# *Resource (Year 1/2 – Sharing our planet)*

<table>
<tr><th>Key areas for consideration</th><th>Examples and Reasoning</th></tr>
<tr><td>At least 2 key understandings for the overall topic</td><td>

- Different animals have different features and living conditions
- Our contribution to the environment & consequences of our actions to others in our planet

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<tr><td>Specific science curriculum links:</td><td>

These curriculum links were chosen due to their relevance to the key understandings (which involve Science understanding and Science as a human endeavour), as well as to support students in improving their Science inquiry skills. These links will be covered through a series of lessons and activities which all work together towards gaining the two key understandings.

**SCIENCE:**

<table>
<tr><th>Strand</th><th>Sub-strand</th><th>Code</th><th>Year 1/2 content descriptors</th><th>Explanation</th><th>Activities</th></tr>
<tr><td>Science Understanding</td><td>Biological Sciences</td><td>ACSSU017</td><td>Living things have a variety of external features<br>• Recognizing common features of animals such as head, legs and wings<br>• Describing the use of animal body parts for particular purposes such as moving and feeding</td><td>- Discussion about different animals (e.g. characteristics of marine animals compared to land animals or birds).</td><td>1,2, 3, 4, 10</td></tr>
<tr><td></td><td></td><td>ACSSU211</td><td>Living things live in different places where their needs are met<br>• Exploring different habitats in the local environment such as the beach, bush and backyard<br>• Recognising that different living things live in different places such as land and water<br>• Exploring what happens when habitats change and some living things can no longer have their needs met</td><td>- Through discussions about the class fish tank and excursions to the aquarium/beach, students will explore why some animals live where they live, and how their needs are met in their habitats.<br>- Could possibly lead to discussions about what would happen if these environments in which the animals live are changed.</td><td>1, 2, 3, 4, 5, 6, 8, 9, 10</td></tr>
<tr><td>Science as a Human Endeavour</td><td>Nature and development of science</td><td>ACSHE021, ACSHE034</td><td>Science involves observing, asking questions about, and describing changes in, objects and events<br>• Jointly constructing questions about the events and features of the local environment with teacher guidance.<br>• Recognising that descriptions of what we observe are used by people to help identify change.<br>• Describing everyday events and experiences and changes in our environment using knowledge of science.</td><td>- After observing the state of the local beach, the teacher could lead the students to question what impact the rubbish and plastic pieces on the beach might have on the wildlife.</td><td>5, 9, 11, 12, 13, 15</td></tr>
<tr><td></td><td>Use and influence of science</td><td>ACSHE034, ACSHE035</td><td>People use science in their daily lives, including when caring for their environment and living things<br>• Identifying ways that science knowledge is used in the care of the local environment such as animal habitats, and suggesting changes to better meet the needs of native animals.<br>• Identifying the ways humans manage and protect resources, such as reducing water and caring for water supplies.<br>• Monitoring information about the environment and Earth’s resources.</td><td>- Talking about how the students can use what they have learnt to take care of their environment, and hence enhance the living environment of animals around them.<br>- Doing a rubbish pickup activity on the beach, and discussing the positive impacts of this activity on marine animals and birds.</td><td>7, 13, 16</td></tr>
<tr><td>Science Inquiry Skills</td><td>Questioning and predicting</td><td>ACSIS037</td><td>Pose and respond to questions, and make predictions about familiar objects and events<br>• Thinking about “What will happen if…?” type questions about everyday objects and events.<br>• Using the senses to explore the local environment to pose interesting</td><td>- This can be covered in “polluted tanks”; Students can predict what might happen if the living environment for fish is polluted.<br>- Students can discuss what might happen to the marine life living in the ocean near their</td><td>4, 5, 6, 10, 11, 12,</td></tr>
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| | | | questions and making predictions about what will happen. | neighbourhood when plastics and other rubbish float into the sea. | |
| | Planning and conducting | ACSIS025, ACSIS038 | Participate in guided investigations to explore and answer questions<br>• Manipulating objects and making observations of what happens.<br>• Researching ideas collaboratively using big books, web pages and ICT within the classroom.<br>• Exploring different ways of solving science questions through guided discussion<br>• Sorting objects and events based on easily identified characteristics with teacher guidance and individually. | - Students can explore the living environment of the fish in the class fish tank. | 5 |
| | | ACSIS039 | Use informal measurements to collect and record observations, using digital technologies as appropriate<br>• To make and compare observations with teacher guidance and individually. | - Students can use the class camera to record the environment and the growth progress of the fish in the class fish tank.<br>- Photos can also be used to record the state of the local beach. This can be done before and after the beach clean-up excursions. These can be used to prompt discussions | 9, 11, 12 |
| | Processing and analysing data and information | ACSIS027, ACSIS040 | Use a range of methods to sort information, including drawings and provided tables and through discussion, compare observations with predictions<br>• Using matching activities, including identifying similar things, odd one-out and opposites.<br>• Discussing original predictions and, with guidance, comparing to their observations<br>• Exploring ways of recording and sharing information through class discussion.<br>• Sorting information in provided tables or graphic organisers. | - Students can use provided tables to differentiate between different types of animals and their habitats. | 1, 4, 8 |
| | Evaluating | ACSIS213, ACSIS041 | Compare observations with those of others<br>• Discussing observations as a whole class and in groups to identify similarities and differences in results. | - Students can observe each others' environmental models and make comparisons to see what differences there are in the models depending on the environments that the students chose. | 9, 11, 12 |
| | Communicating | ACSIS029, ACSIS042 | Represent and communicate observations and ideas in a variety of ways<br>• Discussing or representing what was covered in an investigation to other students, both one-to-one and in small groups.<br>• Engaging in whole class or guided group discussions to share observations, ideas and discoveries. | - Create models of the environments students have observed out of recycled materials. | 1, 4, 6, 9, 11, 12, 13,15, 16 |

