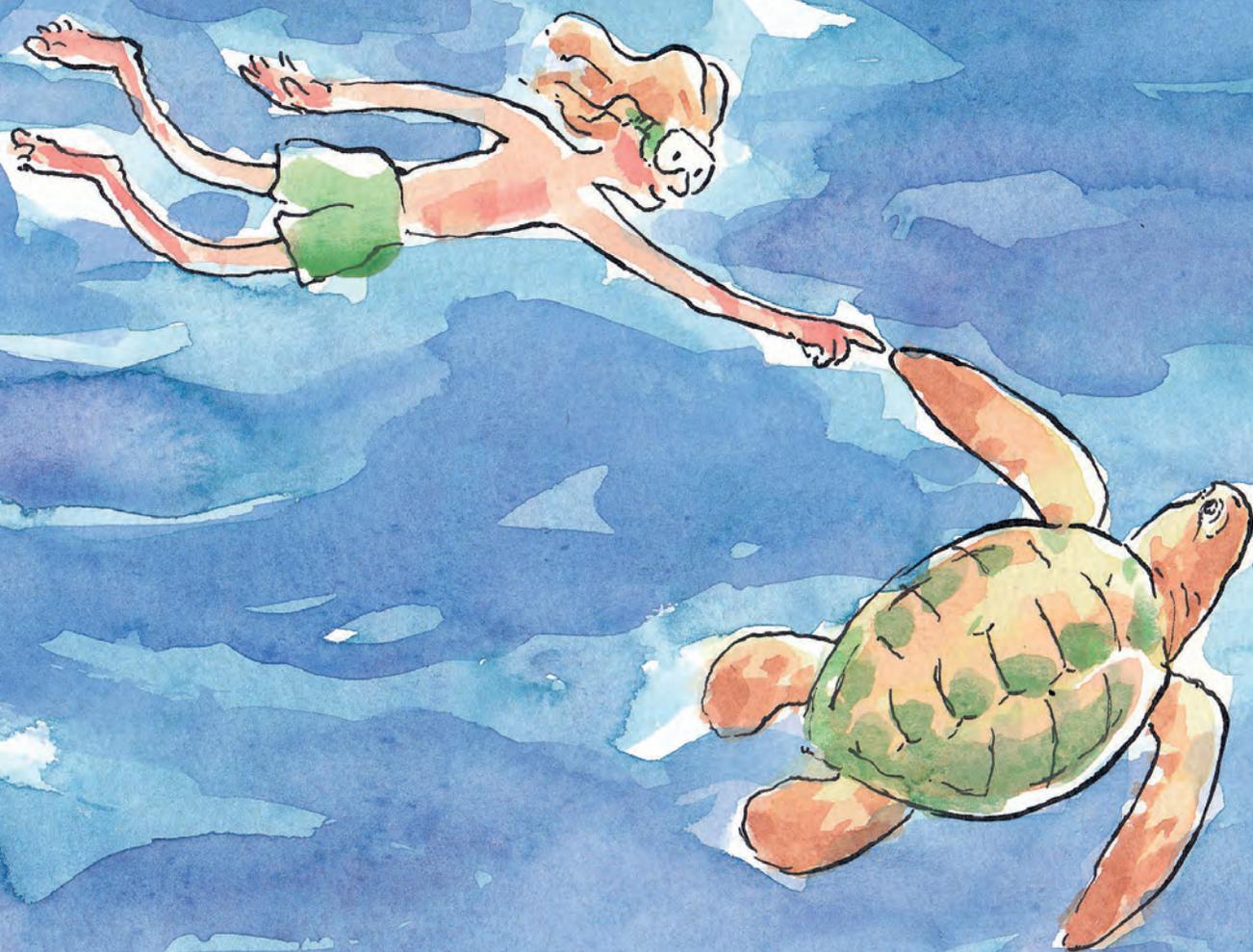


EDUCATIONAL PACK

Sea Turtles

TEXT - ILLUSTRATION: Vassilis Hatzirvassanis

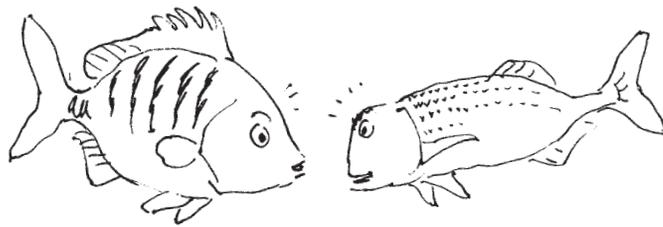
For
students



EDUCATIONAL PACK

Sea Turtles

For Students



www.archelon.gr



Produced by
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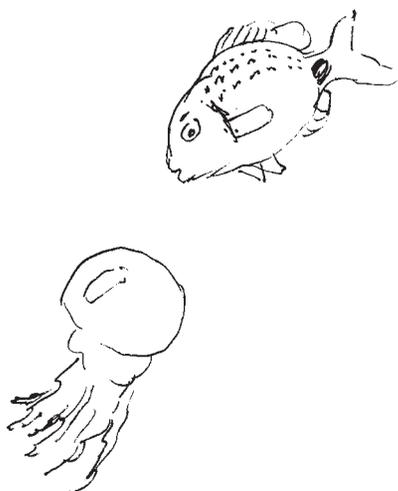
Special Thanks to:
Anna Kremezi-Margaritouli and Elias Pitsikas

This publication was made possible with the contribution of the LIFE financial instrument of the European Union (LIFE15 NAT/HR/000997 - LIFEEUROTURTLES). The contents do not necessarily represent the official opinions of the European Union.



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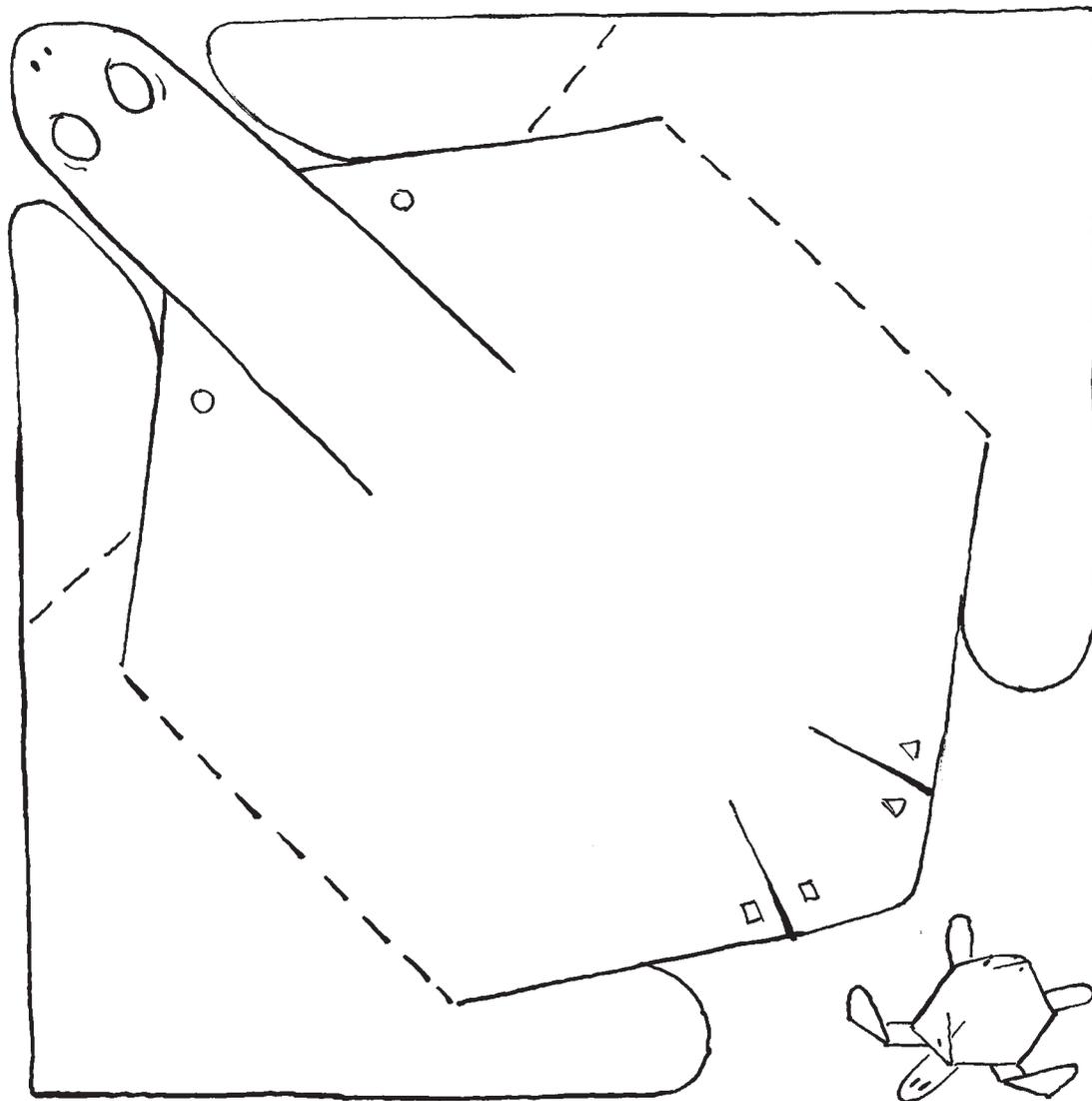
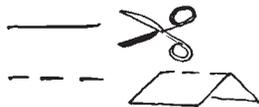
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ACTIVITIES
Primary Grades 1-3

