

What is happening to the bees?

What are the busy bees up to?

Let's find out....



An inquiry based integrated program -
'Look and think like a scientist. Draw like an artist.'

Leith Hogan August 2018

Australian Curriculum:

Year 3: Biological sciences: Living things can be grouped together on the basis of observable features and can be distinguished from non-living things

Science involves making predictions and describing patterns and relationships

Year 5: Biological sciences: Living things have structural features and adaptations that help them to survive in their environment

Science involves testing predictions by gathering data and describing patterns and relationships to develop explanations of events and phenomena

Geography: Develop geographical questions to investigate and plan an inquiry.

Literature: How texts reflect the context of culture and situation to describe the effect of ideas, text structures and language features

Personal responses to ideas, characters and viewpoints

Create literacy texts using realistic and fantasy settings and characters.

Literacy: Plan rehearse and deliver oral presentation for defined audiences incorporating accurate and sequenced content.

Connecting ideas to personal experiences: present a personal point of view

Language: Learn extended and technical vocabulary and ways of expressing opinions.

Understand how different types of texts vary in use of language choices, depending on their function and purpose.

Maths : Statistics and probability: Chance: List outcomes of chance experiments involving equally likely outcomes.

Collect data, organize into categories and create displays using tables, graphs.

Visual Arts: Use materials, techniques and processes to explore visual conventions when making art works:

Applying art and design techniques effectively and safely.

Manipulating and experimenting with combinations of various materials

Practicing a variety of techniques and materials to interpret a theme or subject.

Explore some fiction, non-fiction and traditional texts about bees with the students in class for a week or two.



Introduce inquiry with Inquiry question:

What are the busy bees up to?
Let's go outside and find out

Using ipads with notes pages if possible get the students to go exploring in the school grounds in pairs to see if they can take photos of the bees that they might see.....

Encourage them to notice... really look!

Head? Thorax? Abdomen? 6 legs? Wings? Eyes? Stinger and proboscis? Stripes?

Their photo MUST capture all the characteristics of the bee.

[Have a conversation about not getting too close or the bee might sting. Encourage the children to use the zoom feature on the ipad camera]

Students take notes to go with the photos that they take.

WWW and H in relation the bee photo. [e.g. Photo: notes, Photo: notes] Give them time to combine them when they get back to class.

Then: Collect all of the photos from the students and put them up on the Interactive whiteboard.

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Get the class to choose their favourite bee photos. What will the process for choosing be? Clarity? Characteristics? Setting? Be clear BEFOREHAND.

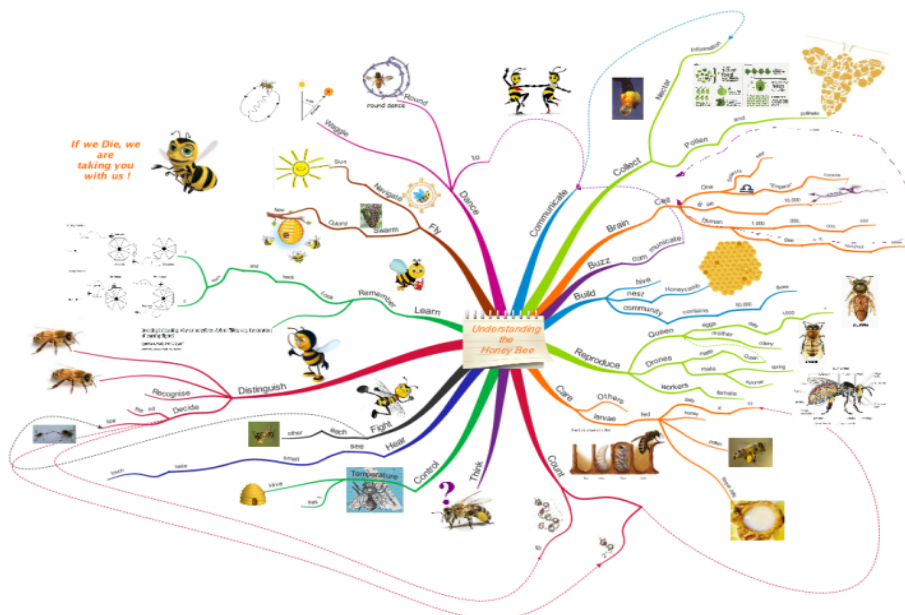
Print 8/10 photos of the bee from the photos taken. Laminate them or put each into a plastic sleeve

Share amongst students.