Relevant literacy and numeracy curriculum links

**LITERACY:**
Content descriptors are sourced from the Literacy Learning Continuum.

| Element | Sub-element | Year 1/2 content descriptors | Explanation | Activities |
|---|---|---|---|---|
| Comprehending texts through listening, reading and viewing element | Navigate, read and view learning area texts | Navigate, read and view texts with illustrations and simple graphics. | - Scientific texts are different in comparison with storybooks, thus, students learn to navigate through information to find and understand relevant information. | 3, 6 |
| | Listen and respond to learning area texts | Listen to two or more step instructions for undertaking learning tasks, listen for information about topics being learned in spoken and audio texts and respond to texts read aloud. | - While carrying out investigations, students learn to listen, read and comprehend texts to perform tasks accurately.<br>- | 4, 5, 6, 13 |

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|---|---|---|---|---|---|
| | | Interpret and analyse learning area text | Interpret and use texts to explore topics, gather information and make some obvious references using comprehension strategies. | - Children use encyclopedias and online resources to find informational data to inform understanding and support arguments.<br>- Relate understanding from Cat in the hat books to scientific concepts. | 5, 6, 7, 10, 11, 15 |
| | Composing texts through speaking, writing and creating element | Compose spoke, written, visual and multimodal learning area texts | Compose and edit a small range of learning area texts. | - Documents such as journals and observation diaries allow students to illustrate ideas and record observations. | 4, 5, 9 |
| | | Use language to interact with others | Use pair, group and class discussions as learning tools to explore learning area topics, to represent ideas and relationships, and to prepare for creating texts. | - Teacher uses groups discussions to share ideas and make connections among them in Jigsaw classroom lessons.<br>- Other instances include getting inputs from different groups during joint construction. | 1,4 |
| | | Deliver presentations | Plan, rehearse and deliver short presentations on learning area topics, incorporating some visual and multimodal elements. | - Students could create presentations on life of a fish | 5, 12 |
| | Text knowledge element | Use knowledge of text structures | Use knowledge of the structure and features of learning area texts to comprehend and compose a growing range of texts with teacher support. | - Persuasive writing piece and the poster requires a specific structure for the reader to understand. Students learn to formulate such texts through joint constructions. | 9, 13, 14, 15, 16 |
| | Grammar knowledge element | Use knowledge of sentence structures | Use simple and compound sentences to record observations, and make connections between ideas- writing journals, etc. | - Students use specific forms of sentences according to the aim of the text. They write observations differently in comparison with persuasive texts. | 16 |
| | | Use knowledge of words and word groups | Recognise and use nouns that represent people, places, things and ideas in the learning area and expand nouns to achieve greater precision. | - During construction, children learn to use appropriate types of words and placement of words according to needs. | 9, 13 |
| | | Express opinion and point of view | Identify and use language that expresses feelings and opinions, and compares and evaluates people and things- life of animals before and now (connection to humanities and social sciences) | - Build existing schema through exploration of different perspectives could help children make informed decisions based on sound understanding | 7, 15 |
| | Word knowledge element | Understand learning area vocabulary | Use mostly familiar vocabulary, with a steady introduction of new vocabulary in learning area contexts | - The teacher encourages students to use familiar vocabulary in relevant scientific contexts and introduces new concepts with explanation of the meaning of new vocabulary. | 1, 5, 6, 7, 9, 11, 13, 15, 15 |

**NUMERACY:**
Content descriptors are sourced from the Numeracy Learning Continuum.

| Element | Sub-element | Year 1/2 content descriptors | Explanation | Activities |
|---|---|---|---|---|
| Estimating and calculating with whole numbers | Understand and use numbers in context | Estimate the solution to a problem and then calculate the answer. | - How long until they decompose? type prompts could be used to introduce two and three-digit numbers in a specific context. | 11 |
| Recognise and use patterns and relationships | Recognise and use patterns and relationships | Identify, describe and create everyday patterns. | - Such lessons allow children to relate patterns in real-life in the form of observations and records to make sense of phenomena. | 6, 9 |
| Interpreting statistical information | Interpret data displays | Collect and describe data on a relevant issue based on one variable and display as lists, tables or picture graphs. | - Use of lists and tables to sort and arrange information to evaluate data and findings. Also, come up with solutions for the same. | 8, 11 |

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| Other learning areas | **ENGLISH:** |

which could be explored and enhanced through this topic

| Strand | Sub-strand | Code | Year 1/2 content descriptors | Explanation | Activities |
|---|---|---|---|---|---|
| Language | Language variation and change | ACELA1460 | Understand that spoken, visual and written forms of language are different modes of communication with different features and their use varies according to the audience, purpose, context and cultural background | - Students learn to use appropriate language when addressing a letter to the council | 3, 13, 16 |
| Literacy | Creating texts | ACELY1671 | Create short imaginative, informative and persuasive texts using growing knowledge of text structures and language features for familiar and some less familiar audiences, selecting print and multimodal elements appropriate to the audience and purpose | - These three curriculum links can be used and developed through writing a persuasive letter to the council. See the “Activities” section for further detail. | 16 |
| | | ACELY1672 | Re-read and edit text for spelling, sentence-boundary punctuation and text structure | | |
| | | ACELY1674 | Construct texts featuring print, visual and audio elements using software, including word-processing programs | | |

**MATHEMATICS:**

| Strand | Sub-strand | Code | Year 1/2 content descriptors | Explanation | Activities |
|---|---|---|---|---|---|
| Measurement and geometry | Location and transformation | ACMMG044 | Interpret simple maps of familiar locations and identify the relative positions of key features | - Students can learn to look at maps and use this skill to plot the locations in which they found rubbish or other debris | 12 |
| Statistics and probability | Data representation and interpretation | ACMSP049 | Collect, check and classify data | - These curriculum links are covered through collection, classification and recording of data collected from the local beach | 12 |
| | | ACMSP050 | Create displays of data using lists, table and picture graphs and interpret them | | |
| Number and algebra | Number and place value | ACMNA030 | Solve simple addition and subtraction problems using a range of efficient mental and written strategies | | |

