

Table of Contents

THE STORY OF LIFE ON EARTH.....	1
BIOLOGY THE STUDY OF LIVING ORGANISMS	4
Material:	6
Presentation:	6
LIVING AND NON-LIVING.....	6
Follow-Up Work:	7
Material:	8
Group Presentation: Key Experience	8
BIOLOGY CLASSIFYING AND ORGANIZING	8
PROKARYOTIC AND EUKARYOTIC CELLS	10
Material:	11
Group Presentation: Key Experience	11
THE PROKARYOTIC CELL.....	11
Material:	15
Group Presentation: Key Experience	15
THE EUKARYOTIC CELL	15
Material	22
Group Presentation 1: Key Experience	22
THE DOMAINS.....	22
Material:	25
Group Presentation 1: Key Experience	25
FIVE KINGDOMS: PRESENTATION	25
Group Presentation 2: Kingdom Chart	27
THE KINGDOMS OVERVIEW.....	28
The Prokaryote Kingdom:	28
Bacteria:	28
Protista Kingdom:	29
Fungus Kingdom:	29
Plant Kingdom:	29
Animal Kingdom:	30
Prokaryote Kingdom:.....	31
Protista Kingdom:.....	31
Fungus Kingdom:.....	31

CHARACTERISTICS OF THE FIVE KINGDOMS	31
Plant Kingdom:.....	32
Animal Kingdom:.....	32
Material:	33
Presentation:	33
FIVE KINGDOMS CHART	33
Material:	36
Group Presentation: Key Experience	36
CLASSIFYING AND ORGANIZING BASED ON GENETIC RELATIONSHIPS.....	36
Material:	37
Presentation:	37
TREE OF LIFE PRESENTATION	37
Origins of Prokaryotes	40
PROKARYOTES: REPRODUCTION.....	40
THE PROKARYOTE KINGDOM INTRODUCTION.....	40
Kinds of Prokaryotes:.....	41
Distribution of Bacteria:.....	41
The Role of Bacteria:.....	42
Precambrian Period - 4.6 billion to 541 million years ago.....	43
Cambrian Period - 541 to 485 million years ago	43
THE PROKARYOTE KINGDOM: TIME LINE OF LIFE	43
Material:	44
Presentation:	44
THE PROKARYOTE KINGDOM: KEY EXPERIENCE.....	44
Material:	45
Presentation:	45
THE PROKARYOTE KINGDOM CHART	45
Material:	46
Presentation:	46
THE PROKARYOTE KINGDOM CHART	46
Material:	47
Presentation:	47
THE PROKARYOTE KINGDOM : LIFE CYCLES	47
Material:	48
Presentation:	48
THE PROKARYOTE KINGDOM: HOW THE BACTERIA SATISFIES ITS NEEDS.....	48
Material:	49
Presentation:	49

THE ARCHAEA AND BACTERIA KINGDOMS: WHO AM I? STORIES	49
Origins of Protista:	50
The Eukaryotic Cell:	50
THE PROTISTA KINGDOM: INTRODUCTION.....	50
Life Cycles of Eukaryotes:	51
Life Cycle of Protists:	51
How Protists Feed:	51
Environment:.....	51
Precambrian Period - 4.6 billion to 541 million years ago.....	52
Cambrian Period - 541 to 485 million years ago	52
THE PROTISTA KINGDOM: TIME LINE OF LIFE.....	52
Ordovician Period - 485 to 443 million years ago.....	53
Silurian Period - 443 to 419 million years ago	53
Material:	54
Presentation:	54
THE PROTISTA KINGDOM: KEY EXPERIENCE	54
Material:	55
Presentation:	55
THE PROTISTA KINGDOM CHART	55
The Parts of the Amoeba.....	56
THE PARTS OF THE AMOEBIA	57
Systems of Protozoa (Amoeba, Paramecium, Euglena)	58
The Parts of the Radiolarian	58
RADIOLARIAN: ORDER SPUMELLARIA.....	60
RADIOLARIAN: ORDER NASSELLARIA.....	61
The Parts of the Paramecium	62
THE PARTS OF THE PARAMECIUM.....	64
The Parts of the Euglena	65
THE PARTS OF THE EUGLENA	66
The Parts of the Brown Algae (Kelp).....	67
Material:	68
Presentation:	68
THE PROTISTA KINGDOM: LIFE CYCLES	68
Material:	69
Presentation:	69
THE PROTISTA KINGDOM: HOW THE PROTIST SATISFIES ITS NEEDS	69
Material:	70
Presentation:	70