In pairs using pencils and card get the students to draw the bee that they have photographed. Then get the students to list common features of a bee, so that they can make sure that they are really looking like a scientist as they draw and are remembering all of the characteristics of a bee in their drawing.



What are they? What makes a bee a bee? Graph observable features:
Then a Bee Mind map: Everything student's know about bees:



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In pairs, students start sorting out their Mindmap ideas about bees into categories and then headings. e.g Geographical features of where bees and beehives are...

Size
Shape
Types
Families
Hive
Home
Who builds their home?
Territory
What does the Queen bee do?
Who does what and when?
What is a worker bee?
What is a drone?
Who sleeps where, when?
Life cycle...
Do they care for each other?
Communication?
How do they make honey?
What do they eat?
Smell
Touch
Sound
Movement / dance
Fly
How long do they live?
Predators
How accessible is their food to them?
Do they rest?
Do they need water? How much?
How important are bees to us?
More?

Help the students to develop a set of prompt level 4 BLANK questions.....one for each category. Get them to write them up and place them on a Bee Wonder wall [yellow????]

What do you want to know about bees?

- What could happen if
- Why did
- Why has
- What could
- Why cant
- How could
- What will
- Why are
- What could
- If..... etc.,

Encourage the students in pairs to think about one of the Bee wonderings to use as their own Inquiry question:

Eg. I wonder how important the drone bee is to all the bees in the hive?

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Then: How will they find the answers to their inquiry?

- Where?
- How will they record them?

Will they have a Bee book or a bee folder on their ipad or a honey jar filled with all the information that they have collected about bees? OR ?

How will they present their findings?

How will the group celebrate their work and the answer to the inquiry?

Will they have a honey joy morning tea where they share their inquiry with their classmates and their mums and dads? What will they do?

Create a Busy Bee inquiry task sheet for each student such as the one below for the duration of the inquiry:

On the task sheet students will need to complete two samples of work from each curriculum area connected to the Year 2/3 SCSA curriculum.

Students collect their work over the course of the inquiry for the showcase or exhibition of what they know about bees.

At the completion of this work get them to look at their original question. Did they find out the answer to their inquiry question?

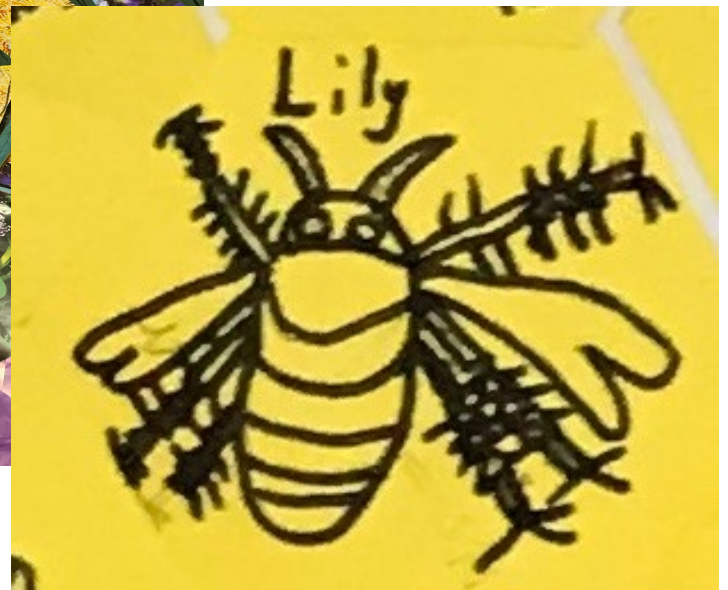
Does their collection of work demonstrate the answer to their inquiry question?