**HUMANITIES AND SOCIAL SCIENCES:**

| Strand | Sub-strand | Code | Year 1/2 content descriptors | Explanation | Activities |
|---|---|---|---|---|---|
| Inquiry and skills | Questioning | ACHASSI034 | Pose questions about past and present objects, people, places and events | - Students will question why humans are polluting the sea and the animals that live in the ocean. It will lead students to question their own actions and the actions of others around them. | 5, 11, 12 |
| | Analysing | ACHASSI038 | Explore a point of view | - Student can develop and understanding of others point of views. In terms of the unit’s focus students can look at an individual's point of view, a councils point of view and an animal's point of view. | 7, 11, 12, 16 |
| | Evaluating and reflecting | ACHASSI042 | Reflect on learning to propose how to care for places and sites that are important or significant | - On the completion of the unit students can suggest ways to care for their environment and recognise sites in their community and in their world which need special efforts for conservation | 12, 13, 16 |

**VISUAL ARTS:**

| Code | Year 1/2 content descriptors | Explanation | Activities |
|---|---|---|---|
| ACAVAM106 | Explore ideas, experiences, observations and imagination to create visual artworks and design, including considering ideas in artworks by Aboriginal and Torres Strait Islander artists | - Students will look how Aboriginals have used the land to survive, and how other communities live off the land. It will show students another perspective from another community which will be shown to students through art works by aboriginal artists. | 7 |
| ACAVAM108 | Create and display artworks to communicate ideas to an audience | - Students can create an ecosystem diorama which will show the audience how animals within the ocean live. Students will also be able to show the audience the negatives that are affecting these ecosystems.<br>- Students can add their own artwork to posters to get their ideas across more effectively. | 12, 13 |

**MEDIA ARTS:**

| Code | Year 1/2 content descriptors | Explanation | Activities |
|---|---|---|---|
| ACAMAM056 | Create and present media artworks that communicate ideas and stories to an audience | - producing and presenting a media artwork for a particular purpose | 13 |

**HEALTH AND PHYSICAL EDUCATION:**

| Strand | Sub-strand | Code | Year 1/2 content descriptors | Explanation | Activities |
|---|---|---|---|---|---|
| Personal, Social and Community Health | Contributing to healthy and active communities | ACPPS023 | Identify and explore natural and built environments in the local community where physical activity can take place | - Students could have an opportunity to go to the local beach to collect rubbish along the foreshore. | 12 |

Connections with general capabilities

| General capabilities | Connections | Activities |
|---|---|---|
| Critical and Creative thinking | - Students are encouraged to pose questions about the topic of inquiry (e.g. animal habitats, impact of human actions), as well as predict the answers to those questions.<br>- Through the reflective write-ups, students are encouraged to “think about thinking” (metacognition).<br>- While proposing solutions to save marine life, students imagine possibilities and connect ideas. In addition, they consider effective alternatives, seek solutions and put ideas into action. | 4, 5, 6, 9, 10, 12, 13, 14, 15, 16 |
| Personal and Social capability | - Students start to reflect and evaluate the ways in which they learn through reflective writing and teacher feedback. This will also allow students to set goals for themselves.<br>- The activities in the “Engage” section are designed to prompt interest in the students, allowing them to show initiative throughout the unit..<br>- During the class and group discussions, students will learn to appreciate diverse perspectives and contribute to civil society. | 1, 3, 4, 5, 6, 10, 12, 13, 14 |
| Ethical Understanding | - Students will start looking at ethical issues through the example of polluting animals’ habitats.<br>- Students are encouraged to think about the rights of living things, and our responsibilities.<br>- Through the activities in the “Elaborate” section, students will start to think about their own actions and its consequences. They will learn to use reason and make ethical decisions for future actions. | 10, 11, 12, 13, 15, 16 |
| Intercultural Understanding | - Through the talk by the guest speaker from the Aboriginal community, students will explore and compare their own beliefs and culture about animals and their environments to that of the Aboriginal culture. They will learn to respect and appreciate others’ cultural views. | 7 |

Connections with cross-curriculum priorities

**ABORIGINAL AND TORRES STRAIT ISLANDER HISTORIES:**

| Key concepts | Code | Organising ideas | Explanation | Activities |
|---|---|---|---|---|
| Country and place | OI.3 | Aboriginal and Torres Strait Islander Peoples have holistic belief systems and are spiritually and intellectually connected to the land, sea, sky and waterways. | - Students learn about the close connection between the Aboriginal and Torres Strait Islander people and the natural environment. Students discuss about how to respect the Aboriginal and Torres Strait Islander people through taking care of the environment. | 7 |

