

Education Resource Pack

Key Stage 2

Introduction

The Key Stage 1 Resource Pack is an educational tool for teachers to use in conjunction with a visit to Bournemouth Oceanarium. Whilst at the Oceanarium the children will explore the beautiful aquatic life that lurks beneath the surface of the World's waters, ranging from tropical to temperate climates in both marine and freshwater environments.

This resource pack is designed to aide both children and teachers, enabling pupils to discover more about the incredible animals that would otherwise live thousands of miles away. All the activities are designed to be fun and educational and relate to the creatures on display at the Oceanarium. The activities explore the various processes, relationships and cycles that occur in the natural world and are all linked to key areas of the curriculum.

The activities in this pack require little teacher preparation and relevant worksheets are included. Some of the activities can be completed during a class visit to the Oceanarium, and others can be undertaken back in the classroom. NB If your group does wish to complete a worksheet during your visit you must provide all equipment and materials. If your group is having a guided tour, worksheets should be undertaken once the tour is completed.

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Discovery Trail

This can be described as a 'knowledge treasure hunt'. The questions are set in the order that answers can be found if you walk around the Oceanarium from entrance to exit. For most questions the appropriate zone is indicated. Children should be encouraged to answer other questions in note form and to try not to write in full sentences.

Answers:

Question	Answer	Location of answer
1.	Lots because they live in shoals.	Observation of the first tank at the bottom of the stairs.
2.	They incubate them in their mouth.	Africa zone - Zebra Cichlid lightbox
3.	It has a bright red tail and looks similar to a shark.	Observation in Ganges Zone
4.	No teeth; feed on seaweeds & grasses; lay as many as 100 eggs; travel up to 2000km to breed; eggs take 50 days to hatch; return to area of hatching.	Turtle interpretation boards in Turtle Beach area.
5.	Tourism, pollution, fisheries.	'Turtles in Trouble' board in Turtle Beach area.
6.	Inflates its body with water to scare off predators.	Marine Research Lab - first bubble tank.
7.	CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) is an international agreement between Governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival.	Clipboard next to the reptiles - beyond the Marine Research Laboratory.
8.	African Mud Turtles; live coral; reptiles	Tanks in the lobby/reception area. Marine Research Lab, Reptiles in the reptile sanctuary.
9.	Uses its flattened body to smother and trap prey	Observation and deduction in the tunnel.
10.	Sharks attack less than 100 humans a year. Man kills 100 million sharks a year.	Shark information board - before entering the tunnel.
11.	Positive effects for people are that it provides a leisure facility, it brings new business to the local area and it acts as a natural beach defence. Positive effects on wildlife are that it provides a new habitat for animals and it's a good nursery ground for small fish. A negative effect would be that it might create overcrowding and may cause associated problems like increased traffic and in the long run, pollution.	The notice board on the right, after leaving the displays on the wall just before the shop entrance.

Curriculum Links: Science (Ideas and Evidence in Science; Investigative Skills; Variation and Classification, Living Things In Their Environment; Breadth of Study: environmental contexts & use a range of sources of information); English (Reading for Information; Writing: Composition)



Discovery Trail – Worksheet

On a visit to the Oceanarium you can find out many interesting facts about life in freshwater and marine environments around the world. This quiz is a chance for you to see how well you can find information and use your thinking skills to deduce answers.

1. If you were setting up a tank, would it be better to have one Penguin Tetra or lots? Why?

2. What is unusual about the way the Zebra Cichlid, and other cichlids, look after their eggs?

3. Where do you think the Red Tailed Shark Minnow of the Ganges River gets its name from?

4. In the Marine Research Lab there is a lot of information about Green Turtles. List three facts about them:
 - 1.
 - 2.
 - 3.

5. List three things that are a threat to marine turtles:
 - 1.
 - 2.
 - 3.

6. How does the Pufferfish protect itself?

7. What is CITES? Why is it important to conservation?

8. List three things at the Oceanarium that were confiscated by Customs & Excise:
 - 1.
 - 2.
 - 3.

9. How does the Southern Stingray kill its prey?

10. 'Man is 1 million times more dangerous to sharks than sharks are to man'. Why?

11. As you leave the displays you will see an information board about the Artificial Reef being built in Boscombe. How might this affect the local wildlife and the local people? Think of both positive and negative factors.