THE PROTISTA KINGDOM: WHO AM I? STORIES	70
Origins of Fungi:.....	71
Life Cycle of the Fungus:.....	71
THE FUNGUS KINGDOM	71
How Fungi Feed:.....	72
Environment:.....	72
The Role of the Fungi:	72
THE FUNGUS KINGDOM: THE TIME LINE OF LIFE.....	73
Material:	74
Presentation:	74
THE FUNGUS KINGDOM: KEY EXPERIENCE	74
THE PARTS OF THE MUSHROOM	76
Material:	77
Procedure:	77
Observations:.....	77
Conclusions and Discussion:.....	77
Further Experimentation:.....	77
THE FUNGUS KINGDOM: EXPERIMENTS WITH YEAST	77
Material:	78
Presentation:	78
THE FUNGUS KINGDOM CHART	78
Asexual Reproduction of Lichen.....	79
ASEXUAL REPRODUCTION OF LICHEN.....	80
Material:	81
Presentation:	81
THE FUNGUS KINGDOM: LIFE CYCLES.....	81
Material:	82
Presentation:	82
THE FUNGUS KINGDOM: HOW THE FUNGUS SATISFIES ITS NEEDS.....	82
Material:	83
Presentation:	83
THE FUNGUS KINGDOM: WHO AM I? STORIES.....	83
THE PLANT KINGDOM: OVERVIEW.....	84
Characteristics:	84
Organisms:	84
Time Line of Life:	84
Origins of Plants:.....	84

Characteristics of Plants:.....	85
Plant Groups:.....	85
Reproduction:	86
Precambrian to Cambrian Periods - 4.6 billion to 541 million years ago	87
Ordovician Period - 485 to 443 million years ago.....	87
Silurian Period - 443 to 419 million years ago	87
Devonian Period - 419 to 358 million years ago.....	87
Carboniferous Period - 358 to 298 million years ago.....	87
THE PLANT KINGDOM: THE TIME LINE OF LIFE	87
Permian Period - 289 to 251 million years ago.....	88
Triassic Period - 251 to 201 million years ago	89
Jurassic Period - 201 to 145 million years ago.....	89
Cretaceous Period - 145 to 66 million years ago.....	89
Tertiary Period - 65 to 2.5 million years ago.....	89
Quaternary Period - 2.5 million years ago to the present	90
THE PLANT KINGDOM: KEY EXPERIENCE - THE PLANT.....	91
Material:	91
Group Presentation 1: Key Experience	91
Presentation 2: The Nomenclature	92
Material:	94
Presentation:	94
PLANT KINGDOM: LIFE CYCLES.....	94
Material:	95
Presentation:	95
PLANT KINGDOM: HOW THE PLANT SATISFIES ITS NEEDS.....	95
Presentation:	96
THE PLANT KINGDOM: WHO AM I? STORIES	96
Characteristics:	97
Organisms:	97
Time Line of Life:	97
Origin of Animals:.....	97
THE ANIMAL KINGDOM	97
Characteristics of Animals:.....	98
Environments:	98
Animal Classification:	99
Precambrian to Cambrian Periods - 4.6 billion to 541 million years ago	100
Cambrian Period - 541 to 485 million years ago	100

THE ANIMAL KINGDOM: THE TIME LINE OF LIFE	100
Ordovician Period - 485 to 443 million years ago.....	101
Silurian Period - 443 to 419 million years ago	101
Devonian Period - 419 to 358 million years ago.....	102
Carboniferous Period - 358 to 298 million years ago.....	103
Permian Period - 289 to 251 million years ago.....	103
Triassic Period - 230 to 181 million years ago	104
Jurassic Period - 201 to 145 million years ago.....	104
Cretaceous Period - 145 to 66 million years ago.....	106
Tertiary Period - 65 to 2.5 million years ago.....	107
Quaternary Period - 2.5 million years ago to the present	109
Material:	110
Presentation 1: Key Experience	110
Precambrian to Cambrian Periods - 4.6 billion to 541 million years ago	110
Cambrian Period - 541 to 485 million years ago	110
THE ANIMAL KINGDOM: PHYLUM PORIFERA.....	110
Ordovician Period - 485 to 443 million years ago.....	111
Material:	111
Presentation 4: How the Poriferan Satisfies Its Needs.....	111
Presentation 5: Porifera Stories	112
ANIMAL KINGDOM: PHYLUM CNIDARIA.....	113
Material:	113
Presentation 1: Key Experience	113
Presentation 2: Life Cycle (Zoology II Manual)	113
Presentation 3: Internal Structure (Zoology II Manual).....	114
Precambrian to Cambrian Periods - 4.6 billion to 541 million years ago	114
Cambrian Period - 541 to 485 million years ago	114
Ordovician Period - 485 to 443 million years ago.....	114
Silurian Period - 443 to 419 million years ago	114
Devonian Period - 419 to 358 million years ago.....	114
Carboniferous Period - 358 to 298 million years ago.....	114
Life Cycle of the Jellyfish	115
Cretaceous Period - 145 to 66 million years ago.....	115
Internal Parts of the Sea Anemone.....	116
Internal Parts of the Jellyfish	117
Material:	118
Presentation 4: How the Cnidarian Satisfies Its Needs.....	118
Presentation 5: Research and Classification (Zoology II Manual)	118
Presentation 6: Cnidarian Stories.....	119
ANIMAL KINGDOM: PHYLUM PLATYHELMINTHES.....	120
Cambrian Period - 541 to 485 million years ago	121