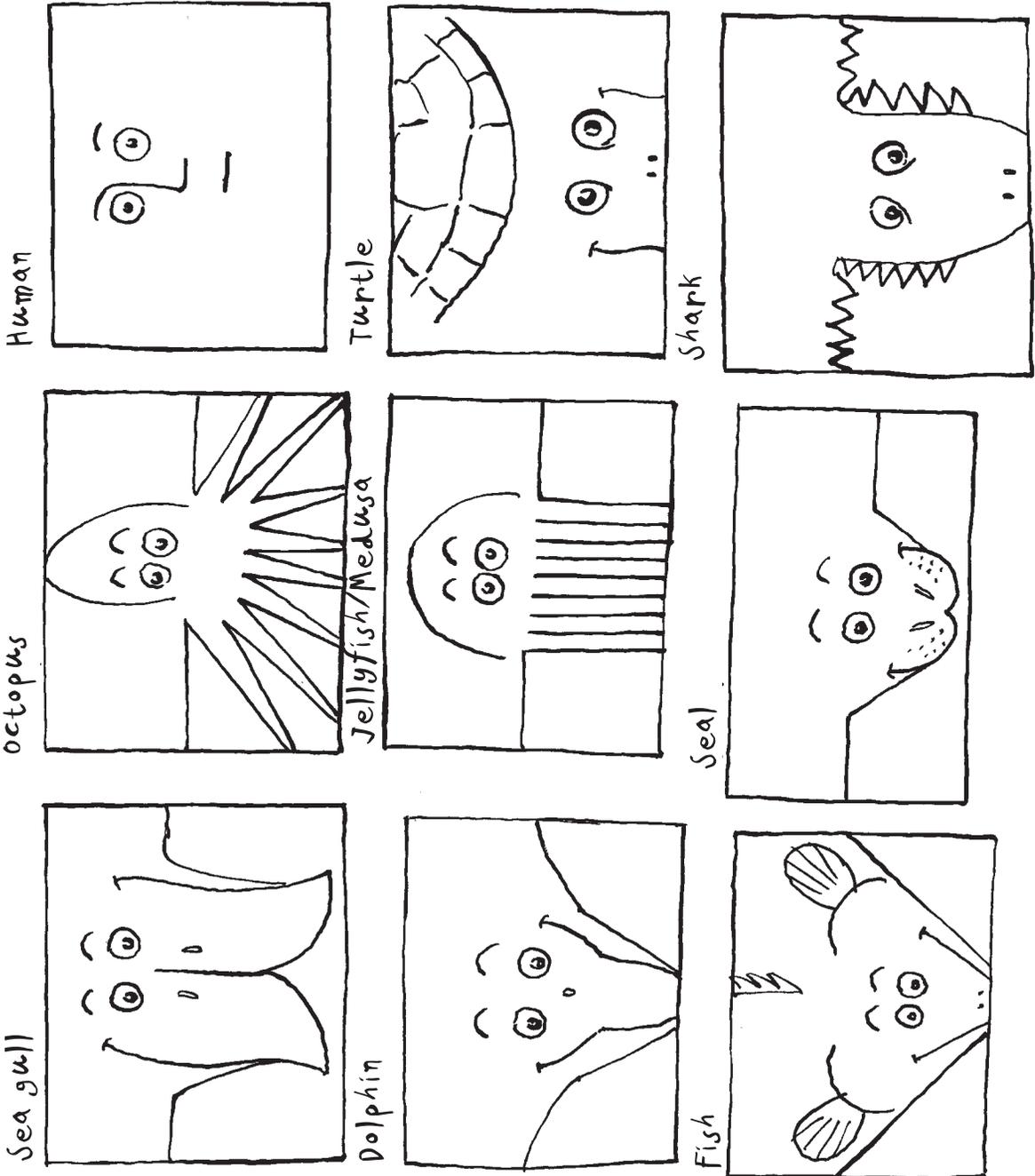
Worksheet

How big is a turtle?



