










































# Prenatal Development Timeline

<span style="color: blue;">■</span> Nervous	<span style="color: red;">■</span> Cardiovascular	<span style="color: maroon;">■</span> Muscular	<span style="color: teal;">■</span> Early Events
<span style="color: yellow;">■</span> Special Senses	<span style="color: orange;">■</span> Respiratory	<span style="color: grey;">■</span> Skeletal	<span style="color: gold;">■</span> Growth Parameters
<span style="color: magenta;">■</span> Blood & Immune	<span style="color: purple;">■</span> Gastrointestinal	<span style="color: cyan;">■</span> Endocrine	<span style="color: white;">■</span> General
<span style="color: pink;">■</span> Skin/Integument	<span style="color: green;">■</span> Renal/Urinary	<span style="color: lightgreen;">■</span> Reproductive	<span style="color: limegreen;">■</span> Movement

Unit 1: The First Week	
Day 0	<ul style="list-style-type: none"> <li>Embryonic period begins</li> <li>Fertilization resulting in zygote formation</li> </ul>
Day 1	<ul style="list-style-type: none"> <li>Embryo is spherically shaped and called a morula comprised of 12 to 16 blastomeres</li> </ul>
Day 2	<ul style="list-style-type: none"> <li>Early pregnancy factor (EPF)</li> <li>Activation of the genome</li> <li>Blastomeres begin rapidly dividing</li> </ul>
Day 3	<ul style="list-style-type: none"> <li>Compaction</li> </ul>
Day 4	<ul style="list-style-type: none"> <li>Embryonic disc</li> <li>Hypoblast &amp; epiblast</li> <li>Inner cell mass</li> <li>See where the back and chest will be</li> </ul>
Day 5	<ul style="list-style-type: none"> <li>Hatching blastocyst</li> </ul>
Day 6	<ul style="list-style-type: none"> <li>Embryo attaches to wall of uterus</li> <li>Solid syncytiotrophoblast &amp; cytotrophoblast</li> </ul>
1 week	<ul style="list-style-type: none"> <li>Chorion</li> <li>Chorionic cavity</li> <li>Extra-embryonic mesoderm (or mesoblast)</li> <li>Placenta begins to form</li> </ul>
Unit 2: 1 to 2 Weeks	
1 week, 1 day	<ul style="list-style-type: none"> <li>Amnioblasts present; amnion and amniotic cavity formation begins</li> <li>Bilaminar embryonic disc</li> <li>Positive pregnancy test</li> </ul>
1 week, 2 days	<ul style="list-style-type: none"> <li>Corpus luteum of pregnancy</li> <li>Cells in womb engorged with nutrients</li> <li>Exocoelomic membrane</li> <li>Isolated trophoblastic lacunae</li> <li>Embryonic disc 0.1 mm diameter</li> </ul>
1 week, 4 days	<ul style="list-style-type: none"> <li>Intercommunicating lacunae network</li> <li>Longitudinal axis</li> <li>Prechordal plate</li> <li>Trophoblastic vascular circle</li> </ul>
1 week, 5 days	<ul style="list-style-type: none"> <li>Implantation complete</li> <li>Embryonic disc diameter: 0.15 to 0.20 mm</li> </ul>
1 week, 6 days	<ul style="list-style-type: none"> <li>Blood islands in umbilical vesicle</li> <li>Angiogenesis in chorionic mesoblast</li> <li>Blood vessels in villi</li> </ul>








































	 Connecting stalk
	 Primordial blood vessels
	 Amnion with single cell layer
	 Chorionic villi
<b>2 weeks</b>	 Embryonic epiblast gives rise to primitive streak and primitive node and
	 Yolk sac
	 Yolk sac
<b>Unit 3: 2 to 3 Weeks</b>	
<b>2 weeks, 1 day</b>	 3 germ layers
	 Cloacal membrane
	 Primitive groove
	 Rostral-caudal orientation
<b>2 weeks, 2 days</b>	 Erythroblasts in yolk sac
	 Three types of blood-forming cells in yolk sac
	 Primordial germ cells
	 Allantoic diverticulum
	 Allantoic diverticulum
	 Amnion with two cell layers
	 Notochordal process
	 Secondary villi
<b>2 weeks, 4 days</b>	 Foregut, midgut, and hindgut
	 Uteroplacental circulation well established
	 Prechordal plate with 1 retinal field
	 Brain is first organ to appear
	 Caudal eminence
	 Neural ectoderm
	 Neural groove and neural folds
	 Notochordal and neurenteric canals
	 Notochordal plate
	 Connecting stalk
	 Primitive pit (or notochordal pit)
<b>2 weeks, 5 days</b>	 Prechordal plate with 2 retinal fields
<b>2 weeks, 6 days</b>	 Numerous blood islands in umbilical vesicle
	 Septum transversum (primitive diaphragm)
	 Foregut
	 Oropharyngeal membrane
	 Pharyngeal pouch 1
	 Stomodeum forming
	 Blood vessels emerge simultaneously in umbilical vesicle, embryo proper, amnion, and connecting stalk
	 Common umbilical artery
	 Dorsal aortae (paired)
	 First pair of aortic arches