Then: As a whole class project:

Each student is to create a collage of a bee using the bee images that they have photographed as the basis of the collage OR they can make a bee construction using junk materials.... OR... ??

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Collage can be on fabric or card and will be perfect for an Art exhibition on bees for the showcase day.



Facts about Bees

How do bees make honey?

First, they land on a flower, suck the nectar up and store it in their stomachs. Back at the hive, they convert this nectar into honey, once the worker bees have ripened it. They do this by taking a drop into their stomachs where enzymes turn the nectar into watery honey. Then the bees fan the watery honey with their wings until it becomes thick and golden and ready to eat. The bees store the honey in a honeycomb cell and seal the top with wax. The wax comes from the bees too, from four pairs of wax glands on the underside of their abdomens. Beekeepers then take some of this honey from the honeycomb and put it into jars for everyone to enjoy. But don't worry, there's plenty of honey to go around, so the bees don't mind sharing it with us too.

What does the queen bee do?

In every hive there are thousands of worker bees and drone bees. But there is one bee – who isn't a worker or a drone – who is very very special... the queen bee. The queen's only task is to lay eggs, which will grow to become worker bees, drones and more queens. The worker bees feed and clean the queen, so she can spend as much of her time as possible laying the eggs. Bees eat honey, of course. But the queen bee eats lots of royal jelly too, which is full of protein. That's how she grows big and strong – ready to lay lots and lots of eggs. She lays up to 2,000 eggs per day! She also looks different to the workers and drones; her abdomen is bigger, her tail and wings are longer, her legs are brighter and she usually looks smoother and shiner than the other bees. The beekeeper often puts a little dab of paint on her back, to spot her easily amongst the thousands of other bees in the hive.

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What jobs do bees do in the hive?

There are two other types of bees aside from the queen: workers and drones. Worker bees are very busy indeed. They're always female, and have a lot to do in the different stages of their life. Drones, on the other hand, are male, and their main job is to be ready to fertilise the queen. When a young worker bee comes out of her cell, she spends the first three days cleaning the honeycomb cells in which the queen will lay her eggs. From the fourth to the ninth day, the worker is a nurse bee, producing food from glands in her head to feed the younger larvae. She also makes a mixture of honey and pollen, called 'bee bread', to feed the older larvae. Then she has a variety of tasks to do, like: building the honeycomb, storing the pollen and nectar collected by the field bees and helping to ripen the nectar. After the twentieth day some worker bees act as guards, standing at the door to keep out stranger bees from other colonies. And after that, the worker flies around the fields looking for and bringing home pollen and nectar until she dies. Drone bees are all male and get their name from the low noise they make when they're flying, which makes them sound sleepy. Drones don't do much around the hive and get all their food from the worker bees. A lucky few will get the chance to mate with the queen, but for most drones, you could say life is a bit dull.

How do bees pollinate plants?

Bees work very hard collecting nectar from flowers to turn into honey. But something else happens when worker bees buzz around on their daily mission. It's called 'pollination' and it's very important for our planet. Every time a bee lands on a flower, a little bit of pollen sticks to their feet. Some pollen also falls off as they fly about. When this pollen falls onto other plants, pollination occurs, which means the plants reproduce.

Bees pollinate two thirds of the world's crops and flowers. Which means they make two thirds of all our plants grow, giving us food to eat and lovely flowers to enjoy. Bees pollinate onions, avocados, apples and strawberries, just to name a few! We have a lot to thank bees for, which is yet another reason why we must protect our precious honey bees.

Are bees sociable insects?

One of the most interesting and wonderful things about honeybees is just how sociable they are. Bee colonies (at their largest) can grow to 40,000 members in the busy season. Just imagine living with 40,000 other people in a small living space. You'd quickly have to learn how to get along!