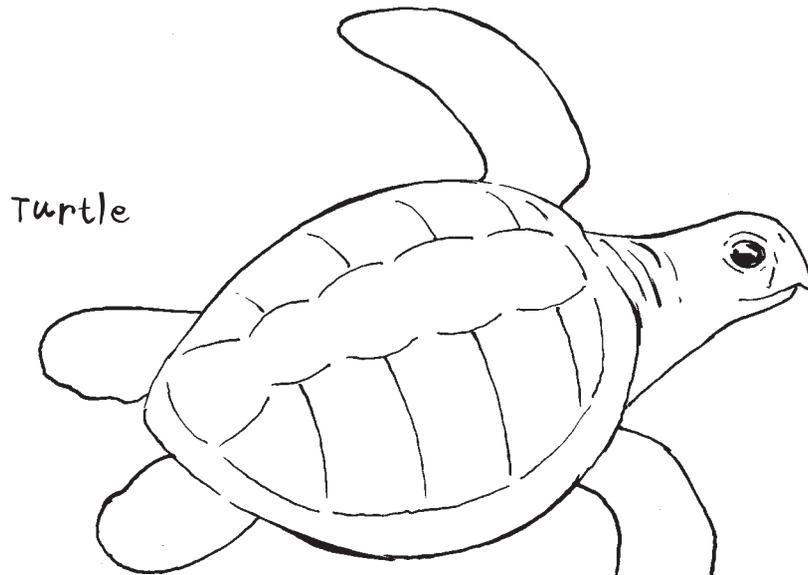
Worksheet

Finger-puppet stories



Worksheet

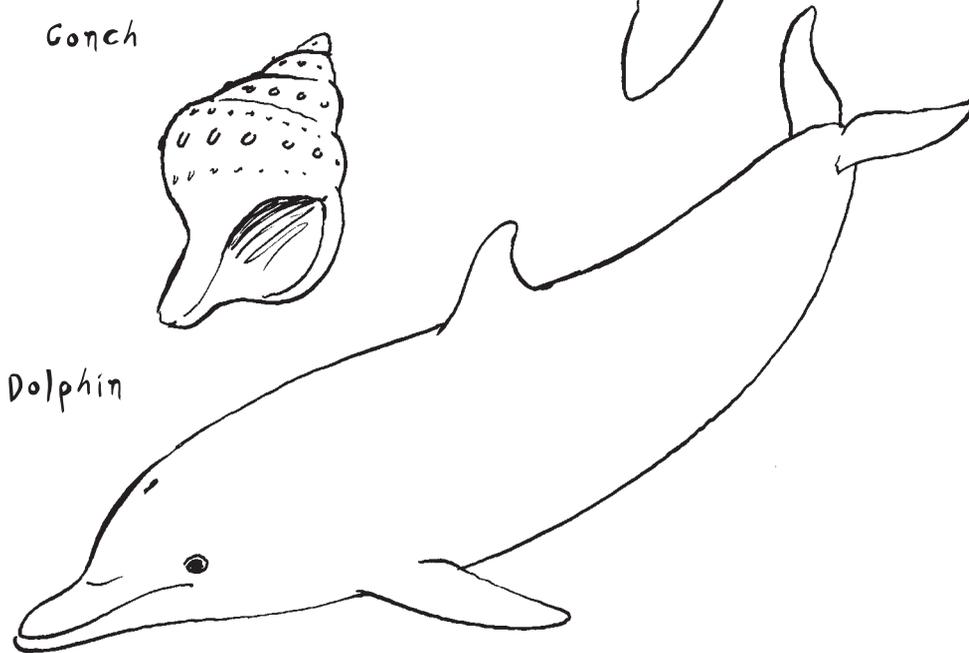
Make a mobile



Turtle



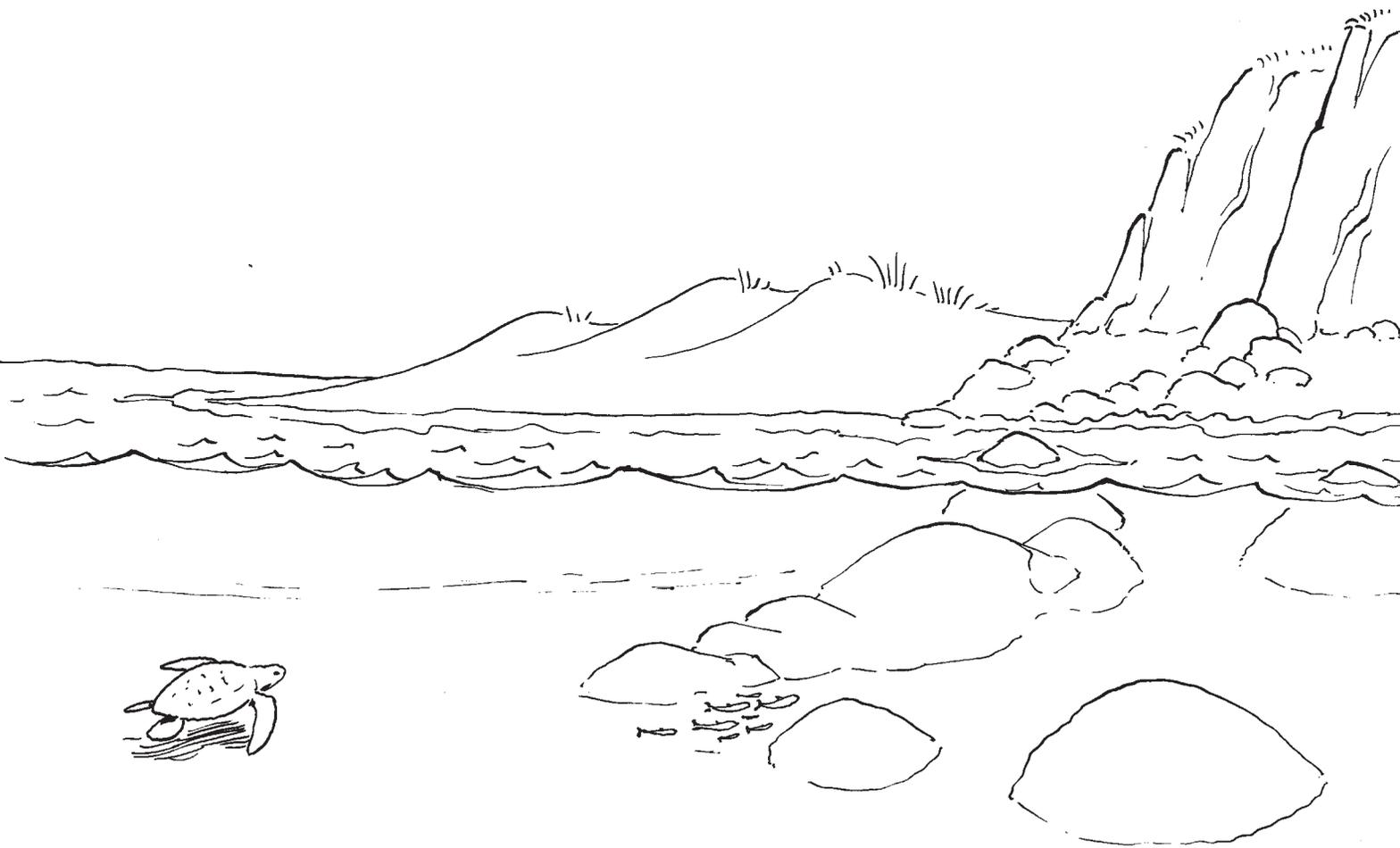
Conch



Dolphin

Worksheet

Which beach do I want?

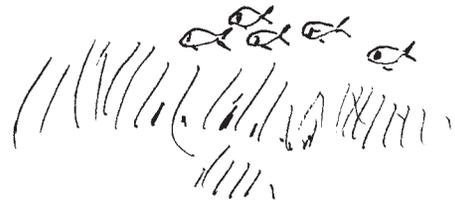


Worksheet

Looking for tomorrow's trash

Look in your bag, fridge, kitchen, and closets and find 10 items that will be thrown into the trash (e.g., leftover food, packages from food items, soap/cleaning products, paper, etc.). Note down each one and place a tick (✓) next to it in the column where it belongs.

Object to be thrown in the trash	Organic (e.g. paper, bones, plants)	Metal	Plastic
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
Total			

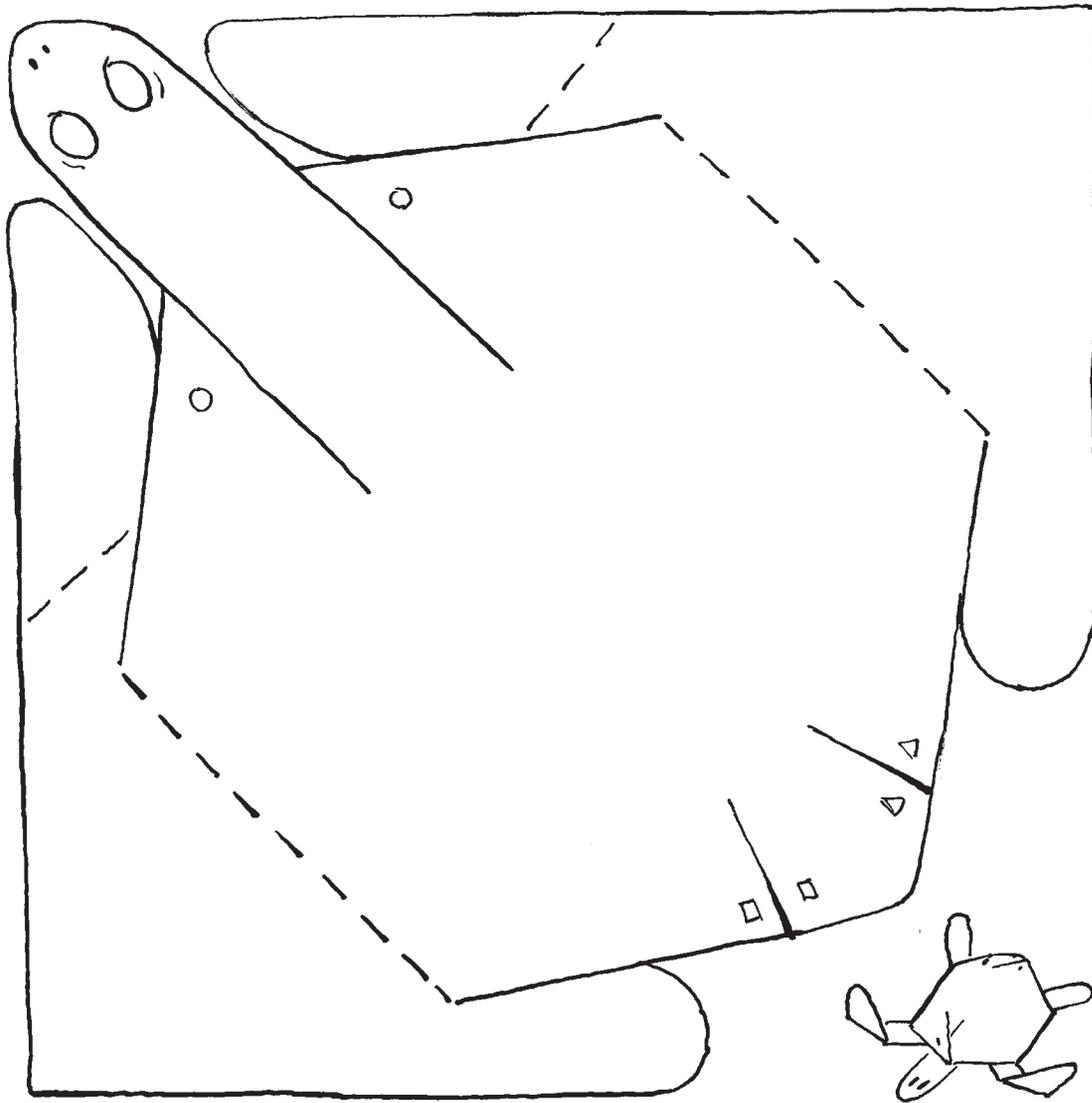
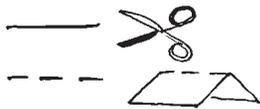