**SUSTAINABILITY:**

| Key concepts | Code | Organising ideas | Explanation | Activities |
|---|---|---|---|---|
| Systems | OI.2 | All life forms, including human life, are connected through ecosystems on which they depend for their wellbeing and survival. | - This idea can be explored through looking at how our decisions and actions impact the environment and hence the wildlife. | 11, 12 |
| World views | OI.4 | World views that recognise the dependence of living things on healthy ecosystems, and value diversity and social justice, are essential for achieving sustainability. | - This idea can be explored through looking at how our decisions and actions impact the environment and hence the wildlife. | 11, 12 |
| | OI.5 | World-views are formed by experiences at personal, local, national and global levels, and are linked to individual and community actions for sustainability. | - Students could discuss about how observing and learning about the impact of humans on animals' survival changed their views. This discussion could lead to talking about how important it is for individuals and communities to be aware of these problems and to actually take action | 11, 12, 13, 15, 16 |
| Futures | OI.6 | The sustainability of ecological, social and economic systems is achieved through informed individual and community action that values local and global equity and fairness across generations into the future. | - Students could discuss about how observing and learning about the impact of humans on animals' survival changed their views. This discussion could lead to talking about how important it is for individuals and communities to be aware of these problems and to actually take action. | |
| | OI.7 | Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments. | | |
| | OI.8 | Designing action for sustainability requires an evaluation of past practices, the assessment of scientific and technological developments, and balanced judgements based on projected future economic, social and environmental impacts. | - Students can have some time to reflect on their own actions in the past → have they thrown rubbish on the ground? Did they not recycle properly?<br>- Connecting to this, discussions about what could be done to save the environment in which different animals live in could occur as a class. | 11, 12, 13, 14, 15, 16 |
| | OI.9 | Sustainable futures result from actions designed to preserve and/or restore the quality and uniqueness of environments. | - Students could look at the uniqueness of the living environment through videos, excursions and the class fish tank.<br>- Teachers could ask questions such as: How have the environments been contaminated/changed? What can be done to restore this? | 1, 3, 4, 5, 10, 13, 15 |

Possible alternative conceptions

Students will come with their own ideas to class. It is the job of the educator to try and defuse these ideas as best they can. Some of these ideas might include:

- Some land animals can breathe underwater (4).
- Fish breathes air (1, 2, 3, 4).
- Turtles live on land (4).
- All animals live on land (4).
- Water is one colour (6).
- Fish can eat waste and plastic (10, 11).

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| Types of activities | All the below activities will be according to the 5E model for teaching and learning science.<br><br>**Engage (1-2 lessons):**<br>*Through these activities, the teacher tries to create interest and generate curiosity in the topic of study. Educators will assess current understanding during this stage and students will start framing questions related to the topics.*<br><br>1.Jigsaw classroom -<br>Students in groups of three reflect on prior knowledge and each group will make a list of different animal habitats, characteristics of a fish's environment, or the fish's external features. The teacher ensures every group is given a different topic and in the end students will share to formulate ideas together as a whole class. Teacher makes connections and raises questions in relation to each of the areas.<br><br>2. Word wall -<br>Students record words they have learnt about various topics for the day such as the different features of animals, marine life and their environment. This will be an ongoing project so that students can expand their vocabulary for use in projects in the Explain and Elaborate stages. During this process, the teacher also introduces unfamiliar words and explores students' current understanding related to them.<br><br>3. Introduction or warm-up -<br>Teacher uses literature and media to introduce new topics - various habitats using 'Cat in the hat' books, Animal habitats Youtube video, Fish tank using the 'Rainbow fish' book, clips from the movie 'Finding Nemo' about pollution, and, diver Rich Horner's video about swimming in an ocean of plastic. |
| | **Explore (3-4 lessons):**<br>*These activities have been included to encourage students to perform independent investigations and learn new concepts when exploring the desert or north and south poles. These will also enable them to research further and to answer questions raised by themselves about unfamiliar habitats.*<br><br>4. Jigsaw classroom- Animal habitats -<br>The teacher begins with posing questions such as: 'Can a camel live in a forest?' and 'Are there sharks in our local pond?' and writes the students predictions and answers on the board. In this inquiry project, students explore seven different habitat locations as a group and become 'habitat experts'. Students begin to research a chosen habitat and share findings and judgements. At the end, they relate predictions to findings and compare required physical features of animals from different habitats to survive in that environment. Each group chooses one animal and illustrates and labels physical features on an A3 piece of paper.<br><br>5. Living environment of a Fish -<br>A class fish tank will be set up as part of this unit. Students will begin by discussing elements about what the fish needs and the environment needed to survive. They will monitor the progress of the fish in the tank and see how over time they can develop. Any questions raised will be written on the 'Wonderings chart' placed next to the fish tank. For example how is the fish breathing in water?. This resource explores various science concepts about the fish's physical features that help him survive underwater.<br><br>6. Exploring ocean layers -<br>In the Layers of the Ocean habitat project, the teacher raises some under-the-sea science questions related to the five layers of the ocean, who lives there and how the existence of the light affects animal living conditions. The teacher uses this resource (in the resources section below) to make the five different layers in a bottles. Children will use *Ocean: A Visual Encyclopedia* to learn about the types of marine animals who live in each layer to extend their understanding.<br><br>7. Guest Speaker - Member of the Aboriginal Community -<br>Students will listen to a guest speaker from the Aboriginal community who will come in to speak to the students. This speaker will about the ideas that have been raised by Peter Yu cited in the Environment Australia Consultancy report available in the resource section of this unit guide. The teacher uses a small excerpt from the document to support the guest speaker's ideas in relation to the western beliefs. He or she stresses on will expose students to a different understanding of how other communities use and respect animals and the environment. |
| | **Explain (2-3 lessons):**<br>*During Explain, children are encouraged to explain concepts in their own words, and, are asked for evidence and clarification of their explanation. The teacher relates understanding to students' previous experiences as a basis for discussion.*<br><br>8. I Spy ocean, rainforest, desert, polar and pond animals-<br>Students will be given a sheet with a collage of various animals from these habitats. Then they are asked to separate animals according to their habitats and justify their actions with the help of concepts explored in the animal habitats project.<br><br>9. Observation diary-<br>As part of the fish tank activity, students maintain an observation diary about the fish's behaviour for a period of four weeks when exposed to various stimuli such as food, seagrass bed, sandy bottoms or rocks. Students make predictions and describe patterns and relationship between the events. Explicit scaffolding will be provided by the teacher during this project in the form of word banks, making connections to concepts from other activities and encoding texts or diagrams. In the end, the conclusion section will provide reasons for predictions and observations. |