Honeybees have a variety of ways in which they make friends with each other. For example, they split up the work they do to keep their nest running smoothly. Some look for nectar, some take care of the hive and others make sure the brood (the honey bee eggs) are safe. Everyone has a clear job, which is what makes the hive so very efficient.

How do bees communicate with each other?

The 'waggle dance' might not sound like the most scientific name in the world. But it's the primary way bees talk to one another. The dance that a bee performs can let other bees know where the best flowers are, new water sources to drink from or even a new home.

Karl Von Frisch, the pioneering scientist who first discovered the waggle dance, was awarded a Nobel Prize for his work and research. The waggle dance is made up of a circuit, comprising of a figure of eight and a straight line. Bees can repeat this circuit once, twice - or even one hundred times!

Different movements in the dance mean different things. The longer the waggle, the further away the item of interest (such as nectar) is. Different angles mean different things and even the speed of the waggle can change the meaning.

Bees also release pheromones - special hormones with a distinct smell - to help pass on the

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information to their friends.

Another type of dance is the 'tremble dance'. If you think of the waggle dance as a way to tell other bees where things are, the tremble dance is a form of bee recruitment. Forager bees will perform the tremble dance to their friends to get them involved with collecting nectar for the colony. Karl Von Frisch observed that when a bee did a tremble dance for his friends, they all stopped what they were doing and went to help!

Do bees get all their food from flowers?

Honey bees, like humans, need carbohydrates and protein to survive, and they get both of these from flowers. The carbohydrates come from flowers' nectar and the protein comes from pollen. Nectar is the base of all honey – it contains about 80% water, along with complex sugars. If left in its natural state, nectar would ferment, so in order to store the sugars to use during the winter, bees convert the nectar into honey. The hive bee takes the converted honey and caps it off in a beeswax cell, sealing the honey into the honeycomb so they can eat it later.

How do bees survive the winter?

Bees stay in their hive in winter and form a cluster around the queen. A cluster is basically a ball of bees that means the bees on the inside of the cluster always stay warm. The bees on the outside will switch places with bees on the inside, so they take turns at being warm. In this way, the bees can survive the cold. There are no flowers around in the winter months and therefore no nectar for the bees to eat in the winter. This is why they make honey, so they have something to keep them going through the colder months.

How do you tell the difference between bees and wasps?

Many people are afraid of bees but there is no need to fear these friendly, flying creatures.

Bees are more interested in your flowers than in ruining your good time. It's wasps you have to be wary of. So here are some hints to help you tell them apart...

Bees have robust, hairy bodies with flat rear legs, while wasps' bodies are slender with a narrow waist. Wasps also appear smooth and shiny and have slender legs.

Wild honey bee nests are very rare, but you'll know it's a bee hive if you can see the wax cells the bees stack on top of one another.

A wasp's nest looks like a large rounded comb made of a grey, papery pulp, and they're usually found in out of the way places, like under roof overhangs, or in dark crevices. If you spy one of these nests it's probably best to get a professional in!

Facts about bees: <https://www.rowsehoney.co.uk/facts-about-bees/>

References:

How bees make honey:

<https://honeybee.org.au/education/wonderful-world-of-honey/how-bees-make-honey/>

Bringing back our bees: World Bee project:

<http://worldbeeproject.org/bringing-back-the-bees/>

The honeybee and the hexagon

<http://worldbeeproject.org/video-the-hidden-beauty-of-pollination/>

NASA climate kids: A bee is more than a bug

<https://climatekids.nasa.gov/bees/>

Equipment that might be useful for creating a bee art or craft project:

Calico

Cardboard, lids, bottles, tops, boxes, paper scraps, boxes, plastic bottles

Felt tip pens

Pencils, crayons

Black highlight pens

White glue/ masking tape, cello tape, glue gun

Sequins, pipe cleaners, pegs, buttons, paper towels, cellophane, colored papers, wool etc.,