ACTIVITIES

Primary Grades 4-6

Worksheet

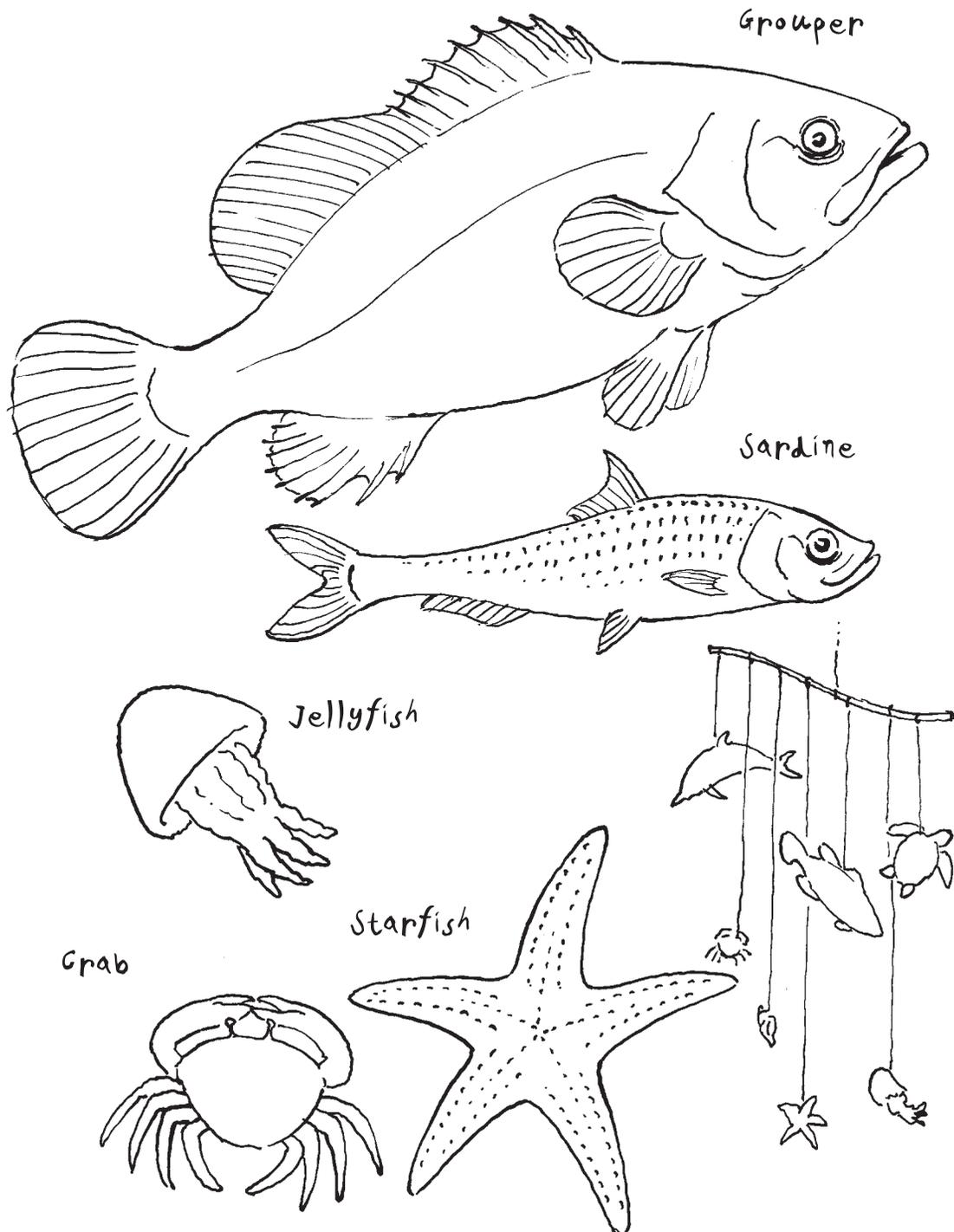
How big is a turtle?



Worksheet

Make a mobile

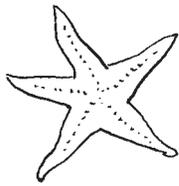
(Note: sizes not drawn to scale)



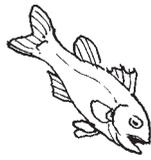
Worksheet A

Animals and Plants in Nature

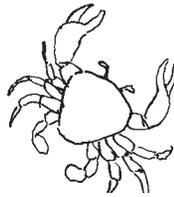
1 Which of the following creatures can you find in nature? Put a tick (✓) next to the image of each creature you saw.



Starfish



Fish



Crab



Sea urchin



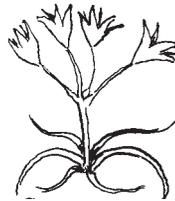
Seaweed



Mussel



Clam



Plant



Conch

2 Look for...

A feather	A seed	A coloured stone
Something alive	A bone	Something shiny
Something dead	Something red	Something thorny
Something flat	Something valuable	Something that smells bad
Something beautiful	Something reusable	Something humans have left
Something very old	Something half-eaten (not by you!)	Something that tells a story
Something useless in nature	Something important in nature	Something that reminds you of yourself

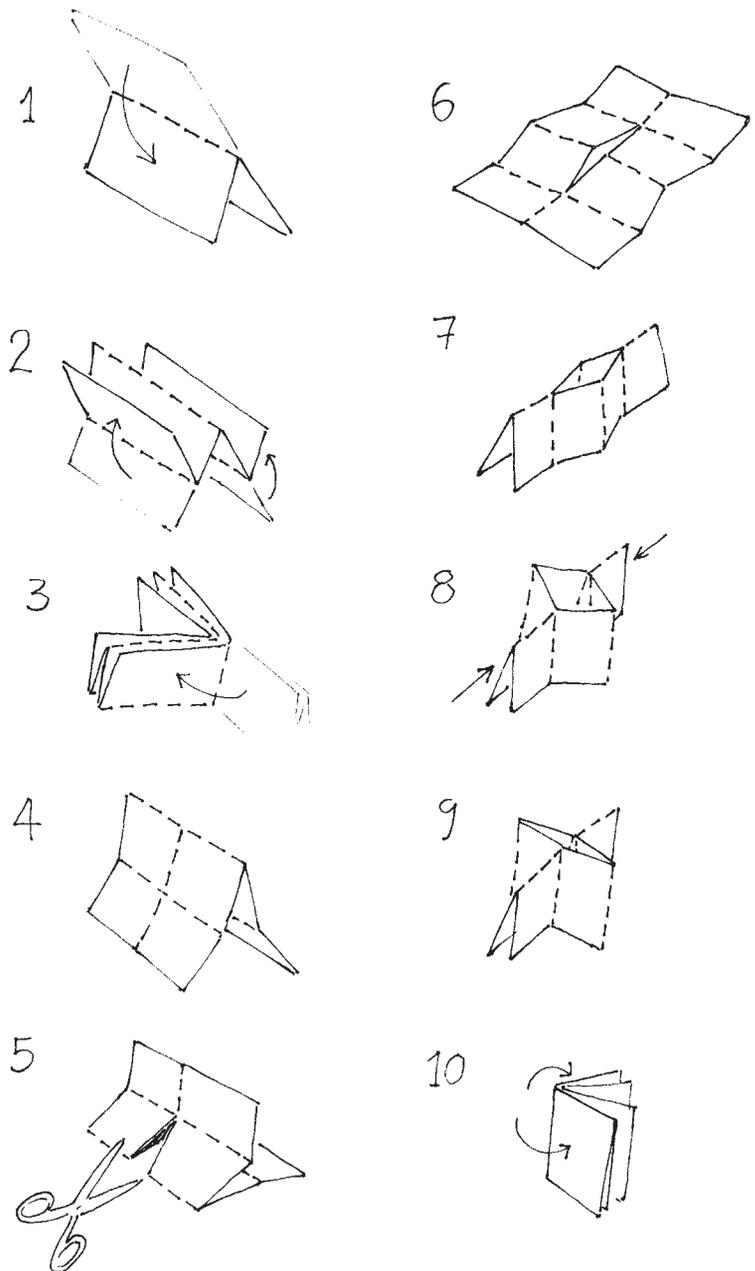
Note: Collect only things that you can put back in the same place without damaging them

Worksheet B

Explorer's Journal

Scientists always take notes of what they observe and then study their notes to draw conclusions. They always have small notebooks with them where they keep 'field notes', with text and drawings. In the times when there were no cameras, the sketches and drawings were critical for preserving scientific observations.

Make your own notebook by folding a large sheet of paper. In it, write notes or draw pictures about what you see that is important to you. Don't forget to make a note of the location and date.



Worksheet

Which beach do I want?



Worksheet

The right tool

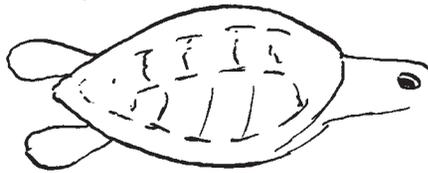
Introduction:

- Through the process of evolution, all animal species have adapted to best utilize what their environment has to offer.
- Depending on its habitat, an animal must be able to move either on the land, in the water, or in the air, to search for its food (and to be able to catch it if it tries to escape), to avoid its enemies, and to protect itself from weather conditions.
- Adaptation involves both physical and behavioural changes in an organism. Thus, a sea turtle has flippers (suitable for swimming) and lives in the sea (where it finds food), but gives birth on land (where sand warmed by the sun helps the baby turtles grow inside their eggs).
- An animal's mouth indicates the way it gets its food: Many small teeth are ideal for catching agile fish, while strong keratin beaks are better suited to catch prey which moves slowly. The limbs of an animal indicate whether it walks or swims.

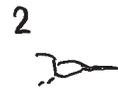
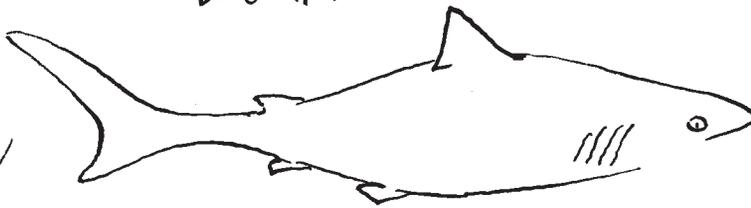
(continued on next page)

Match the correct mouth and limb to each of the animals. Colour the limbs that are used for swimming YELLOW, and others ORANGE.