Aquatic Crossword Puzzle

This is a fun activity that can be completed either whilst at the Oceanarium or back at school.

Answers

Across:

1. Catfish
4. Algae
6. Octopus
8. Turtle
9. Sea Snail
10. Shark

Down:

2. Amazon
3. Clownfish
5. Eel
7. Stingray

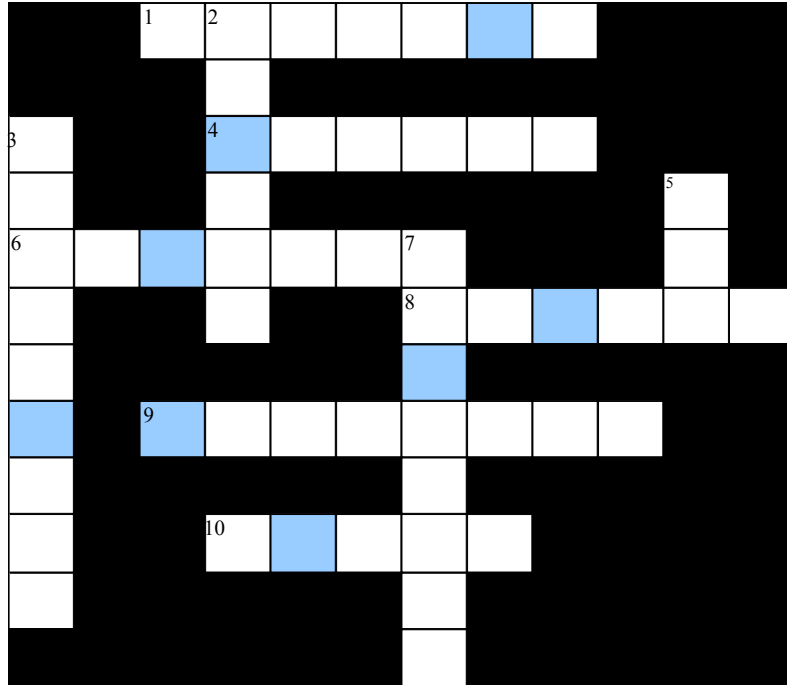
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Curriculum Links: Science (Investigative Skills, Considering Evidence and Evaluating)



Aquatic Crossword Puzzle – Worksheet

Use the clues below to solve the crossword puzzle.



Across:

- 1) I live in freshwater rivers and lakes and use my barbells to feel for food when it's too muddy to see.
- 4) This is a type of aquatic plant that grows wherever there is sunlight and water. It can grow in different shapes, sizes and colours.
- 6) I am famous for my eight sticky arms and eat shellfish and crabs with my powerful beak.



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- 8) This reptile roams the Worlds' tropical oceans. It can weigh over 300kgs and travel over 1500 miles to reach its nesting sites.
- 9) I am a very slow marine animal that lives in a shell. I only have one foot, similar to my garden relatives.
- 10) I am a predatory fish that has been around for almost 400 million years and I have many rows of razor sharp teeth.

Down:

- 2) This is the largest river in the world. It drains 40% of South America and is home to the Piranha.
- 3) I am a brightly coloured fish and live in tropical coral reefs. I use sea anemones for protection from predators.
- 5) This fish is a very slippery customer that can survive in freshwater as well as saltwater.
- 7) I spend most of my day buried under sand at the bottom of the sea. I have a nasty weapon in my tail but only use it to defend myself.

Write down the letters that appear in the blue boxes and then rearrange them in the row below to identify another underwater creature.

Adaptation

Many creatures, over time, have adapted to their environments. This activity challenges pupils to observe creatures and read information in order to match the creatures listed to their relevant features. It also provides an opportunity for teachers to discuss adaptation with pupils during or after the visit. If adaptation has been discussed before the visit this activity provides an opportunity for pupils to reinforce their learning. Most creatures listed are in the Marine Research Lab. It is therefore possible to gather small groups together in this area to discuss adaptation as the pupils do this task.

Adaptation Answers:

1. J
2. H
3. G
4. A
5. D
6. E
7. C
8. B
9. F
10. I

Curriculum Links: Science (Ideas and Evidence in Science, Investigative Skills, Variation and Classification, Living Things in their Environment, Breadth of Study: environmental contexts & use a range of sources of information)



Adaptation – Worksheet

Many creatures, over very long periods of time, adapt their behaviour and body features to survive. Most of the creatures listed below can be found in the Marine Research Laboratory.