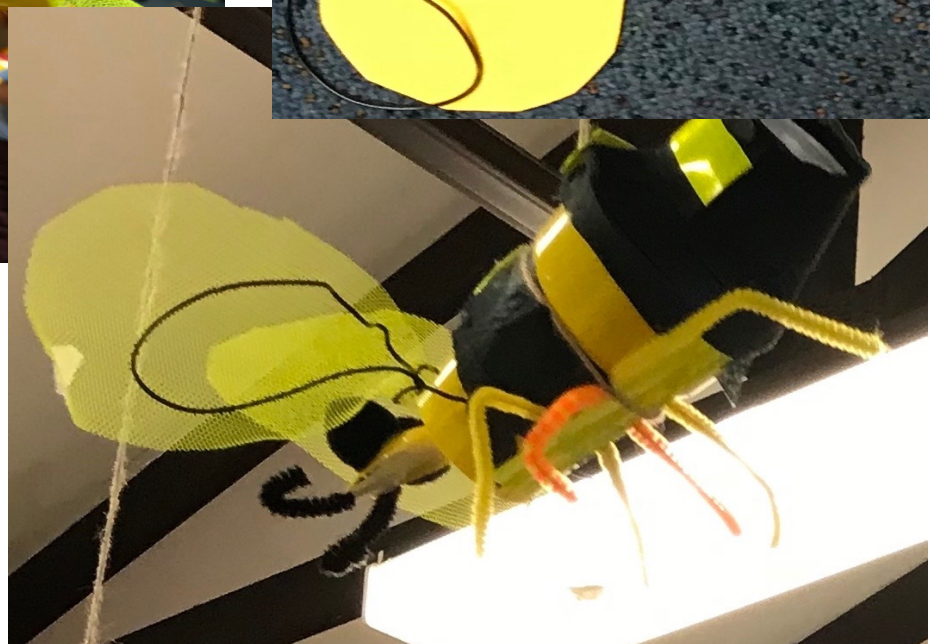
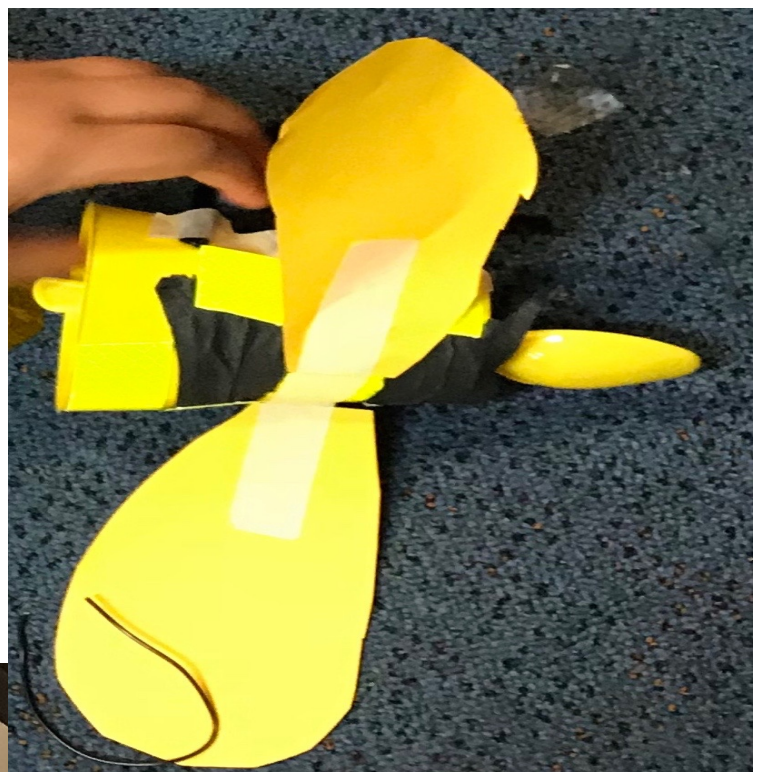
Needle/ cotton and wool

Collage craft materials:

Pop sticks, scraps of material, card

Large sheets of white paper

Paints /edicol dyes /brushes



Showcase:
Here's what the busy bees are up to...
This is what I know !