A. Turtle



B. Shark



C. Dolphin



D. Cormorant



E. Water Boatman



Worksheet

Trapped in Trash

Introduction:

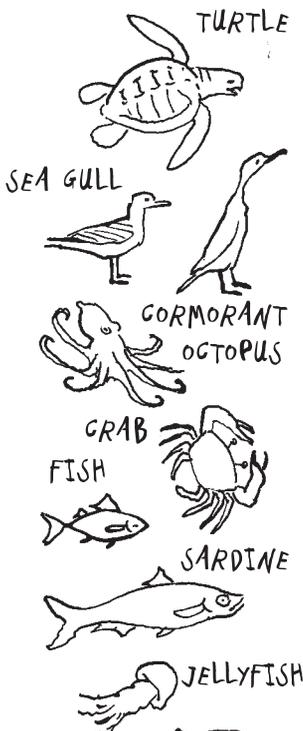
- Almost all solid waste that ends up in the sea comes from the land and has reached the sea by the action of wind and torrents.
- Solid waste is often dangerous to wildlife (e.g. batteries and old engines release toxic liquids and oils, plastic bags cause sea turtles that confuse them with jellyfish to suffocate, the ropes and fishing nets become wrapped around the animals' necks and limbs, and small animals can become trapped inside bottles and cans).



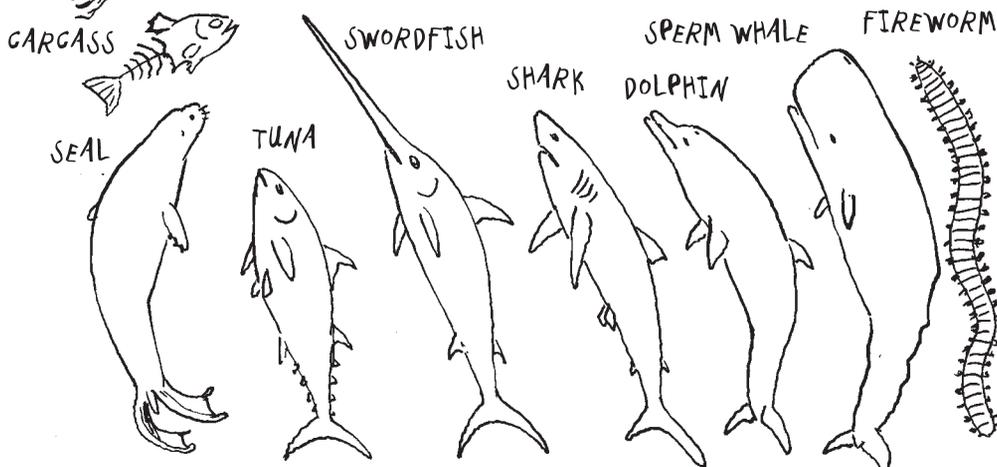
Worksheet

Animal Wordsearch

Learn about some of the animals that live in the sea and the other animals that they eat. The names of the predators are written both horizontally or vertically, and the names of the prey intersect with them. Note: Some prey is eaten by several animals, and so may be written several times.



F	A	S	S	W	O	R	D	F	I	S	H	D	F	G	O	H	J	K
I	L	Q	W	E	E	T	Y	I	Y	I	O	P	Z	A	C	R	A	B
S	E	A	G	U	L	L	A	S	X	C	V	B	N	M	T	A	S	D
H	F	G	H	J	K	L	J	H	M	N	O	P	Z	A	O	Q	F	G
A	S	P	J	K	N	M	E	I	A	E	Y	U	W	X	P	W	A	S
O	N	C	T	U	R	T	L	E	U	P	O	N	A	M	U	I	D	N
I	G	H	T	D	R	E	L	A	R	Y	W	H	I	L	S	E	A	L
P	T	O	N	D	E	R	Y	E	D	S	P	E	N	H	S	U	P	E
R	U	K	A	L	I	F	F	C	O	R	M	O	R	A	N	T	F	J
A	N	T	I	N	T	U	I	B	H	O	U	D	O	L	P	H	I	N
S	A	R	D	I	N	E	S	A	T	E	W	S	C	O	L	O	S	P
T	H	E	Q	U	I	C	H	K	B	R	O	C	W	N	C	A	H	T
J	U	M	P	E	D	O	V	E	R	T	H	A	E	L	A	Z	Y	C
F	I	T	S	O	Q	F	I	R	E	W	O	R	M	A	R	K	O	L
D	F	D	O	L	L	S	W	H	I	L	E	C	P	F	A	R	K	F
N	I	A	R	M	W	H	A	L	L	M	O	A	B	I	T	U	R	T
P	S	P	E	R	M	W	H	A	L	E	A	S	V	S	H	A	R	K
C	H	S	W	A	R	D	I	S	H	L	A	S	R	H	C	A	R	C

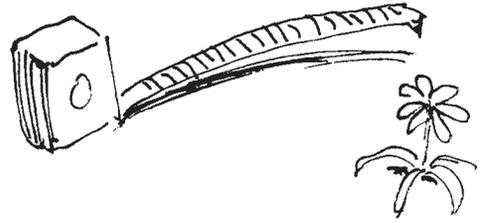


Worksheet

Card stories

- Make at least 30 cards of cardboard or paper.
- On each card, write a word related to the sea, such as the name of a plant, an animal, a landscape, an occupation, or fishing gear (see the suggestions below).
- If you like, draw or paste a picture of the item on each card. (You can find pictures in old magazines or the internet).
- Shuffle the cards and stack them into a deck.
- Make a story: In turns, take a card from the deck and create an episode to continue the story based on the card you have chosen.

The Sun	Waves	Fisherman	Minnow	Rain	Diving ducks
Fish	Sardine	Posidonia	Heavy seas	Nets	Octopus
Mullet	Duck	Hunger	Car	Fence	Cormorant
Heron	Trawler	Umbrella	Parking	Drought	Drinking water
Eel	Turtle	Hunter	Hut	Shipwreck	Pesticides
Frog	Landfill	Tourists	Gull	Crab	Plastic bag
Swordfish	Rain storm	Bulrush	Farmer	Trash	A heroic act
Nest	Monument	Holidays	Money	Seashell	Illegal act
Dolphin	Fire	Shark	Sewage	River	Drainage
Tuna	Road	Sandy beach	Student	Boat	Long line
Tortoise	Rubble dump	Food	Sewer	Fishing boat	River Turtle
Insect	Pine	Flood	Roots	Irrigation	Industry
Jellyfish	Dolphin	Reeds	Rat	House	Protection
Kingfisher	Rock	Ship	Glossy Ibis	Danger	Prohibition



ACTIVITIES

Gymnasium grades 1-3

Worksheet A

Everything is connected

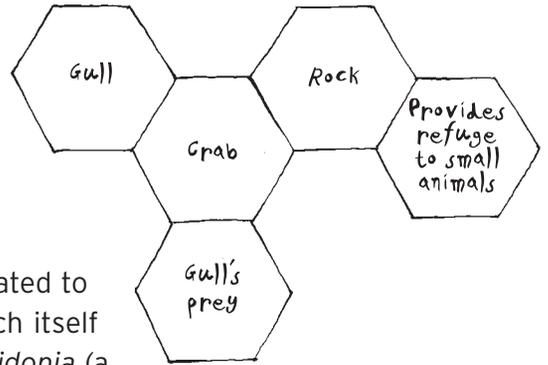
Introduction:

In the sea, every living organism affects all those around it and is in turn affected by them. One species can eat another, can 'steal' its food or its nesting place, become a parasite on it, etc.

Abiotic habitat elements (soil, water, air) are also related to the living organisms in it. A limpet needs rocks to attach itself onto, and waves that will bring food (plankton) to it. *Posidonia* (a marine plant of the Mediterranean) cannot grow at depths where sunlight does not reach.

In any one ecosystem, we can find thousands of different kinds of relationships, and we can group them into a few categories:

- organism - organism (e.g., predation, parasitism, competition, cooperation, symbiosis/co-existence)
- organism - abiotic element (e.g. nutrient intake, toxic effect, enrichment of the area with nutrients)
- abiotic element - abiotic element (e.g., erosion caused by water or wind)



Can you think of any animals, plants or inorganic elements (e.g., rocks) that exist in the sea and they are related to each other in any way? Write or draw some of these relationships in the table below.

At sea, the...	affects the...	because it offers...