Can you match these creatures to their description? Write the letter of the description next to the matching creatures' name.

1. Porcupine Pufferfish Description: _	A. Has poisonous mucus on its skin to protect it.
2. Copperband Butterfly Fish Description: _	B. Mimics a cave to capture its prey.
3. Sea Horse Description: _	C. Can swim upside down and feed on anything floating at the surface of the water.
4. Tomato Clownfish Description: _	D. Has blade-like spines at the base of its tail for protection.
5. Yellow Tang Description: _	E. Has a solid cube shaped skeleton. Moves its fins in different directions to position itself and feed.



<p>6. Yellow Boxfish Description: _</p>	<p>F. Has developed pectoral and pelvic fins to enable it to 'walk' on the seabed.</p>
<p>7. Upside Down Catfish Description: _</p>	<p>G. Has a 'prehensile' tail for hanging on to rocks and plants.</p>
<p>8. Yellow Stingray Description: _</p>	<p>H. Has a long snout to peck at food in small spaces.</p>
<p>9. Epaulette Shark Description: _</p>	<p>I. Can attach itself onto a piece of rock or wood and feed on the algae growing on it.</p>
<p>10. Plecostomus Description: _</p>	<p>J. Can inflate itself with water and make its spines stand on end to protect itself.</p>

Food Web

This activity helps the children understand that when an animal eats another animal or plant it is part of a food chain. This food chain is then part of a greater food web in which one animal can have more than one prey item and also predator. This activity encourages the children to read the information boards and to make educated guesses at what an animal might eat by looking at its physical features and observing its behaviour whilst at the Oceanarium.

Sharks are largely carnivores and have been known to eat small and large fish as well as shellfish, stingrays and turtles. Some of the largest sharks in the world, like the Basking and Whale sharks, are plankton eaters.

Notes

There are 7 species of marine turtle. Most of these species are omnivores and eat prey like small fish, jellyfish, sponges and shellfish. The Green Turtle is an omnivore when young but turns herbivorous as it matures and grazes on algae.

Stingrays are mostly carnivores and are known to eat small fish and shellfish. The largest ray in the world is the Manta Ray and it is a plankton eater.

Large fish come in many shapes and sizes. Because of their size they are usually omnivores and eat jellyfish, small fish and shellfish. Some large Parrot fish are herbivores and graze on algae found on coral reefs.

Jellyfish are fairly immobile and rely on their long tentacles to catch prey like small fish. Some Jellyfish are small and feed on plankton.

Small fish can't eat anything big because they have small mouths so they eat plankton and algae.