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| | 10. TWLH<br>Students are asked to contribute ideas about Australian deserts, what they might look like and what plants and animals might be found there. They are to focus on the structural features of animals that they think help them survive and why. What I think I know-type questions will be asked such as 'What feature of an animal helps it survive in a desert?'. Next, what I want to learn topics decided for exploration based on the previous step. What I have learned - with the help of teacher, students make concept maps. In the end, make connection and explain for How I know I have learned that idea. |
| | **Elaborate (3-4 lessons):**<br>*In this section, children apply concepts and skills in new but similar situations along with the use of formal labels and definitions. They use explore strategies to ask questions, propose solutions, make decisions, experiment and record observations.*<br><br>11. 'So much plastic!'-<br>Children watch videos about the impact of plastics on marine life and their environment. One of them includes diver Rich Horner's video of himself swimming through a deluge of waste off the coast of Bali, Indonesia. Students record observations and have discussions about its effects on marine life. Further, with the help of the 'How long until its decomposed?' poster, they asses the situation using a cause and effect table.<br><br>12. Polluted fish tank art project- (OI2)<br>Teacher poses question about "what will happen to the class fish tank if it gets polluted?" Students represent this polluted fish tank using visual art and craft. They head to the local beach for a clean-up project and include some rubbish materials collected in their art projects. The teacher holds class discussions about the cause of pollution, what the fish tank might look like and its impact on the fish's life as a result to support their reasoning behind the art pieces.<br><br>13. What can I do differently? (Poster)-<br>Students implement conservation strategies in their own lives with the help of a list about 'ways in which we can make a difference and prevent marine debris pollution' provided by the Positive change for Marine life team on their website. Students will use that list to think and discuss about what they are going to start doing differently from today. Later, they make posters in groups for their community and post them in public spaces such as libraries, parks, etc. to spread the awareness. |
| | **Evaluate (2-3 lessons):**<br>*In the following activities implemented throughout the range of activities, students learn to reflect on new concepts learned, explain their understanding in detail as well as the teacher gets to assess student learning.*<br><br>14. Reflection write-ups-<br>Choose to use these based on the activities at the end of lessons - Three things I have learnt over this topic are, Two things that made me go aha and/or provided me with new insights, One question I have is, or, Head- something that made you think, heart- something that made you feel, bin- something you did not find interesting, bag- something you will take away, or,, Traffic lights (Stop, Proceed with caution and GO), What? So what? Now what?<br><br>15. Claim, evidence, reasoning (CER)-<br>In this citizen science project, students collect evidence to support or contradict existing claims about ocean health and marine life. For example, 'Animal species are getting affected because of pollution'. Research or consult local conservationists to look for evidence to support this claim.<br><br>16. Persuasive writing piece-<br>Students will use knowledge about the effects of pollution and rubbish on marine animals to form an argument and write a persuasive letter to the council. They use Scientific literacy tools to frame arguments. After finishing their handwritten copy, editing and proofreading their work, students will use Microsoft Word or similar programs to create the final draft. The teacher provides support in the beginning through the joint construction strategy. |
| Assessing learning | **DIAGNOSTIC**<br><br>**Jigsaw classrooms:**<br>Students will be assessed on:<br>● The knowledge they have gained through research skills<br>● Ability to contribute to group work<br>● Ability to cooperate and communicate in a group setting<br>● The structure of their research<br>● Ability to extract relevant information from the source.<br><br>**Word Wall:**<br>Students will be assessed on: |

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| | ● Contribution and participation to the word wall<br>● Ability to record words they know or learn about environment, marine animals or animals in general<br>● Their ability to understand the purpose and practice of the word wall and why it helps to facilitate learning<br>● Handwriting and spelling<br><br>**Wonderings chart in Living Environments of a Fish (activity 5):**<br>Students will be assessed on:<br>● Their questioning about what is happening in this fish tank and to the fish<br>● Their ability to predict what might happen to the fish in the current circumstance and in other hypothetical circumstances<br>● The ability to communicate the questions effectively<br><br>**FORMATIVE:**<br><br>**Discussions**<br>Students will be assessed on<br>● Their contribution and participation to class discussions<br>● Quality and relevance of discussion<br>● Effective listening skills<br><br>**SUMMATIVE:**<br><br>**What can I do differently Poster:**<br>Students will be assessed on:<br>● Accuracy and depth of information presented on their poster<br>● Creativity and originality in design.<br>● The ability to communicate effectively through a poster<br>● Layout and design<br><br>**Observation Diary/Journals in reflection write up (activity 14):**<br>Students will be assessed on:<br>● Record keeping skills in their journals<br>● Literacy skills including spelling, grammar and handwriting<br>● Depth of their own individual reflection throughout the unit<br><br>**Persuasive writing (activity 16):**<br>Students will be assessed on:<br>● Their understanding of the human impact on animal habitats<br>● Their persuasive writing skills<br>● Handwriting, spelling and grammar |
| Resources | The below resources are a selection of links, websites etc, and will be used in activities as clearly outlined.<br><br>Rainbow fish read aloud- https://www.youtube.com/watch?v=Pg6f7qtGc1M<br>Animal habitats video- https://www.youtube.com/watch?v=Xj1ASC-TIsI<br>Exploring habitats resource- https://www.kcedventures.com/blog/exploring-habitats-with-the-cat-in-the-hat-40-projects-science-activities<br>Acquarium management- https://oimb.uoregon.edu/Documents/GK12/Curricula-Aquarium-MoreLessonIdeas.pdf<br>Exploring ocean layers - https://www.kcedventures.com/blog/layers-of-the-ocean-under-the-sea-science-activities<br>Marine life Encyclopedia - https://www.amazon.com/gp/product/1465435948/ref=as_li_tl?ie=UTF8&camp=1789&creative=9325&creativeASIN=1465435948&linkCode=as2&tag=kced-20&linkId=88327d55c9034eb5c9f1c3fd6b3b29d1<br>Fisheries, aquaculture and Aboriginal and Torres Strait Islander people- https://www.environment.gov.au/archive/coasts/publications/series/pubs/report3-all.pdf<br>'So much plastic!'- https://www.facebook.com/theguardian/videos/10156634250321323/<br>What can you do about the ocean list- https://pcfml.org.au/what-we-do/campaigns/honour-the-ocean/what-can-you-do-about-marine-debris<br>30 kg of plastic found in a dead whale's stomach- http://www.heraldsun.com.au/kids-news/scientists-find-30kg-of-plastic-inside-dead-sperm-whales-stomach/news-story/c5594a1a58bad8e3d155240b00a043f8<br>Plastic that degrades completely:<br>http://www.heraldsun.com.au/kids-news/a-teenagers-invention-could-help-save-the-world-from-plastic-pollution/news-story/7a799ee3007cccf978d02353095fc357 |
| Opportunities for Information and | **iPad**<br>● iPads could be used to take photos for data collection and research claims. |