Worksheet A



Looking for trash

- In the past, rubbish consisted only of organic materials (such as food waste, vegetable and animal waste, ceramics, and wood). Sunlight and microorganisms (e.g. fungi, bacteria, etc.) decompose most organic materials in a few months or years.
- Since 1950, rubbish has been comprised of many synthetic substances (e.g. plastic, nylon, PVC, synthetic resins and fibres, etc.) and forms of metal which do not rust (e.g., aluminium and stainless steel). These materials are extremely resistant to decomposition by microorganisms or sunlight and can last for many years or even centuries in the environment. The sun and the waves break down the plastic into tiny pieces ('microplastics'), which can 'survive' for hundreds of years. But even the rubbish that decomposes in a few weeks or months - like paper - is much more abundant today than it used to be.
- Most rubbish is disposed of in landfills or dumps, but much is left illegally in isolated places, or thrown into streams or the sea. The wind and floods carry it from land to the nearest river, and from there to the sea.
- The sea would be much cleaner if we recycled some rubbish and - more importantly - if we reduced the amount by changing our daily habits. For example, using glass instead of plastic bottles and containers, shopping bags made of fabrics instead of nylon bags, paper instead of plastic packaging, economical rather than individually packaged items, etc.)

When shopping, I choose a product (✓) because:

	It has attractive packaging.		It has recyclable packaging.
	It comes from exotic countries.		It's made in this country.
	It's rare because it's not seasonal.		It's in season.
	My friends have it, too.		I need it for my work.
	It is in many small packages.		It's in an economical package.
	It's cheap (per package).		It's cheap (per kilogram of product).

If you ticked more options in the right column, you're on the right track!

(continued on next page)

Worksheet

Identifying the beach zones

Introduction:

- On a sandy beach, the wind carries grains of sand from the edge of the sea to the land. The sand grains bounce and form higher and higher dunes ('sand hills'), until they are trapped in the roots and branches of plants. Plants can take root anywhere, except for the edge of the sea, where there is a lot of salt and the ground surface is unstable.
- Between the coast and the interior of the land, vegetation forms different zones. Behind the edge of the sea zone which has no plants, there is a zone with 'pioneer' species (i.e., sparse grasses which are the first vegetation to take root in the bare sand, followed by a zone of sparse shrubs or trees, and finally (but not always), a forest zone.
- Over time, the vegetation on the dunes becomes more dense and prevents sand grains and drops of sea water to pass. In this way, the dunes with vegetation protect the interior from the sand and salt, and also from the erosive waves.

Worksheet A

Search for information (in books and on the internet) about the following plants, as well as any other plant you know that grows on the beaches of Greece (use the scientific name for best results online). With the information and images you find, make your own brief plant identification guide.

Sea Lily (<i>Pancratium maritimum</i>)	Pine (<i>Pinus halepensis</i> , <i>Pinus brutia</i>)
Sea Spurge (<i>Euphorbia paralias</i>)	Stone Pine (<i>Pinus pinea</i>)
Judas Tree (<i>Cercis siliquastrum</i>)	Kermes Oak (<i>Quercus coccifera</i>)
Wild Asparagus (<i>Asparagus angustifolius</i>)	Mastic Tree (<i>Pistacia lentiscus</i>)
Almond-leaved Pear (<i>Pyrus amygdaliformis</i>)	Asphodel (<i>Asphodelus</i> sp.)
Butcher's-Broom (<i>Ruscus aculeatus</i>)	Pink Rock Rose (<i>Cistus</i> sp.)
Mediterranean Smilax (<i>Smilax aspera</i>)	Myrtle (<i>Myrtus communis</i>)
Giant Reed (<i>Arundo donax</i>)	Rushes (<i>Juncus</i> sp., <i>Carex</i> sp.)
Wild Reed (<i>Phragmites australis</i>)	Brambles (<i>Rubus</i> sp.)
Sea Holly (<i>Eryngium maritimum</i>)	Narrowleaf Cattail (<i>Typha angustifolia</i>)
Sea Lavender (<i>Otanthus maritimus</i>)	Juniper (<i>Juniperus</i> sp.)

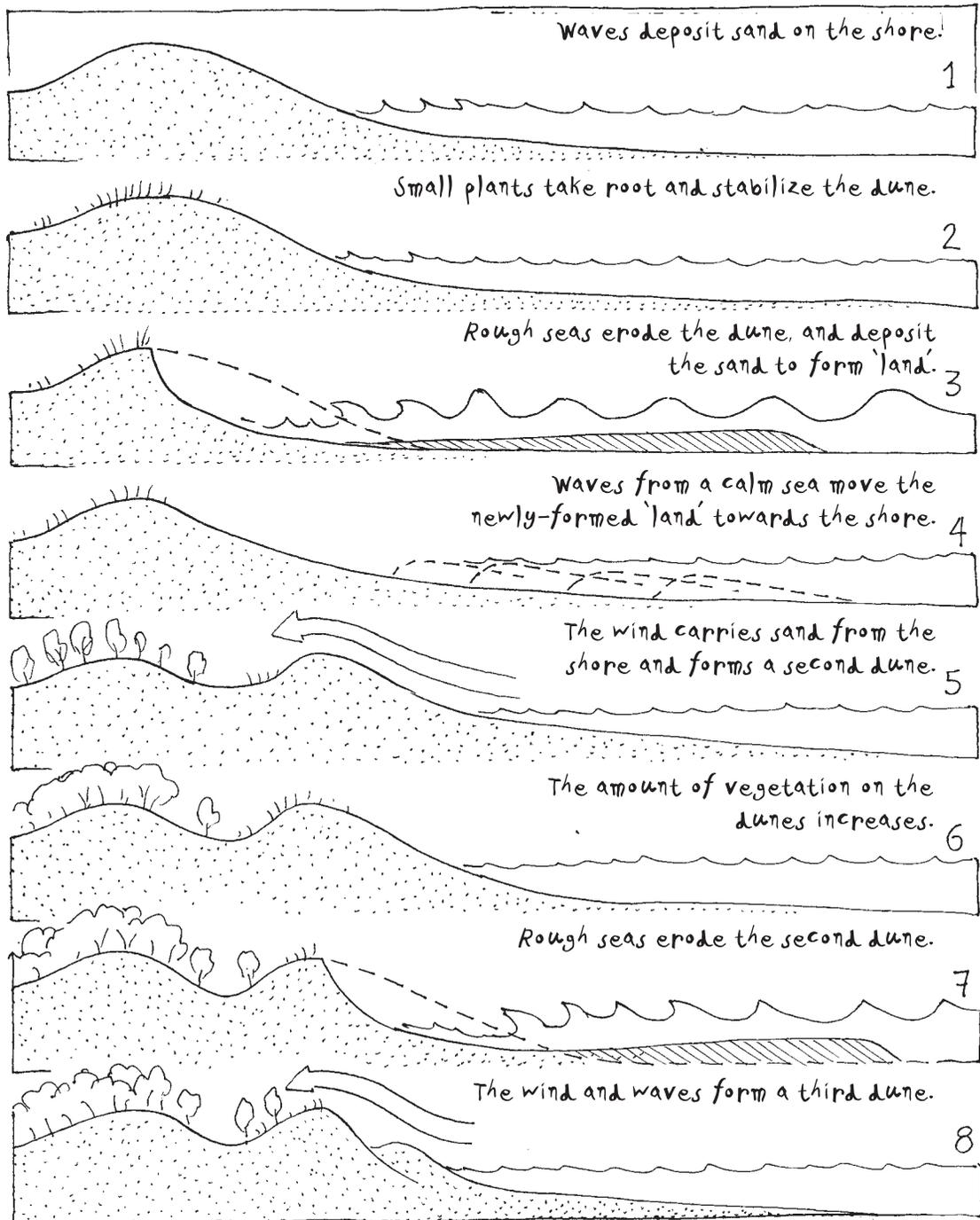
Worksheet A
(Alternative activity)

Name each plant you see on the beach with a letter of the alphabet and mark/design a feature that helps you identify it. (Photograph it for future reference.)

A	J	S
B	K	T
C	L	U
D	M	V
E	N	W
F	O	X
G	P	Y
H	Q	Z
I	R	

Worksheet B

Stages in the development of dunes



Worksheet C

Location of sampling route

Date: Group:

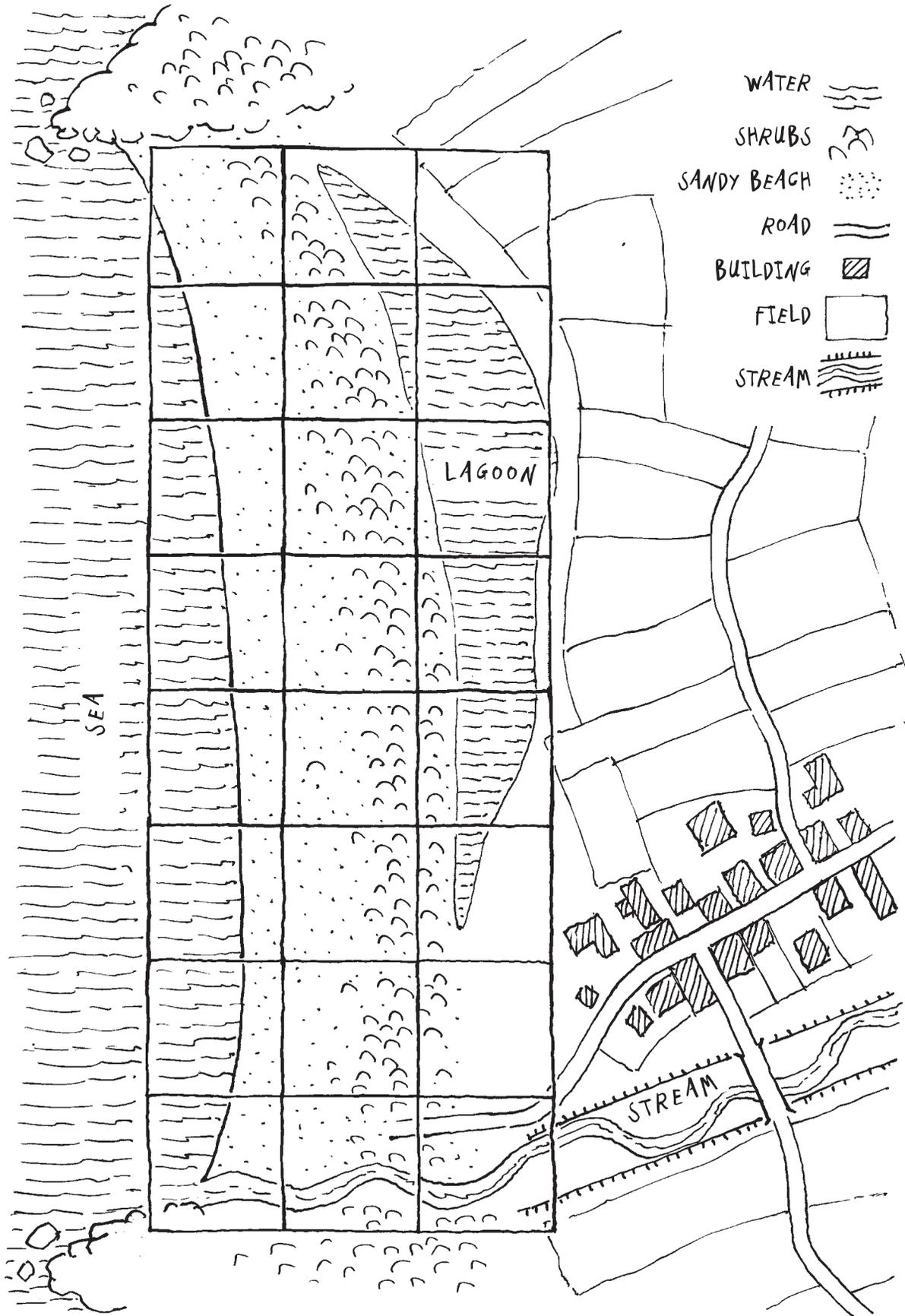
Metres from the sea	0	30	60	90	120	150
Weather						
Ground temp.						
Shaded ground %						
Wind (strong, medium, light, none)						
Wind direction (source)						
Bare sand %						
Grass %						
Shrubs %						
Trees %						
Main species						
Secondary species						

Worksheet A

How would I manage a beach? (role-playing activity)

- The beach attracts many visitors from the nearby town, and there is a serious parking problem at the end of the road to the beach. Cars block the way of farmers, compress the soil surface, and often get stuck in the sand.
- The City Council has decided to build a parking lot and a canteen near the beach.
- Although the Council makes decisions on projects, it takes the opinions of the residents into account.
- The Council can only undertake projects on the land belonging to it (i.e., the large rectangle on the map, measuring 300 x 800 metres). The proposed projects require a total area of 100 x 100 meters (i.e., the size of one of the small squares on the map). The projects can be done together or separately.
- Within the municipal area, there are: A dune beach sparsely covered by shrubs, a small lagoon (which in the winter is flooded by rains, but is almost dry in summer), a small river estuary (which is limited by flood defence mounds near the village).
- There is only one access road, marked on the relevant map.
- The lagoon beach is the only natural spot in an agricultural area.
- Occasionally, a small number of sea turtles give birth on the beach.
- The land next to the roads is expensive and in great demand for construction projects.
- The fields are valuable to the residents, who earn their living by agriculture.

(continued on the next page)



Worksheet B

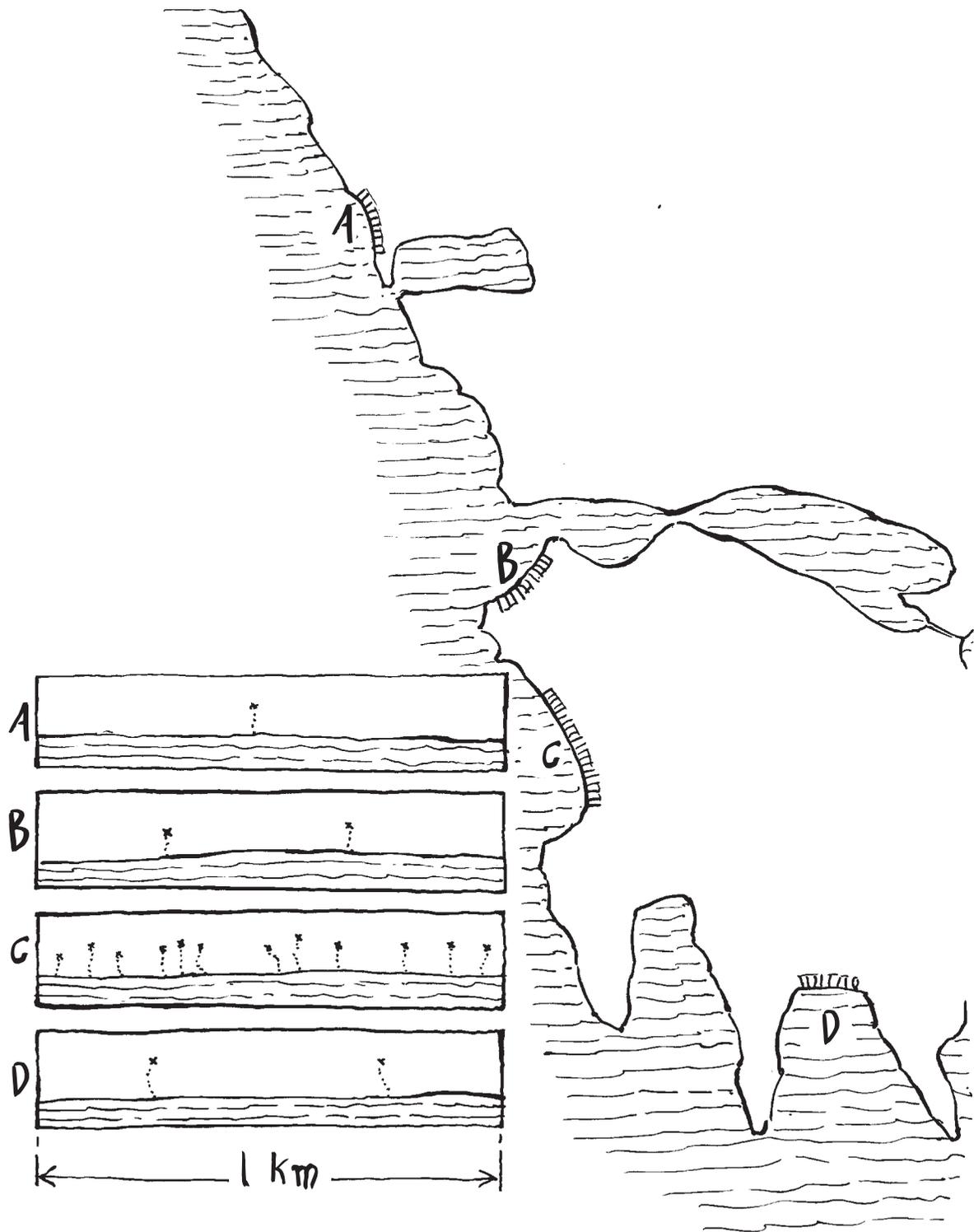
How would I manage a beach?

- With a drone (UAV / unmanned aerial camera equipped with a camcorder) you researched 1km sampling plots on four beaches:

Beach	Length	Nests per 1 km	Total nests on beach
A	Preveza	30 km	
B	Kotychi	25 km	
C	Kyparissia Bay	45 km	
D	Lakonikos Bay	16 km	

- Along each route measure the turtle nests (distinguished by the turtle traces that connect each nest to the sea).
- Calculate the total number of nests on each beach by extrapolating from the number of nests in the sampling area to the total length of the beach. The number of nests shows how important each beach is to sea turtles.
- Imagine you live close to one of these beaches. If you had to protect sea turtles and nesting beaches, how many and which beaches would you choose to protect? Would you also choose your neighbouring beach? Why?