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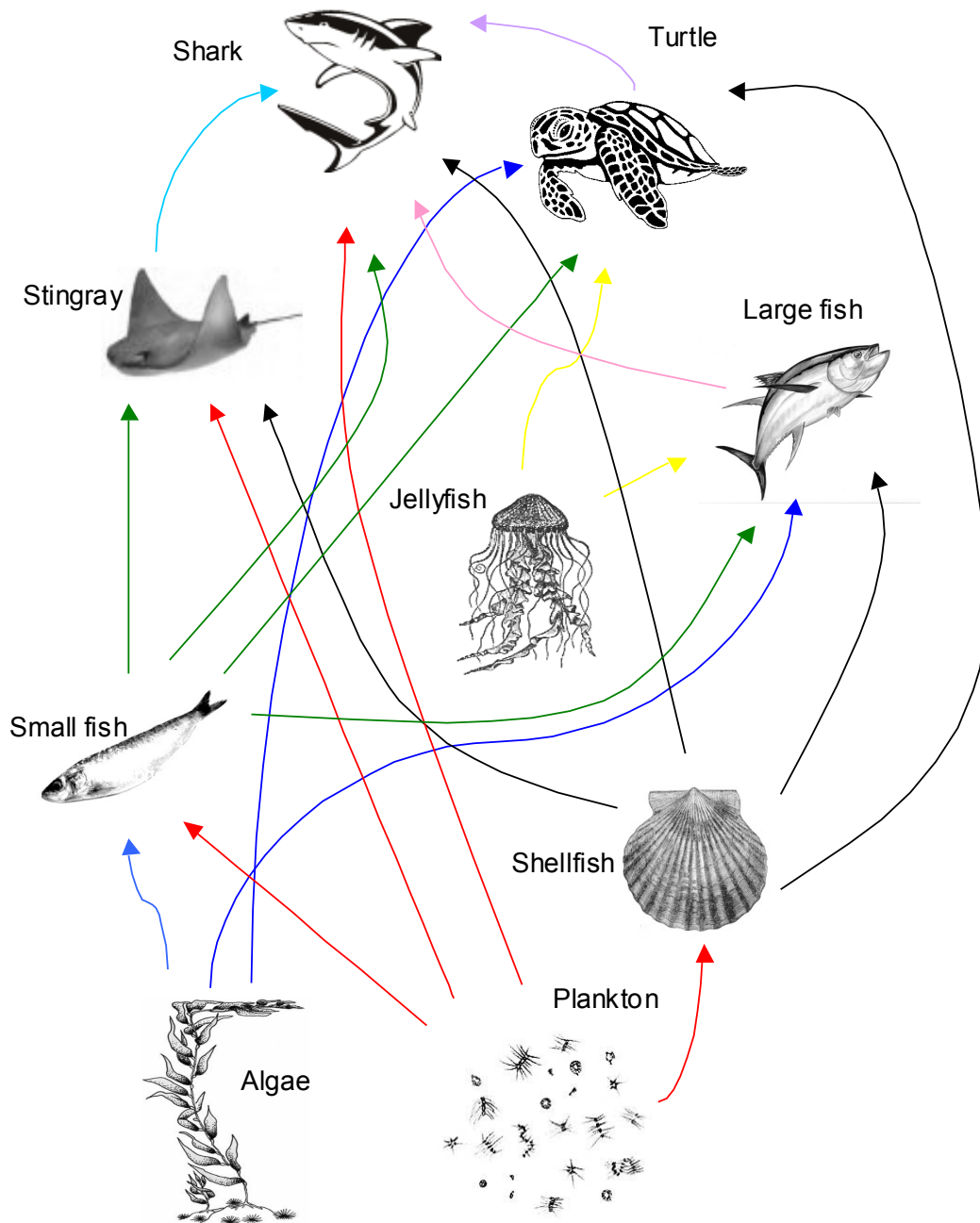
Shellfish feed by filtering their food out of the water. Their food is plankton that drifts around in the currents.

Plankton consists of both plant (phytoplankton) and animal (zooplankton) matter. The zooplanktons eat each other as well as eating phytoplankton. The phytoplankton gets its energy from the sun, this is why plankton is found near the surface.

Algae is the name for a general type of aquatic plant which gets its energy from sunlight.

For answers please see the following page. Children might not identify all connections in the food web – but this can allow for group discussion.

Answers



Curriculum Links: Science (Ideas and Evidence in Science, Investigative Skills, Life Processes, Green Plants, Living Things in their Environment)

Food Web - Worksheet



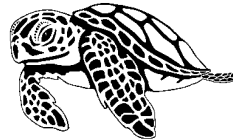
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Every living animal and plant is part of a food chain and a connected group of food chains is known as a food web. Draw arrows between animals you think eat certain food items. The arrow should go **from** the prey to the predator to show which way energy is passing through the food chain. Some predators eat more than one prey item.

Shark



Turtle



Stingray



Large fish



Jellyfish



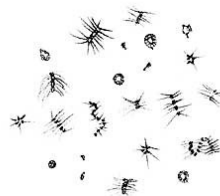
Small fish



Shellfish



Plankton



Algae



Conservation Trail

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One of the aims of the Oceanarium is to promote a greater understanding of our marine and freshwater environments and how we can protect them. This activity aims to encourage pupils to consider the issues that are highlighted around the displays.

Each zone within the Oceanarium has a 'Conservation Watch' board that identifies environmental problems and suggests ways in which we can help.

A partially completed table is given for the pupils to complete. To avoid the pupils having to record too much in writing, much of the information from the boards is already provided. In some cases the zone is not given and the pupils will need to deduce the location from the information in the table. In all cases they are required to record at least one way in which they could help to conserve our environment.

This is a subject that could be revisited back at school with activities such as making conservation posters, leaflets or collages.