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| Communication Technologies (ICTs) | ● Potential apps that may be useful: Brushes Redux application for the art project.<br>**Interactive whiteboard**<br>● Could be used to show videos/pictures.<br>● Could be used to categorise activities; for example, students drag animals into their natural habitats.<br>● Tables such as TWLH could be created here.<br>**Computers**<br>● Microsoft Word for students who require differentiated assistance of others who are proficient.<br>● Research pictures and collection of research data.<br>● Create presentations as a group to display research findings. |
| Links with community | Due to the location of the school, and close proximity to the beach, the students will be offered rich opportunities to work closely with the community.<br><br>● The persuasive writing piece link with the local council allows students to connect with their local community and have an impact on their local area.<br>● 'What can I do differently?' posters allow students to realise that individual efforts can lead to bringing about change in the wider community (Sustainability- OI5).<br>● Marine debris challenge- Cleaning up their local environment makes them active participants within their community (Sustainability- OI5).<br>● Guest speaker from the community or a parent from marine biology field could come in to talk to the students about programs that are going on to link with the environment and how students can do their bit. This could be done on a smaller scale, just addressed to the specific 1-2 class or it could be a whole school incursion, for example this talk could be done in a school assembly time. |
| Possible challenges | ● Budget<br>○ There may not be enough budget provided for science to assist with all the activities.<br>● Possible lack of resources<br>○ Some resources may be difficult to obtain<br>○ Lack of budget may lead to a lack of resources<br>● Prior knowledge gaps between the students<br>○ Student come from different backgrounds and may have varying ideas, depth of knowledge, communication skills and inquiry skills.<br>● Time limit<br>○ The allocated time for science classes may not be sufficient to cover all the activities and curriculum links.<br>● Lack of confidence in teachers engaging with science curriculum<br>○ Some teachers may not be confident in teaching a topic they are not familiar/confident in. |

# *Rationale*

**Justification** (Namrata Adsul)

Our overall aim was for children to understand the scientific concepts about animals and their lives, followed by investigation of our impact as humans on their natural environments. Through this resource, we want students to use science inquiry skills (SIS) to develop science understanding (SU) and use the knowledge acquired to solve real-life environmental issues related to science as a human endeavour (SHE). As this is a Year 1 and 2 composite classroom resource, SU learning outcomes are from Year 1 and are extended for the higher year level to ensure differentiation.

We have applied the 5E instructional model with the five phases: Engage, Explore, Elaborate and Evaluate. This model cognitively challenges students as well as provides them with relevant resources to develop understanding (Fleer, 2015). It also enables teachers to assess learning in various contexts during the comprehension, explanation and elaboration phases.

The Engage section enables teachers to surface students' prior knowledge and experiences related to the topic of inquiry and use that to develop understanding of new concepts (Cowie, 2013). Introduction or warm-up literature and media acts as a stimulus and helps to subtly introduce the topic of inquiry and make children feel excited as well as start thinking about it without actually mentioning it (Ng, 2013). Using this as a prompt, they create word walls and lists. It is a way for the educator to diagnose base or validity of current knowledge and design lessons accordingly (Fleer, 2015).

The jigsaw technique is a co-operative learning approach that promotes equal

participation, hence, accountability (Social Psychology Network, n.d.). We decided to use this strategy due to this reason in hand with the nature of the science subject of building on others' ideas and using them together to formulate a common understanding (Wilson & Lewthwaite, 2013). Each piece or each group's part is essential for completion and full understanding of the final product (Social Psychology Network, n.d.). Physical features of animals and its purpose in various habitats could not be entirely understood without relating all seven of them together. Simultaneously, it also promotes valuable discussions.

Activities under the Explore and Explain component are student-centred instead of the teacher heading the investigations. We decided this as a group so that children are given an opportunity to learn independently. At first, students might believe that animals' physical features are simply for what they are but later discover that they are for a particular reason. The Explain section provides an opportunity for students to apply science understanding to justify that our structural features and behaviours inherited from parents in a particular environment fulfils a purpose. Investigation of the truth surrounding these predictions allow students to re-construct ideas through research, and compare observations (Tytler, 2007).

In relation, argumentation is at the heart of what scientists do; they pose questions, make claims, collect evidence, debate with other scientists and compare their ideas with others in the field (Australian Academy of Science, 2012). In this primary science classroom, argumentation is for students to articulate and communicate their thinking and understanding to others in activities 4, 12, share information and insights in 12, 13, 14, and present their ideas with evidence in 6, 8, 9, 15, 16. It is through articulating, communicating and debating their ideas and arguments that

students are able to develop a deep understanding of science content (Australian Academy of Science, 2012). Hence, students learn science through the process of constant conceptual change when there is an interaction between preconceptions and the appropriate scientific concepts (Cutter-Mackenzie & Logan, 2013). Students' ability to justify, reason and formulate arguments is reflective of concrete understanding of scientific concepts (Tytler, 2007).

