

Contents

Preface	viii	5 Skeletal Systems	40
1 Introduction	1	Tissues of the Skeletal System	40
Classification and Comparison	1	Cartilage	41
Defining the Chordates	1	Bone	42
Chordate Characteristics	2	Divisions of the Skeletal System	43
Studying Advice	6	Postcranial Skeleton	43
Laboratory Strategy	6	Vertebrae and Ribs	43
Designing for Students	6	Girdles and Limbs	52
2 Protochordates	8	Skull	67
Protochordates	8	Introduction	67
Hemichordata	8	The Composite Skull	67
Cephalochordata	10	Cranial Skeleton	69
Urochordata (Tunicates)	16	Elasmobranchii—Shark	69
3 Agnathans—Examination of a Basal Vertebrate:		Osteichthyes— <i>Amia</i> (Bowfin)	71
The Lamprey	18	Amphibia— <i>Necturus</i>	72
Agnathans	18	Reptilia	72
Myxini—Hagfishes	18	Aves	78
Petromyzoniformes—Lampreys	18	Dorsal and Lateral Views	79
The Origin and Evolution of Vertebrates: Shifts in		Ventral and Posterior Views	80
Feeding Mechanisms	20	Sclerotic Ring and Hyoid	80
Adult Lamprey Anatomy	22	Mammalia—Cat	80
External Anatomy	22	Teeth	84
Sagittal and Cross Sections	22	Tooth Anatomy	84
Anatomy of the Lamprey (<i>Ammocoete</i>) Larva	27	Sharks—Homodont	
Whole Mount	27	and Polyphyodont Teeth	84
Cross Section through the Pharynx	28	Amphibia/Salamander—Homodont	
Cross Section through the Trunk	28	and Polyphyodont Teeth	84
4 Vertebrate Integuments	29	Reptiles/Alligator—Homodont	
Introduction	29	and Polyphyodont Teeth	85
Dermis	29	Mammal—Heterodont and Diphyodont Teeth	85
Epidermis	30	Pattern of Evolutionary Change	86
Examination of Vertebrate Integuments	31	6 Muscular Systems and External Anatomy	89
Fishes	31	Introduction	89
Tetrapods	33	Terminology	89
Specializations of the Integument	37	Actions	90
Nails, Claws, and Hooves	37	General Muscle Groups	90
Horns and Antlers	37	Dissection	90
Baleen	38	The Process	90
		General Safety Precautions	91
		External Anatomy	91
		Shark Dissection	91
		External Anatomy	91
		Skinning the Shark	92
		Musculature	92

<i>Necturus</i> 100	Postcava 170
External Anatomy 100	Hepatic Portal System 172
Dissection 100	
Musculature 100	
Cat 106	9 Urogenital Systems 174
External Anatomy 106	Shark 174
Approach 106	Male Urogenital System 174
Musculature 107	Female Urogenital System 176
7 Digestive Systems 132	<i>Necturus</i> 179
Introduction 132	Male Urogenital System 179
Shark 132	Female Urogenital System 181
Pleuroperitoneal Cavity 132	Cat 181
Pericardial Cavity 137	Male Urogenital System 181
<i>Necturus</i> 137	Female Urogenital System 184
Pleuroperitoneal Cavity 137	10 Nervous Systems 187
Pericardial Cavity 139	Introduction 187
Cat 139	Nerve Function 188
Salivary Glands 139	Spinal Nerves 188
Oral Cavity 140	Cranial Nerves 189
Structures of the Thoracic Region 142	Shark 192
Abdomen 144	Dissection Procedure 192
8 Circulatory and Respiratory Systems 147	Brain (Dorsal Aspect) 193
Introduction 147	Cranial Nerves 193
Respiratory System 147	Brain (Ventral Aspect) 196
Circulatory System 147	Brain (Sagittal Aspect) 197
Shark 147	Sheep Brain 197
Pericardial Cavity 147	Overview—Whole Brain 197
Respiratory System and Branchial Arteries 148	Cranial Nerves—Whole Brains
Pleuroperitoneal Cavity 151	(Figure 10.11) 202
<i>Necturus</i> 155	Brain Regions—Sagittal Sections
The Heart, Branches of the Ventral Aorta,	(Figure 10.12) 202
and Gills 155	Brain Stem—Parts (Figure 10.13) 204
Dorsal Aorta and Lungs 157	Spinal Nerves 204
Hepatic Portal System 161	Glossary 206
Systemic Veins 161	Index 213
Cat 162	Student Art Notebook 239
Heart and Its Major Vessels 162	Appendix: Master List of Relevant Roots 388
Respiratory System 165	
Precava 168	
Dorsal Aorta 169	