Zone	Local Creatures Found	Problems	How You Can Help
Amazon	Red bellied piranha	Rainforests are under threat from logging, industrial development, farming and open cast mining. 150,000 km of forest are lost each year	Go to www.saverainforest.net Each click saves 2 km of rainforest
Mediterranean	Crab, cod, salmon	Over fishing threatens many species of fish. New technology has enabled man to catch fish faster and more accurately.	Support the World Wide Fund for Nature who help endangered species: www.wwf.org
Great Barrier Reef	Green turtle, southern stingray, blacktip reef shark, banner fish, black tail humbug, blue runner etc	Coral reefs are extremely vulnerable and easily damaged. The greatest dangers are manmade: pollution, sewage, global warming. Other problems include: Loved to death by visitors, construction industry	Support the marine conservation society www.mcsuk.org
Africa	Zebra Cichlid	Use of artificial fertilisers. "Eutrophication": sewage, detergents etc produce microscopic organisms that cover the surface of the water and block out light. This stops oxygen being absorbed.	Use water wisely and take care with the use of artificial chemical pesticides and fertilisers
Ganges River	E.g.: Boesman's rainbow fish Clown knife fish,	Pollution from factories along the river (large amounts of chemicals. Volume of waste put into river (100,000,000 litres a day). Little is done because people believe the river will clean itself.	Support Whale & Dolphin Conservation Society (many dolphins in the river) www.wdcs.org
Key West	Horn sharks, grunts, stingrays	Due to the lucrative shrimp industry, mangrove forests are cleared to make way for artificial ponds.	Avoid buying pond-raised shrimp from the supermarket

Curriculum Links: Science (Ideas and Evidence in Science; Investigative Skills; Living Things In Their Environment; Breadth of Study: environmental contexts & use a range of sources of information); PSHE & Citizenship (Preparing to play an active role as citizens; Consider social and moral dilemmas they come across in everyday life).



Conservation Trail – Worksheet

One of the main aims of the Oceanarium is to help people understand the problems that threaten our marine and freshwater habitats. In each zone within the Oceanarium you will find a conservation information board. Fill in the missing information and by the end of your visit we hope these boards will have helped you find at least one way you can help to look after our planet.

Zone	Local Creatures	Problems	How You Can Help
Amazon	Red bellied piranha	Rainforests are under threat from logging, industrial development, farming and open cast mining. ----- km of forest are lost each year	
-----	Crab, cod, salmon	Over fishing threatens many species of fish. New technology has enabled man to catch fish faster, and more accurately.	
Great Barrier Reef	----- ----- ----- -----	Coral reefs are extremely vulnerable and easily damaged. The greatest dangers are manmade: pollution, sewage, global warming. Other problems include: ----- ----- -----	
-----	Zebra Cichlid	Use of artificial fertilisers. "Eutrophication": sewage, detergents etc. produce microscopic organisms that cover the surface of the water and block out light. This stops oxygen being absorbed.	
Ganges River	-----	Pollution from factories along the river (large amounts of chemicals. Volume of waste put into river (100,000,000 litres a day). Little is done because ----- ----- -----	
Key West	-----	Due to the lucrative shrimp industry, mangrove forests are cleared to make way for artificial ponds.	