Material:	120
Presentation 1: Key Experience	120
Precambrian to Cambrian Periods - 4.6 billion to 541 million years ago	120
Presentation 2: Life Cycle (Zoology II Manual)	121
Presentation 3: Internal Structure (Zoology II Manual).....	121
Life Cycle of the Liver Fluke	121
Material:	122
Presentation 4: How the Platyhelminth Satisfies Its Needs	122
Presentation 5: Research and Classification (Zoology II Manual)	122
Presentation 6: Platyhelminth Stories	123
ANIMAL KINGDOM: PHYLUM NEMATODA	124
Material:	124
Presentation 1: Key Experience	124
Presentation 2: Life Cycle (Zoology II Manual)	124
Presentation 3: Internal Structure (Zoology II Manual).....	124
Life Cycle in Humans.....	125
Material:	126
Presentation 4: How the Nematode Satisfies Its Needs	126
Presentation 5: Research and Classification (Zoology II Manual)	126
Presentation 6: Nematode Stories	127
ANIMAL KINGDOM: PHYLUM ANNELIDA	128
Material:	128
Presentation 1: Key Experience	128
Precambrian Period - 4.6 billion to 541 million years ago.....	129
Cambrian Period - 541 to 485 million years ago	129
Presentation 2: Life Cycle (Zoology II Manual)	129
Presentation 3: Internal Structure (Zoology II Manual).....	129
Material:	129
Presentation 4: How the Annelid Satisfies Its Needs	129
Presentation 5: Research and Classification (Zoology II Manual)	130
Presentation 6: Annelid Stories	130
ANIMAL KINGDOM: PHYLUM ARTHROPODA	131
Material:	131
Presentation 1: Key Experience ...	131
Precambrian Period - 4.6 billion to 541 million years ago	132
Cambrian Period - 541 to 485 million years ago	132
Ordovician Period - 485 to 443 million years ago.....	133
Silurian Period - 443 to 419 million years ago	133
Devonian Period - 419 to 358 million years ago.....	133
Carboniferous Period - 358 to 298 million years ago.....	133
Permian Period - 289 to 251 million years ago.....	133

Triassic Period - 230 to 181 million years ago	134
Jurassic Period - 201 to 145 million years ago.....	134
Presentation 2: Life Cycle (Zoology II Manual)	134
Presentation 3: Internal Structure (Zoology II Manual).....	134
Material:	134
Presentation 4: How the Arthropod Satisfies Its Needs	135
Presentation 5: Research and Classification (Zoology II Manual)	135
Presentation 6: Arthropod Stories	136
ANIMAL KINGDOM: PHYLUM MOLLUSCA.....	137
Material:	137
Presentation 1: Key Experience	137
Precambrian to Cambrian Periods - 4.6 billion to 541 million years ago	138
Cambrian Period - 541 to 485 million years ago	138
Ordovician Period - 485 to 443 million years ago.....	138
Silurian Period - 443 to 419 million years ago	138
Devonian Period - 419 to 358 million years ago.....	139
Carboniferous Period - 358 to 298 million years ago.....	139
Permian Period - 289 to 251 million years ago.....	139
Triassic Period - 230 to 181 million years ago	139
Jurassic Period - 201 to 145 million years ago.....	139
Cretaceous Period - 145 to 66 million years ago.....	140
Tertiary Period - 65 to 2.5 million years ago.....	140
Presentation 2: Life Cycle (Zoology II Manual)	140
Presentation 3: Internal Structure (Zoology II Manual).....	140
Material:	140
Presentation 4: How the Mollusk Satisfies Its Needs.....	140
Presentation 5: Research and Classification (Zoology II Manual)	141
Presentation 6: Mollusk Stories.....	141
ANIMAL KINGDOM: PHYLUM ECHINODERMATA	142
Material:	142
Presentation 1: Key Experience	142
Precambrian Period - 4.6 billion to 541 million years ago.....	143
Cambrian Period - 541 to 485 million years ago	143
Ordovician Period - 485 to 443 million years ago.....	143
Silurian Period - 443 to 419 million years ago	144
Devonian Period - 419 to 358 million years ago.....	144
Carboniferous Period - 358 to 298 million years ago.....	144
Presentation 2: Life Cycle (Zoology II Manual)	144
Presentation 3: Internal Structure (Zoology II Manual).....	144
Material:	145
Presentation 4: How the Echinoderm Satisfies Its Needs	145
Presentation 5: Research and Classification (Zoology II Manual)	145