	Heart: Cardiogenic plate, cardiac jelly, myocardial mantle, and endocardial plexus
	Left ventricle, right ventricle, conotruncus
	Paired pericardial cavities
	Paired tubular heart
	Hindbrain with four rhombomeres
	Isthmus rhombencephali demarcates midbrain and hindbrain
	Mesencephalon (or midbrain)
	Neural cord within caudal eminence
	Neural groove deepens substantially
	Primary neuromeres
	Three main divisions of brain
	Cephalic and caudal folds
	Neural crest: Rostral and facial
	Primitive streak reaches neurenteric canal
	Somites with central somitocoels: Pairs 1 through 3

#### Unit 4: 3 to 4 Weeks


























3 weeks, 1 day	Thyroid primordium emerges from floor of pharynx
	Nephrogenic cord emerges (at 10 somites)
	Cloaca
	Common coelomic cavity divides into peritoneal, pericardial, and pleural cavities
	Liver: Hepatic plate (endoderm)
	Midgut emerging
	Pharyngeal arches 1 and 2
	Pharyngeal cleft 1
	Second pharyngeal cleft and pouch
	Pharyngeal groove and ridge with laryngotracheal sulcus
	Respiratory outgrowth
	Atria (right and left) far apart
	Bulbis cordis
	Endocardial tubes fuse forming tubular heart
	Heart begins beating
	Pericardial sac
	Pericardium
	Primary head vein
	Sinus venosus
	Tubular heart begins folding
	Umbilical arteries
	Umbilical veins (right and left)
	Optic primordia fill neuromere D2
	Otic pits
	Chiasmatic plate

	Mesencephalic flexure
	Neural tube
	Neuromeres D1 and D2 (in diencephalon)
	Optic sulcus in forebrain
	Pontine region identifiable near cranial nerves VII and VIII
	Segment D in rhombencephalon
	Some secondary neuromeres
	Superior colliculus
	Telencephalon
	Telencephalon (or telencephalic) medium
	Body cavities
	Hyoid arch
	Mandibular arch and maxillary process
	Neural crest: Trigeminal, facioacoustic, glossopharyngeal-vagal, and occipitospinal
	Somites: Pairs 4 through 12
3 weeks, 3 days	Primordial germ cells begin moving from umbilical vesicle to hindgut
	Face: Maxillary and mandibular processes (bilaterally)
	Cloacal membrane
	Mesonephric duct emerges from nephrogenic cord
	Nephric vesicles
	Cystic primordium
	Hepatic diverticulum
	Liver
	Membrane between future mouth and throat may begin to rupture
	Angiogenesis along surface of central nervous system
	Aortic sac
	Atrioventricular canal
	Capillary plexus begins forming around brain and spinal cord
	Conotruncus
	Conus cordis emerging from right ventricle
	Endocardium
	Heart contractions produce peristaltic blood flow
	Internal carotid arteries
	Interventricular septum
	Primordium of myocardium
	Sinus venosus separating from left atria
	Trabeculated outpouches along primary cardiac tube representing primordia of left and right ventricles
	Trigeminal and otic arteries
	Facio-vestibulocochlear ganglia (CN VII, CN VIII)
	Glossopharyngeal and vagal ganglia

	 Optic evagination (starting at 14 somites)
	 Otic vesicle
	 Trigeminal ganglia (CN V)
	 Neural crest: Optic crest emerges during Carnegie Stages 11 and 12
	 Nose: Nasal plate
	 Optic vesicles form (17 to 19 somites)
	 Adenohypophysial pouch
	 Adenohypophysis
	 Lamina terminalis
	 Mesencephalon contains tectum and tegmentum
	 Neural crest production and migration continue
	 Neurohypophysial primordia
	 Neuropore (near brain) closes
	 Notochord
	 Segmentation of mesoblast alongside neural tube bilaterally
	 Somites: Pairs 13 through 20
<b>3 weeks, 3 days - 5 weeks, 6 days</b>	 All eight rhombomeres (Rh 1 through Rh 7, Rh D) - Present in stages 11 through 17
<b>3 weeks, 5 days</b>	 Telopharyngeal bodies
	 Alimentary epithelium invades stroma of liver
	 Alimentary epithelium proliferates in primordia of stomach, liver, and dorsal pancreas
	 First part of pancreas
	 Gastric portion of foregut elongates (25 to 28 somites)
	 Hepatic primordium with abundant vascular plexus
	 Omental bursa
	 Oropharyngeal membrane is ruptured
	 Pharyngeal arch 3
	 Pharyngeal arches with dorsal and ventral parts
	 Umbilical vesicle elongates
	 Cervical sinus
	 Laryngotracheal groove
	 Lung bud
	 Tracheo-esophageal septum
	 Atrioventricular canal
	 Common cardinal veins (right and left)
	 Descending aorta
	 Heart circulates blood to and from central nervous system, umbilical vesicle, and chorion
	 Hepatocardiac channels (right and left)
	 Rostral and caudal cardinal veins along brain and spinal cord feeding common cardinal veins
	 Septum primum and foramen primum sometimes present

