Water Cycle

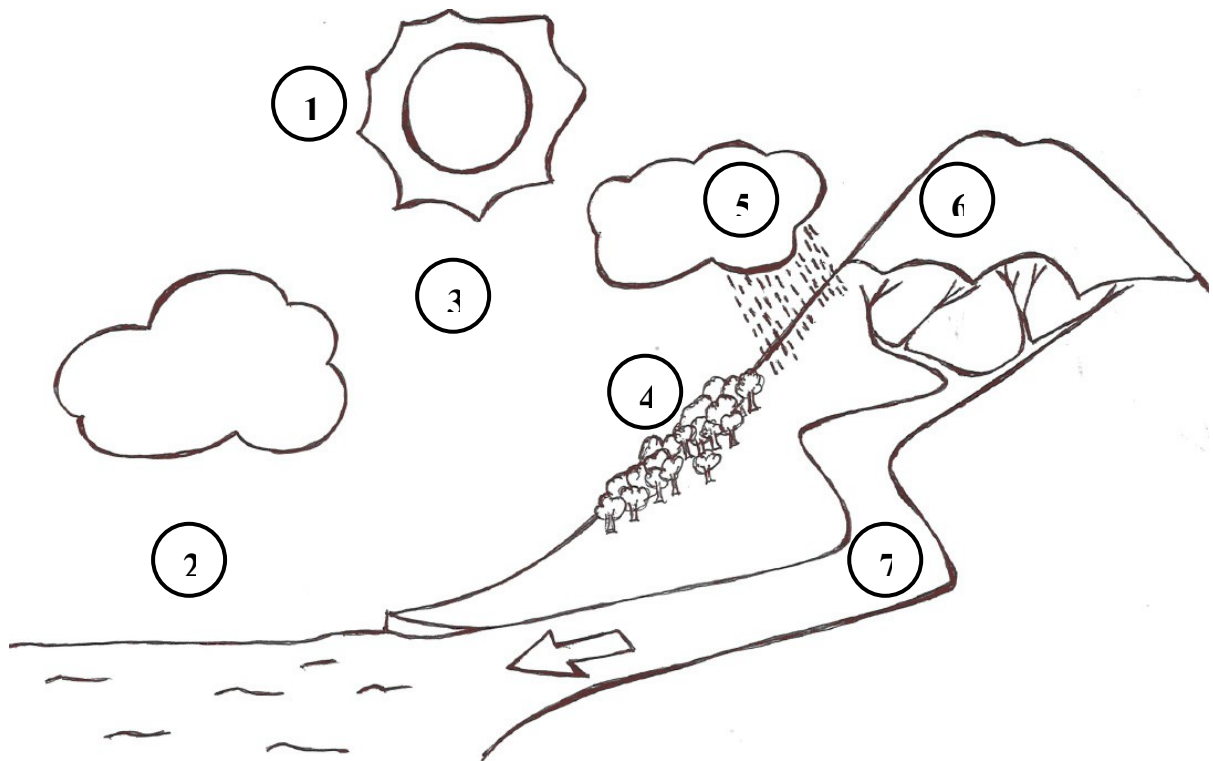
The water cycle is a vital part of daily life for most animals and plants, humans included. The cycle is a never ending process in which water changes between liquid, vapour and ice. This activity highlights the various stages of this cycle and the order in which they belong. This exercise can be done individually or in small groups and encourages open discussion about the children's personal experiences and recollections of seeing this cycle in action. As you go through the answers ask the children to read out the passages in order that they can picture the cycle in its entirety.

Water cycle answers:

1. D
2. B
3. E
4. C
5. G
6. A
7. F

Curriculum Links: Science (Ideas and Evidence in Science, Life Processes, Green Plants, Changing Materials, Breadth of Study)

Water Cycle – Worksheet



The water cycle is an important part of life on earth. Millions of people and creatures rely on it to bring them water every day. The diagram above has seven different stages to it. Match up each of these numbers with one of the following passages:

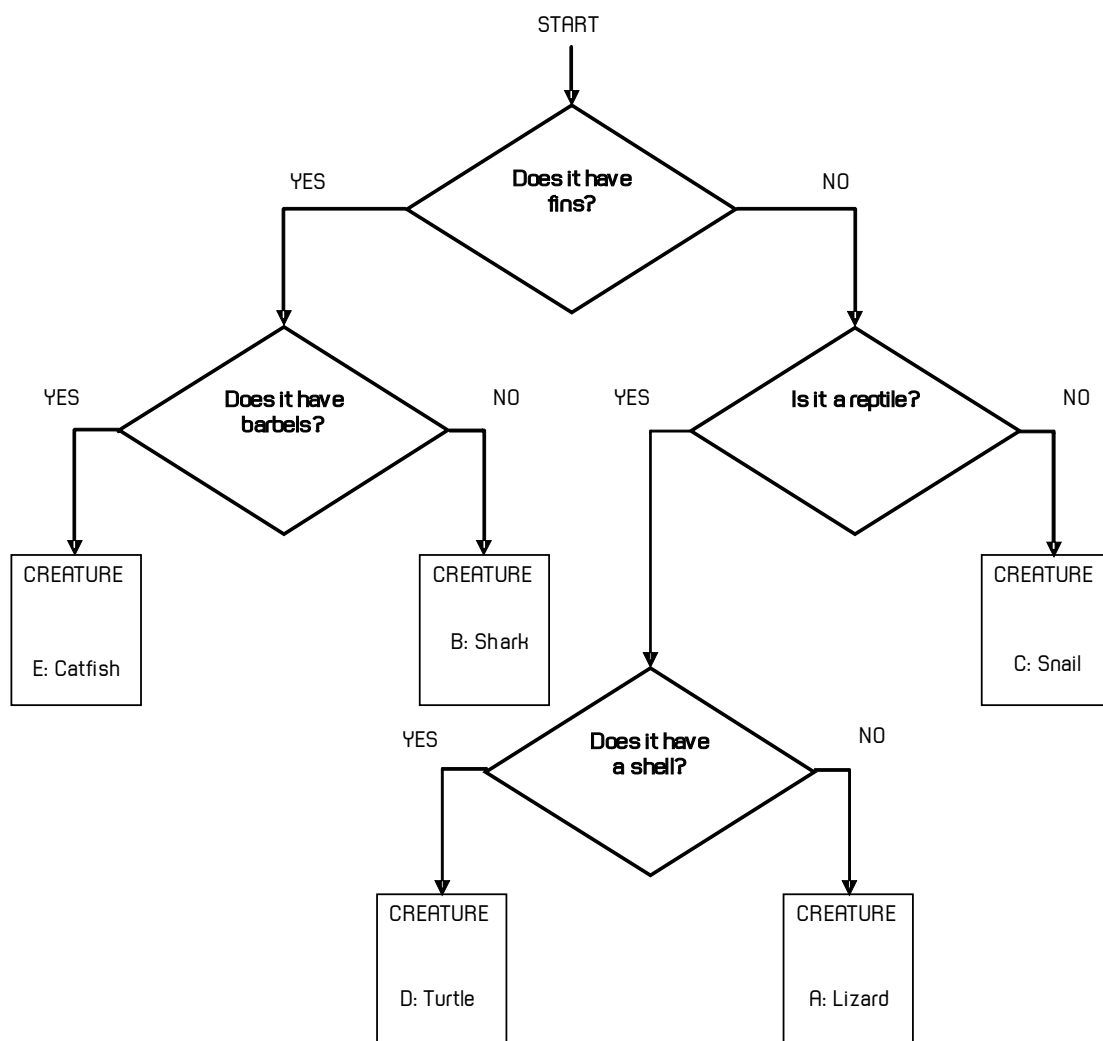
- A. Water can be stored in the form of ice and snow. This may only become a part of the water cycle on a seasonal time scale. Stage ___
- B. Water slowly evaporates from the oceans and lakes. The vapour droplets rise and start to cool down to create clouds. Stage ___
- C. Water held on or in trees can also evaporate and help form clouds. This process is called 'evapotranspiration'. Stage ___
- D. Every day the sun heats up the water in the world's oceans and lakes. Stage ___
- E. Winds blow the clouds around the oceans and lakes until they reach land. Stage ___
- F. The fallen water collects in river basins and drains into the rivers. These eventually lead back to oceans and lakes. Stage ___
- G. Once the clouds reach land they need to rise over hills and mountains. As they rise the water vapour cools and condenses to form rain or 'precipitation'. Stage ___



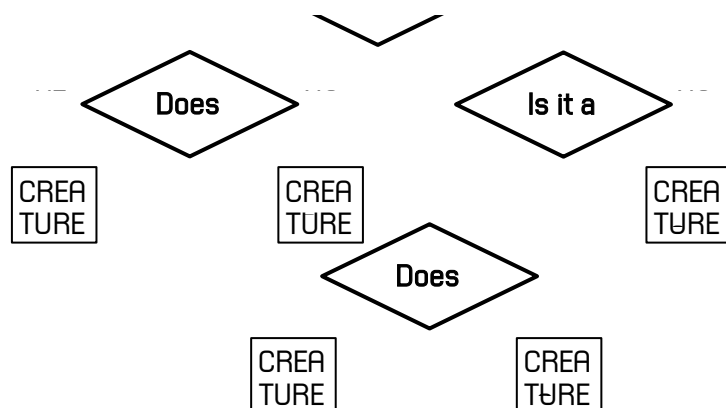
Using Keys

Learning how to use keys is an important tool in scientific identification. At any level of science you have to go through a series of questions in order to identify an unknown species. Being able to create keys also helps to understand and learn the process better. To help the children make their own key encourage them to choose species with distinguishable features.

