

Table of Contents

Contents

Acknowledgements	
Table of Contents	vii
Chapter 1: The Book	1
Subtitle of the book	
Most organisms are small	
The community of scientists	
Adobe® Photoshop® used here	
Units of measurement	
This book is not	
Nothing is completely new	
Comments and suggestions	
Chapter 2: The Dock	3
The natural shore	
The Dock is special	
Clean can be dull	
Chapter 3: The Water	7
Salt in the water	
Oxygen in the water	
The ocean is actually a soup	
The water changes twice a day	
The water itself	
A good place to live	
Chapter 4: Classification of Species	13
What is a species?	
Names for species	
Classification of organisms	
How is life classified?	
Chapter 5: Plants on the Dock	15
Marine plants	
Diatoms on the Dock	
Diatoms in the water	
Dinoflagellates	
Chlorophyll	
Chapter 6: Large Animals	21
Mussels carry a world on their back	
Sponge (phylum Porifera)	
Sea Anemone (phylum Cnidaria)	

Mussel (phylum Mollusca)
Limpet (also phylum Mollusca)
Keyhole Limpet
Skeleton shrimp: phylum Arthropoda, class Crustacea, family Caprellidae
Barnacles (class Crustacea)
Fish (phylum Craniata)

Chapter 7: Small Animals 41

Colonial organisms
Another mussel
Branched Bryozoan colonies
Flat Bryozoan colonies
Phylum Rotifera
Ostracods
Where are the other small animals?

Chapter 8: The Very Small 49

Very small organisms are missing
The very small are difficult to see
The very small are not photogenic
The very small world is granular
Why the very small are important
Language of the very small is chemistry
Respect for the very small is growing

Chapter 9: *Ciona*, a model on the Dock 53

A model for scientists
Relation to other animals
Anatomy of *Ciona*
Filter feeding
Blood
Reproduction

Chapter 10: Relatives of the Model 67

Colonial ascidians
Complete reproductive cycle
Takeover, apoptosis, and death
Botryllus, a close relative
Other Ascidians on the Dock
Pelagic tunicates

Chapter 11: Animals Hiding on the Dock 79

Flat worms: Platyhelminthes
Hair worms: Nematodes
Segmented worms: Annelids
Scale worms
Amphipods

Chapter 12: Life Near the Dock	86
The harbor seal, phylum Craniata	
Jellyfish, phylum Cnidaria	
Comb jellies, phylum Ctenophora	
Small plankton caught in a net	
Copepods	
Chapter 13: Attaching to the Dock	100
Five stages of colonization	
Inside a burrow	
Your slide may be different	
Biofouling: unwanted colonization	
Chapter 14: Food and Space at the Dock	111
The food chain	
Individual versus total mass	
The food chain is really a web	
Some large animals eat very small organisms	
Some small animals eat larger organisms	
Food spirals	
Cannibalism	
The important parameter is flux	
Life in the ocean is often boom and bust	
Are diatoms and dinoflagellates at the bottom of the food chain?	
The simple food chain is still a useful summary	
Tropic layers are also linked by CO ₂ and O ₂	
The space organisms occupy	
Ecology	
The ecological niche	
The take home lesson	
Chapter 15: The Family	125
Kingdoms missing from the book	
Kingdoms in the book	
Classification of life	
Classification of life by evolution	
The DNA revolution	
DNA to life: 1 to 3 dimensions	
DNA mutations (changes)	
Many types of RNA	
Epigenetics	
Classification by DNA sequence	
Biology is history	
DNA sequences split a Kingdom	
Results of DNA classification	
Cryptic species	

Chapter 16: Now You Explore

140

How to learn more about life

Look for yourself

An aquarium

A plankton net

Internet sites:

Reading complements looking

The Internet is your friend

Magazines and journals

Amateur Scientists

Universities, laboratories, museums

There are amateur scientists

Books you might find useful

Appendix

150

Exponential (or scientific) format for numbers

Units of measurement