes of bee decline. The rest of the class must guess what is being shown in the sketch.</p> <p>The '<b>Food Web Activity</b>' helps the group to explore the idea of inter-dependence and to discuss what might happen if we take bees out of our own food web. What effect will this have on what we can eat? Will it change what can grow and what our world will look like?</p> <p><a href="https://www.rspb.org.uk/ourwork/teaching/resources/science/web_game.aspx">https://www.rspb.org.uk/ourwork/teaching/resources/science/web_game.aspx</a></p> <p><b>Diary entry #4 - Sad Times</b> Children explain to their diaries what has been happening to bees. How do they feel about this? Do they think it can be stopped?</p>

Knowledge	Skills	Storyline	Suggested Activities
<p>The future is very uncertain. As things stand, more farms are likely to use insecticides to make sure they can grow as many crops as possible. As farm fields grow larger, more grasslands, hedgerows and other habitats for wild bees will continue to be lost. The weather may become less predictable. All of these things could contribute to the continued decline in our bee populations into the future.</p> <p>People have guessed at what might happen if bees become extinct. Would some types of fruit and vegetables be gone forever? Would our gardens and parks have many less types of plants and flowers? Would we even struggle to feed ourselves?</p> <p>Nobody is sure, but it is clear that we need to act quickly to save bees or things will only get worse.</p>	<p><b>SCIENCE</b></p> <p>Commenting on current scientific news SCN 2-20b</p> <p><b>LITERACY</b></p> <p>Working with others and sharing ideas LIT 2-02a</p> <p>Describing my experiences ENG 2-30a</p> <p><b>EXPRESSIVE ARTS</b></p> <p>Expressing ideas and feelings through drama EXA 2-13a</p> <p>Observing and recording from my experiences EXA 2-04a</p>	<p><b>Episode 5 - Time Travel</b></p> <p>A mysterious eccentric scientist appears in the laboratory, claiming that the government have given her permission to try out a new highly classified piece of technology to help us with our mission. It may be dangerous, but could also be of great benefit to us in our research.</p> <p>This incredible machine will allow us to see 50 years into the future. The group agree to try it, as they would like to see what happens if bees keep declining (and besides which they are curious about the future in general!) The task force use the technology to peek into the future! They record what they have seen, including the decline of bees and the impact this has had on the agriculture and food.</p> <p>They discuss what they saw and then decide that they have to do everything they can to prevent bee decline from happening. They must put their learning into practice and come up with a plan...</p>	<p>Read out <b>Storyline Part Five</b> together.</p> <p><b>'Time-travel' activity</b> - Invite pupils to close their eyes and imagine that they could see 50 years into the future. What kind of houses would people have? How might they dress? What sort of transport might people use? When they have had some time to imagine these things, they should note down some of the things they saw.</p> <p>The <b>'Time-Travel' activity</b> should be continued by discussing what difference the absence of bees might make to the world in the future. Invite pupils to again close their eyes to picture this. What plants and wildlife would no longer exist? What would our countryside look like?</p> <p><b>Carousel</b> - Place 3 large posters around the classroom with the headings 'Houses', 'Clothes', 'Transport'. Each poster should be divided into two parts - NOW and IN 50 YEARS TIME. A fourth poster should be titled WITH BEES on one side and WITHOUT BEES on the other. Children move from poster to poster, adding sketches and words onto either side of each poster. Results are displayed and discussed.</p> <p><b>Drama activity</b> - The children work in groups to create a short drama - 'A future with no bees'. Class discuss the content of the dramas. Does it seem likely? What would it really be like?</p> <p>Alternatively, pupils could use large-scale <b>line drawings</b> to show how life might be different in 50 years time.</p> <p><b>Diary entry #5</b> - <i>The Future</i> Children report back on all of the exciting, interesting and perhaps worrying things they have seen in the future. What will life be like if there are no more bees?</p> <p><b>Debate</b> - What can we do? Class must come up with their best 5 suggestions to save the future. See suggestions on <b>'Bee Debate'</b> sheet.</p>



Knowledge	Skills	Storyline	Suggested Activities
<p>People in positions of authority will need to come together to make a plan of action if the decline of bees in certain parts of the world is to be reversed.</p> <p>This has happened sometimes - for example, governments have agreed to cut carbon emissions to prevent more global warming. If enough people put pressure onto the government, they will be more likely to make changes to help protect bees.</p> <p>One simple thing people can do is to plant more nectar-bearing plants as food for pollinators. It helps if these are native plants that our pollinators are used to.</p>	<p><b>SCIENCE</b></p> <p>Contributing to the design of a wildlife area SCN 2-02a</p> <p><b>LITERACY</b></p> <p>Working with others and sharing ideas LIT 2-02a</p> <p>Persuasive writing LIT 2-29a</p> <p>Describing my experiences ENG 2-30a</p> <p><b>TECHNOLOGIES</b></p> <p>Problem-solving design ENG 2-14a</p>	<p><b>Episode 6 - Taking Action</b></p> <p>The task force only have one week left in 'The Hive' laboratory. They must act quickly to create a plan to help preserve bees.</p> <p>Each member sits down to write out his or her ideas for protecting bees. They share their ideas with each other and then finally agree on which ideas to put forward to the government. These ideas are put together to make a final plan, which is handed over to the government operative.</p> <p>The task force designs and plants a small garden that that provides food for pollinators. This is their last big task and it will be their example to others of how to get started supporting bees.</p> <p>Before they leave 'The Hive', they get word from the government that they are very impressed by their report and will be putting the plan into action starting today! The scientists can go back to their jobs knowing they have made a real difference to our friends, the bees.</p>	<p>Read out <b>Storyline Part Six</b> together.</p> <p><b>Partner task</b> - Read through the top five suggestions voted on during the debate. Decide on their <b>order of importance</b> and write this out using wipeboards. The class compare and discuss their results - can we use these to create a <b>list of rules</b> for the future?</p> <p>Children write <b>persuasive letters or emails</b> to the local MSP or MP, explaining what they have learnt and what change they would like to see. These may include the <b>list of rules</b> they have developed. If possible, invite the member of Parliament to <b>visit the class</b> in order to respond to the class in person.</p> <p>Alternatively, create <b>TV adverts, brochures or presentations</b> to be shared with parents and the local community at an <b>information evening</b>.</p> <p><b>Homework Task:</b> Find out which plants are best to plant to help sustain local bees. Use this information to <b>design a small garden or flower bed</b> for pollinators in the school grounds.</p> <p>Vote to choose a winning design, then <b>plant your garden or flower bed</b> together with assistance from parents or other members of the community.</p> <p><b>Diary entry #6 - The End of the Project</b> This is a chance to review the project and reflect on what has been learnt along the way. What did the children enjoy? How did their character change along the way?</p>