Presentation 6: Echinoderm Stories	146
THE ANIMAL KINGDOM: VERTEBRATES.....	147
Material:	147
Presentation:	147
Characteristics of Fish:	147
Characteristics of Amphibians:.....	148
Characteristics of Reptiles:.....	148
Characteristics of Birds:	149
Characteristics of Mammals:.....	149
Follow-Up Work:	149
ANIMAL KINGDOM: PHYLUM CHORDATA - FISH.....	150
Material:	150
Presentation 1: Key Experience	150
Precambrian to Cambrian Period - 4.6 billion to 541 million years ago.....	151
Ordovician Period - 485 to 443 million years ago.....	151
Silurian Period - 443 to 419 million years ago	151
Devonian Period - 419 to 358 million years ago.....	152
Carboniferous Period - 358 to 298 million years ago.....	152
Permian Period - 289 to 251 million years ago.....	153
Presentation 2: Life Cycle (Zoology II Manual)	153
Presentation 3: Internal Structure (Zoology II Manual).....	153
Material:	153
Presentation 4: How the Fish Satisfies Its Needs	154
Presentation 5: Research and Classification (Zoology II Manual)	154
Presentation 6: Fish Stories	155
ANIMAL KINGDOM: PHYLUM CHORDATA - AMPHIBIANS	156
Material:	156
Presentation 1: Key Experience	156
Precambrian to Devonian Periods - 4.6 billion to 358 million years ago	157
Carboniferous Period - 358 to 298 million years ago.....	157
Permian Period - 289 to 251 million years ago.....	157
Presentation 2: Life Cycle (Zoology II Manual)	158
Presentation 3: Internal Structure (Zoology II Manual).....	158
Material:	158
Presentation 4: How the Amphibian Satisfies Its Needs	159
Presentation 5: Research and Classification (Zoology II Manual)	159
Presentation 6: Amphibian Stories	160
ANIMAL KINGDOM: PHYLUM CHORDATA - REPTILES.....	161
Material:	161
Presentation 1: Key Experience	161
Precambrian to Devonian Periods - 4.6 billion to 358 million years ago	162

Carboniferous Period - 358 to 298 million years ago.....	162
Permian Period - 289 to 251 million years ago.....	162
Triassic Period - 230 to 181 million years ago	162
Jurassic Period - 201 to 145 million years ago.....	163
Cretaceous Period - 145 to 66 million years ago.....	163
Tertiary Period - 65 to 2.5 million years ago.....	164
Presentation 2: Life Cycle (Zoology II Manual)	164
Presentation 3: Internal Structure (Zoology II Manual).....	165
Material:	165
Presentation 4: How the Reptile Satisfies Its Needs.....	165
Presentation 5: Research and Classification (Zoology II Manual)	166
Presentation 6: Reptile Stories.....	166
ANIMAL KINGDOM: PHYLUM CHORDATA - BIRDS	167
Material:	167
Presentation 1: Key Experience	167
Precambrian to Jurassic Period - 4.6 billion years to 145 million years ago	168
Jurassic Period - 201 to 145 million years ago.....	168
Cretaceous Period - 145 to 66 million years ago.....	168
Tertiary Period - 65 to 2.5 million years ago.....	168
Quaternary Period - 2.5 million years ago to present	169
Presentation 2: Life Cycle (Zoology II Manual)	169
Presentation 3: Internal Structure (Zoology II Manual).....	169
Material:	169
Presentation 4: How the Bird Satisfies Its Needs.....	169
Presentation 5: Research and Classification (Zoology II Manual)	170
Presentation 6: Bird Stories	170
ANIMAL KINGDOM: PHYLUM CHORDATA - MAMMALS.....	171
Material:	171
Presentation 1: Key Experience	171
Precambrian to Jurassic Period - 4.6 billion to 145 million years ago.....	172
Jurassic Period - 201 to 145 million years ago.....	172
Cretaceous Period - 145 to 66 million years ago.....	172
Tertiary Period - 65 to 2.5 million years ago.....	173
Quaternary Period - 2.5 million years ago to the present	174
Presentation 2: Life Cycle (Zoology II Manual)	175
Presentation 3: Internal Structure (Zoology II Manual).....	175
Material:	175
Presentation 4: How the Mammal Satisfies Its Needs.....	175
Presentation 5: Research and Classification	176
Presentation 6: Mammal Stories.....	176