Throughout the sequence, constant scaffolding is provided by the educator. We wanted students to learn in a safe learning environment, wherein their opinions are not considered wrong but building schemas of knowledge. Personal reflection write-ups have been included for students to express thoughts and ideas in a supportive environment. Teacher also uses them to assess learning through observation of changes in children's conceptions instead of formal testing as it makes it less intimidating for students (Fleer, 2015).

SIS covered in this unit of work promote certain behaviours. The components of this resource revolve around the idea of developing values possessed by scientifically literate people (SLP).

According to Goodrum, Hackling & Rennie (2006), SLP:

- Engage in communication of and about science – done throughout in the form of presentations, class discussions, observation diaries.
- Are able to identify questions, investigate and draw evidence based conclusions – seen in activities 4, 5, 6.
- Are sceptical and questioning of claims made by others about scientific matters – in activity 15, students learn to evaluate existing claims. Also,

lesson 7 exposes them to Aboriginal perspectives of co-existence in comparison with western beliefs. Conversations on this topic could provide new insights to their growing beliefs.

- Make informed decisions about the environment and their own health and well-being – students are exposed to harsh truths about the environment and are encouraged to think about its effects on the environment, self and marine life in activities 11, 12 and 13.
- Are interested in and understand the world around them – inquiry-based learning promotes a questioning behaviour. ‘Why does the fish have fins?’ – gets them curious and search for explanations to understand.

The decision to follow an inquiry-based learning approach backed by integration of other learning areas across the curriculum was to foster development of other scientific and problem-solving skills, which help the students learn more effectively in school and later on in life (Ng, 2013, p. 156). Hodson (2003) advocates providing opportunities for students to take action at school as a way of increasing the likelihood of students becoming active citizens (Amy-Cutter & Logan, 2013). The resource provides a platform for them to learn to take action against degradation of marine life in simple ways. The poster and persuasive writing piece is a step into the citizen scientist community. Application of science concepts in real-life issues also leads to authentic science learning. It is imperative students develop these skills at a very young age (Year 1/2) in order to build a base to apply science while making informed decisions in personal life.

Lastly, the sequence of activities begins with explicit instruction in combination with identification of patters by students. They use self-identified facts and skills to

classify and differentiate in order to build further understanding based on analysis of these patterns in the animal habitats project. Later, activities in the Explain stage foster classroom inquiry where students try to answer questions while giving priority to collecting evidence that can be used both in arriving at an answer and explaining their findings. Hence, tasks are arranged according to the process of cognitive acquisition, that is, lower-order thinking to higher-order thinking (Krathwohl, Anderson & Bloom, 2001). Students learn about different animals' habitats and their features first and then current realities that negatively affect these habitats and living organisms that are part of it. It was imperative to develop SU and then apply those concepts in SHE as development of the prior was necessary to build the latter (Krathwohl, Anderson & Bloom, 2001).

**Implications** (Garam Jung)

This unit plan requires teachers to be well aware of the holistic approach to teaching which includes inquiry-based lessons. Without this understanding, the unit plan cannot be used to its full potential, preventing students from experiencing deeper learning. Before the beginning of the unit, teachers need to look back at their own personal beliefs and views regarding science as well. It is essential for the teacher to make sure that their own negative views of science or their lack of knowledge does not prevent science from being well taught in the classroom (Fitzgerald, 2013). Teachers should extend their knowledge and build up their confidence in the topic that they will be teaching, which will be about the different habitats of different animals, and how these environments are affected by our actions (Fitzgerald, 2013).

In using the unit plan in a classroom, the teachers need to be able to bring in the knowledge of their students and use this information to possibly change the resources that are used, or the way in which certain activities are carried out. For effective learning to occur, students need to want to learn, and this usually comes from the relevance of the topic being taught to their own lives (Logan & Skamp, 2008). The activities in the unit plan were chosen to be relevant for a general school located in a metropolitan area near the beach. This particular location meant that the focus was mostly on marine animals throughout the unit plan. This does not mean that the activities will be entirely appropriate for every school and class that is located near a beach. Some schools may have other focuses, or some classes may engage better with different books or movies. Teachers should know their students well enough to consider their interests, social and cultural backgrounds, prior experiences and knowledge when carrying out a lesson and choosing activities.

This unit plan encourages quality learning through the use of multimodal communication. Science understanding for students may be enhanced through multimodal representations of science concepts (Fitzgerald, 2013). The activities in the unit plan includes verbal representations such as discussions and presentation of information, visual representations such as drawing, videos and posters, and written representations which include science journals and other writing activities. Experimental mode is also presented through examples such as the class fish tank. These multimodal representations are to be integrated and used aptly by teachers to support the students' construction of the scientific mental models.

Another factor that contributes to the quality learning is the use of constructivist approach, and more specifically, inquiry-based learning. This means that the unit plan does not list ways to transfer set knowledge, but consists of a sequence of activities from which students can acquire the skills and knowledge outlined by the curriculum links (Driver & Oldham, 1986). For this to be effective, the teacher needs to know the relevant curriculum links which are listed on the unit plan and guide the activities to maximise the learning outcomes. Throughout all the activities, the teacher's role is to carefully and appropriately scaffold the students through the individual's Zone of Proximal Development (Powell & Kalina, 2009; Wu & Hsieh, 2006). Facilitating students' learning is essential for the students to not only construct accurate and widely accepted science knowledge, but also to develop appropriate curiosity, inquiry skills and higher order thinking.