ANSWERS



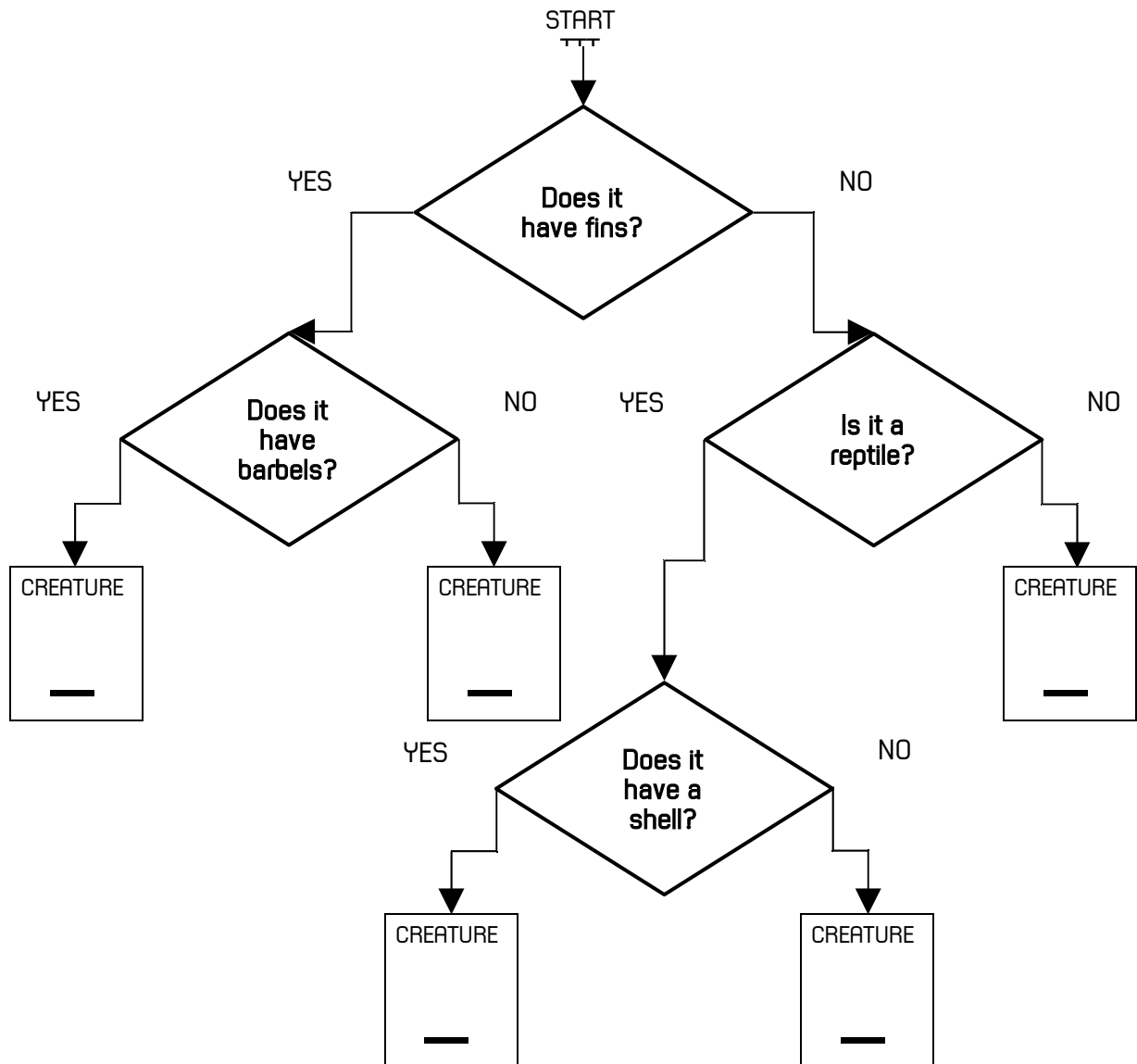
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Using Keys – Worksheet

Below is a key to help you identify 5 animals in the Oceanarium by answering a series of questions. The possible answers are pictured – write your answer in the spaces provided. After you've successfully done this, pick 5 creatures and make your own key.



A B C D E