## Appendix A - All Outcomes

Subject Area	Outcome
SCIENCE	I can use my knowledge of the interactions and energy flow between plants and animals in ecosystems, food chains and webs. I have contributed to the design or conservation of a wildlife area. SCN 2-02a
	I can report and comment on current scientific news items to develop my knowledge and understanding of topical science. SCN 2-20b
	By investigating the lifecycles of plants and animals, I can recognise the different stages of their development. SCN 2-14a
LITERACY	When I engage with others, I can respond in ways appropriate to my role, show that I value others' contributions and use these to build on thinking. LIT 2-02a
	Having explored the elements which writers use in different genres, I can use what I learn to create interesting characters. ENG 2-31a
	Using what I know about the features of different types of texts, I can find, select and sort information from a variety of sources and use this for different purposes. LIT 2-14a
	I can make notes and use them to help me understand information and ideas. LIT 2-25a



Subject Area	Outcome
EXPRESSIVE ARTS	<p>Through observing and recording my experiences across the curriculum, I can create images and objects which show my awareness and recognition of detail.</p> <p><b>EXA 2-04a</b></p>
	<p>Inspired by a range of stimuli, I can express and communicate my ideas, thoughts and feelings through drama.</p> <p><b>EXA 2-13a</b></p>
MATHEMATICS	<p>I can interpret and draw conclusions from the information displayed.</p> <p><b>2-20a</b></p> <p><b>MNU</b></p>
TECHNOLOGIES	<p>I can use search facilities of electronic sources to access and retrieve information.</p> <p><b>TCH 2-03a</b></p>

## APPENDIX B - USEFUL WEBSITES

The websites below may be useful for whole class learning, pupil-led research or to inform teachers throughout the project. Feel free to search for alternative sites if you think these would be more appropriate to the children in your class.

WEBSITE	DETAIL	DESCRIPTION
BBC	BBC Nature - Brilliant Bees	Lots of short video clips all about bees, including 'Waggle Dance' and 'Queen Bee'.
	BBC iWonder	Short extracts, info-graphics and videos looking at what bees do for us and asking 'Would we starve without bees?'
	Bitesize KS2 Science	Various short video clips relating to bees and butterflies as pollinators, plus fun 'Food Chains' game.
	BBC News - Science	Latest news relating to bees.
Greenpeace	sos-bees.org	Beautifully presented website by Greenpeace going through the main risks to bees and suggesting some solutions. Language may be a little difficult for some children.
	bees-decline.org	More detailed online document discussing factors in bee decline in depth - more appropriate for teachers than children.
	www.greenpeace.org.uk/tags/bees	News feed for the latest on bees globally
National Geographic	NGKids Animals - Ten facts about honeybees	Child-friendly facts ideal for independent research into bees and their colonies
	Video Channel - search 'bees'	A variety of high-quality short videos about bees, including 'Time-Lapse: Bees Hatch Before Your Eyes'
Wikipedia	Bee	A wealth of detailed information about bees.
	Colony Collapse Disorder	Detailed information about the history and causes of colony collapse disorder- more appropriate for teachers than children.

Youtube	<p><i>SciShow</i></p> <p>‘How a bee becomes queen’  ‘What’s happening to honey bees?’  ‘Why (and how) do bees make honey?’  ‘The Death of Bees explained’</p> <p><i>It’s Okay to Be Smart</i></p> <p>‘How do bees make honey?’  ‘Why are the bees dying?’  ‘How bees can see the invisible’  ‘Which came first - flowers or bees?’</p>	<p>Fun and accessible videos from the US SciShow Channel</p> <p>Fast-paced, fun and inquisitive videos about bees from ‘It’s Okay to be Smart’</p>
Tay Landscapes	Learning Zone, Get Involved, Events	Information on local learning events and projects in the Perthshire area, including some which relate to bees. Tay Landscape collaborate with schools on nature-related projects.
MBGnet	Biology of Plants	Clear explanation of how plants pollinate with annotated diagrams.
BBKA	<p>About - Local Associations</p> <p>Learn - Animations and Videos</p>	<p>Find your nearest beekeepers and beekeeping associations.</p> <p>Links to short videos of bees in action</p>
Buzz About Bees	<a href="http://www.buzzaboutbees.net">www.buzzaboutbees.net</a>	Ideal website for children to use when researching bees, also includes sections on bee decline and creating a bee garden.