Having the activities appropriate for the 5E's method allows the teachers to follow the constructivists approach of firstly finding out what the students already know, then allowing them to explore the topic and challenge their existing ideas, and then finally supporting the students to link new ideas to what they have experienced through the activities (Fitzgerald, 2013). More importantly, the "Elaborate" stage allows the students to use their new knowledge and make it their own by applying it to new situations. In the unit plan, this stage is where the students are given opportunities to link their knowledge to their own community, which addresses the second key understanding for the unit. Here, the concept of "Science as a Human Endeavour" from the Australian Curriculum is explored thoroughly. Students are encouraged to think about the effects of environmental pollution on animals, and to come up with possible solutions. All these steps allow students to build up many

important skills such as problem solving, communication, reasoning and creative and critical thinking (Fitzgerald, 2013).

The proper use of diagnostic, formative and summative assessments that are presented in the unit plan is also essential to ensure quality learning. Diagnostic and formative assessments need to be properly examined by the teacher to understand the students' progress and areas of needs. This information is to be used mainly by teachers to try alternative instructional methods or possibly repeating areas in which students struggle in to meet the students' learning needs (Boston, 2002). This information could also be used to give students an idea about which areas they need to work on to give them a better chance of achieving the learning goals. Summative assessment information is also important for accountability purposes and can be used by the teachers for future references (Brookhart, 2001).

Most importantly, students need to be motivated to learn science for any quality learning to occur. This means that it is the teacher's role to engage students and make science relevant to their everyday lives (Fitzgerald, 2013). Teachers' attitude towards science needs to be positive in order to encourage students' positive attitude, and the negative perceptions about science being difficult and irrelevant needs to be challenged by the teachers. Teachers also need to be aware of the fact that teacher-student relationship plays an important role in student engagement and achievement (Roorda, Koomen, Spilt, & Oort, 2011). They will need to provide a safe, supportive and welcoming classroom environment in which the students feel comfortable to learn and communicate (Logan & Skamp, 2008).

**Issues and future directions** - Sofie Bensen

When looking at the above resource it is evident that there may be various issues which may hinder an educator's delivery of the ideas within the unit. If there are issues then they will need addressed so that this resource could be used effectively in the future.

When considering the issues involved, an educator will need to look at some of the ideas within the resource and see how these concepts may be difficult for students to grasp. One idea that may be particularly hard for students to understand would be the notion of how science relates to their everyday lives. Throughout this unit, we aim to show this to students in a meaningful way looking at science and how this relates to the human endeavour. Often it is this link that is the hardest element for students to grasp and one which holds great importance. Smith and Fitzgerald suggest that the primary classroom can "become a powerful context for exploring science as the human endeavour, because teachers are actively creating the conditions where school science becomes a working example of the interrelatedness of humanity, learning, society and science" (2013, p.6). However, to make the classroom a 'powerful context' to explore the human endeavour, educators need to feel comfortable teaching the material. This was mentioned in the unit resource above, under the heading of 'possible challenges' where it stated that a possible challenge could be 'a lack of confidence in educators engaging with the science curriculum'. Morgan (2012) conducted a survey of which her results could confirm this lack of confidence whereby teachers felt a feeling of inadequacy and reluctance to teach science at the primary level.

There could also be possible issues with individual students of which some may not be able to pick up the ideas within the unit as easily as others which could create issues for an individual student or for the class. The management of different levels of student knowledge are a constant concern, but the educator will need to remain aware of where their students are at in terms of their knowledge. Additionally, the teacher may need to take different approaches for teaching those students who may struggle with the concepts.

Often in science education many of the concepts that students are presented with can be foreign or difficult to grasp. Naturally students will come to class with alternative conceptions. Kyle et al., suggests that “children begin to construct sets of ideas, expectations, and explanations about natural phenomena to make meaning of their everyday experiences” (1989). As some students may already have some of these ideas instilled in their mind, it could be difficult to defuse them and replace them with ideas from the resource. Stahly et al. (1999) as cited in Pringle (2006) states that, “when children encounter new experiences, or stimuli, the new information may be integrated into their existing framework; or the conceptions, both new and old, could be reorganized; or the currently held conceptions could be rejected” (p. 160) Therefore it is important for educators to understand the impact that these ideas could have on a student’s learning.

In overcoming the alternative conceptions that students may have, it is important that educators provide a space for students which is a safe learning environment both physically and emotionally. Students need to feel safe and supported so that when overriding these alternative conceptions, the student does not feel overwhelmed

when they are trying to grasp these new ideas. Smith and Fitzgerald suggest that “Respect, trust and openness are fundamental principles underpinning the work of the scientific community” (2013, p. 12). By creating an environment that has these principles in place, a teacher can make his or her students feel safe and help them to address these alternative conceptions.

We think it is important to note that this resource is far from perfect and for it to be a successful and functioning resource in the future it will constantly need to be updated and improved. The students who will be undertaking the activities within this unit will be constantly changing as the years go on, and as no one student is the same the activities and ideas presented will need to be tweaked depending on the cohort of students and their abilities. Not only will the students be changing, but the educators teaching this unit might be as well. In order, for this unit to be as effective as it can be in terms of learning, activities may need to be changed to work to an educator’s strength. For example, if a new educator comes to teach this unit and has a strength in drama, an activity within the unit may change to allow for this educator to work to his or her strength. Liesveld, Miller and Robinson (2005) imply that teachers should try and teach by focusing on their strengths instead of focusing on the areas that we are weakest in. I believe that if an educator is working to the best of his or her abilities then this will be evident and the students will follow suit. Therefore, they will get the most out of the learning experience.

As technology continues to advance and move forward so does the technology that is available for educators. The use of ICT within this unit may not be the same in a few years as the speed of our technology advancement is so great. Depending on

the ICT available for teaching at the time the unit is presented, will mean that this unit will have to adapt for it to be successful for learning and teaching in the future.

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