(continued on the next page)



Worksheet

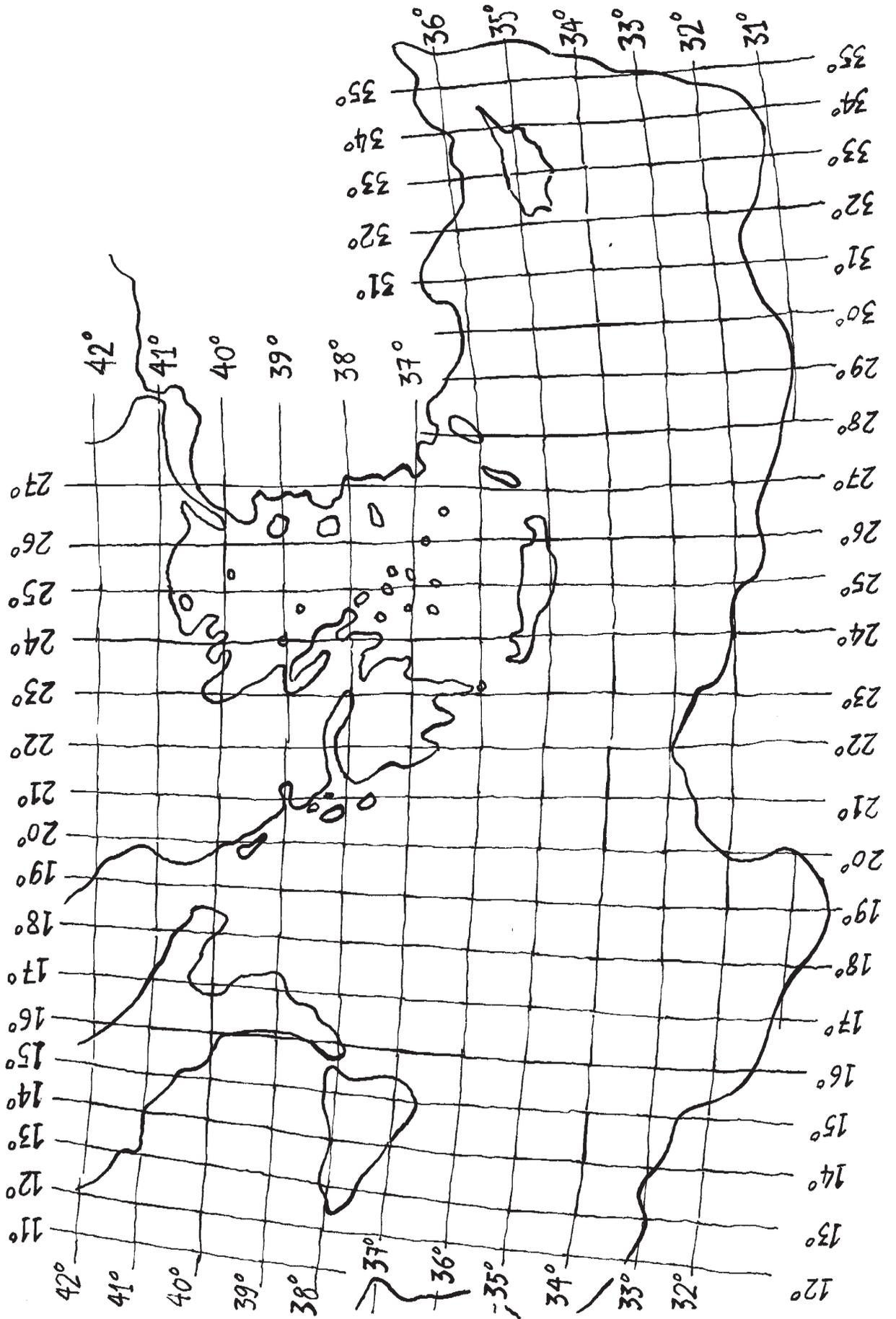
Tracking a sea turtle

In recent decades, scientists have attached small transmitters onto the carapaces of many sea turtles. Every few hours, the transmitter sends the turtle's location to a satellite in the form of geographical coordinates (e.g., 36.80 N, 20.50 E).

Choose one of the five turtles in the table and mark the points along its route on the map of the Mediterranean (the coordinates are given in decimal degrees).

(continued on the next page)

Point	Turtle A		Turtle B		Turtle C		Turtle D		Turtle E	
	North	East								
1.	38,9	21,0	37,8	23,7	35,2	33,9	37,3	21,6	37,7	20,9
2.	38,9	20,9	37,6	23,8	34,9	34,4	37,2	21,4	37,6	20,9
3.	38,9	20,8	37,5	23,7	34,4	34,3	37,4	21,1	37,4	20,5
4.	38,9	20,7	37,5	23,5	33,2	34,8	37,5	20,6	36,8	20,5
5.	38,8	20,7	37,3	23,5	32,0	34,3	37,8	20,4	35,8	18,2
6.	38,8	20,4	37,0	23,1	33,4	32,2	38,2	19,6	34,8	16,0
7.	38,4	19,9	36,8	23,1	31,9	30,8	38,8	19,7	34,4	15,6
8.	36,7	20,3	36,5	23,2	32,1	28,3	39,3	19,6	34,4	14,5
9.	36,4	20,2	36,2	23,2	32,7	24,0	39,5	19,5	34,2	14,2
10.	35,8	22,5	35,8	23,4	32,9	22,2	39,7	19,3	33,6	13,1
11.	34,7	23,5	35,6	23,3	32,9	21,7	40,4	19,2	33,1	11,9
12.	34,1	25,8	35,3	23,2	32,9	20,2	40,7	19,1	33,4	11,3
13.	33,5	30,5	34,8	22,3	31,1	17,6	40,8	19,0	33,7	11,1
14.	33,9	31,1	34,4	21,8	31,3	16,9	40,8	18,5	34,2	11,1
15.	33,7	34,0	33,7	21,8	33,1	14,6	40,9	17,7	37,7	11,6
16.	35,2	35,6	32,9	22,7	33,2	14,0	41,3	17,3	35,5	11,2
17.	36,0	35,7	32,6	23,6	33,0	13,2	41,3	16,7	35,8	10,9
18.	36,5	35,0	32,3	23,7	33,0	12,6	41,4	16,4	36,0	10,6
19.	35,7	32,9	32,1	24,5	33,0	12,3	41,5	16,2	36,4	10,8
20.	36,2	30,7	32,1	25,2	33,2	11,8	41,7	16,1	36,6	10,9





Visit

LIFE EUROTURTLES Program (in English):

<http://www.euroturtles.eu/>

EuroTurtle (information and training activities for
Mediterranean sea turtles, in English):

<http://euroturtle.org/>

ARCHELON The Sea Turtle Protection Society of Greece:

<http://www.archelon.gr/>

NOAAFISHERIES (information about turtles in the world, in
English):

<http://www.nmfs.noaa.gov/pr/species/turtles/loggerhead.html>

Read

Katharine M. Butterworth, *Turtle Facts*, 3rd edition,
2004, ARCHELON The Sea Turtle Protection Society
of Greece, available at: [https://www.archelon.gr/files/
publications/Turtle_Facts.pdf](https://www.archelon.gr/files/publications/Turtle_Facts.pdf)

Kremezi-Margaritouli Anna, *Caretta*, 1997, Erevnites
Publications-ARCHELON The Sea Turtle Protection
Society of Greece

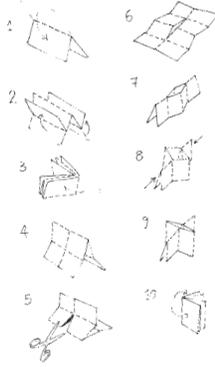
ARCHELON The Sea Turtle Protection Society of Greece,
Sea Turtles, 2014

Worksheet B

Explorer's Journal

Scientists always take notes of what they observe and then study their notes to draw conclusions. They always have small notebooks with them where they keep drawings. In the times when there were no cameras, the sketches and drawings were critical for preserving scientific observations.

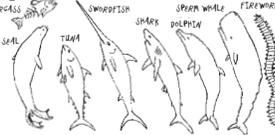
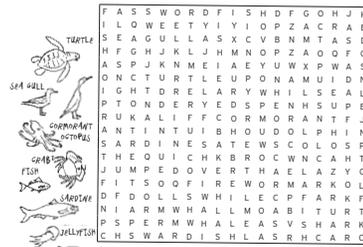
Make your own notebook by folding a large sheet of paper. In it, write notes or draw pictures about what you see that is important to you. Don't forget to make a note of the location and date.



Worksheet

Animal Wordsearch

Learn about some of the animals that live in the sea and the other animals that they eat. The names of the predators are written both horizontally or vertically, and the names of the prey intersect with them. Note: Some prey is eaten by several animals, and so may be written several times.



Worksheet A

Animals and Plants in Nature

1 Which of the following creatures can you find in nature? Put a tick (✓) next to the image of each creature you saw.



2 Look for...

A feather	A seed	A coloured stone
Something alive	A bone	Something shiny
Something dead	Something red	Something thorny
Something flat	Something valuable	Something that smells bad
Something beautiful	Something reusable	Something humans have left
Something very old	Something half-eaten (not by you)	Something that tells a story
Something useless in nature	Something important in nature	Something that reminds you of yourself!

Note: Collect only things that you can put back in the same place without damaging them.



Worksheet B

Stages in the development of dunes