	<div></div> Septum primum, foramen primum
	<div></div> Sinu-atrial foramen prevents backflow into sinus venosus
	<div></div> Sinus venosus collects venous blood from entire embryo
	<div></div> Superior vena cava, inferior vena cava, and sinus venosus collecting all venous blood
	<div></div> Unidirectional circulation
	<div></div> Vitelline arteries and veins
	<div></div> Hypoglossal cord (CN XII) enters pharyngeal arch 4
	<div></div> Otocyst nearly closed
	<div></div> Nasal discs form part of ectodermal ring
	<div></div> Optic vesicles covered by sheath (formed by mesencephalic and optic crest)
	<div></div> Brain involves 40% of neural tube
	<div></div> Brain: Embryonic commissural plate
	<div></div> Ectodermal ring complete
	<div></div> Hypoglossal nucleus (CN XII)
	<div></div> Lowermost spinal cord formation begins
	<div></div> Mamillary recess
	<div></div> Marginal layer in rhombencephalon
	<div></div> Mesencephalic flexure at 90 degrees
	<div></div> Mesencephalon with two neuromeres: M1 and M2
	<div></div> Motor neurons in basal plate of rhombencephalon
	<div></div> Neural tube closes (lower back)
	<div></div> Neurofibrils form in rhombencephalon
	<div></div> Primary neurulation ends
	<div></div> Primordia of ventral thalamus and subthalamus in diencephalon
	<div></div> Sulcus limitans
	<div></div> Sulcus limitans in midbrain
	<div></div> Somites: Pairs 21 through 29
	<div></div> Upper limb primordium at level of somites 8 to 10
	<div></div> Progressively C-shaped embryo
4 weeks	<div></div> Spleen primordia
	<div></div> Thymic primordia
	<div></div> Lower lip forms from merging of mandibular processes
	<div></div> Melanoblasts in epidermis
	<div></div> Gonadal ridge extends from C-7 to T-8 levels
	<div></div> Primordial germ cells migrate to mesonephric ridges
	<div></div> Primordial germ cells number several hundred
	<div></div> Urorectal septum
	<div></div> Thyroid bilobed and attached to pharynx by thyroglossal duct
	<div></div> Diaphragm primordia
	<div></div> Glomeruli emerge in mesonephros

	Mesonephric duct attached to cloaca
	Nephric tubules now S-shaped
	Urogenital sinus
	Urorectal cleavage line
	Diverticulum ilei marks division between foregut and hindgut
	Intestines growing in length
	Mesentery from end of duodenum to proximal half of colon
	Opening between gut and umbilical vesicle decreases
	Pancreas: Ventral pancreas
	Pharyngeal pouches 1 through 4
	Pharynx
	Pleuroperitoneal canals
	Stalk of umbilical vesicle lengthens and narrows
	Stomach assumes shape of a spindle
	Umbilical vesicle at height of development
	Vitelline duct
	Bronchial buds
	Mesenchyme from coelomic epithelium surrounds esophagus and lung buds
	Trachea
	Anterior, middle, and posterior cerebral plexuses
	Aorta branches include dorsal intersegmental, lateral segmental, and ventral segmental arteries
	Aortic arches 4 and 6
	Artery from the common iliac artery feeds each lower limb bud
	Atrioventricular bundle
	Cardiac contractions still under myogenic control
	Celiac artery, superior and inferior mesenteric arteries
	Circulatory system "well established"
	Common iliac arteries (right and left, from dorsal aorta bifurcation)
	Contractions well coordinated and sequential from sinus venosus to atria to ventricles
	Functioning two-chamber heart
	Gas exchange through placenta begins
	Gelatinous reticulum (or cardiac mesenchyme)
	Heart chambers bulging with fluid
	Heart now functions as two parallel pumps
	Heart: Atrioventricular cushions (rostroventral and caudodorsal)
	Heart: Myocardium wall 3 to 4 cells thick
	Primary head veins (right and left) drain anterior, middle, and posterior cerebral plexuses and feed precardinal veins

	 Small arteries emerging throughout mesoderm
	 Ventricle walls trabeculated
	 Vertebral arteries
	 Vitelline veins empty exclusively into hepatic plexus
	 Most cranial nerve ganglia
	 Trigeminal, glossopharyngeal, and vagal preganglia
	 Basement membrane of otic disc surrounds otic vesicle
	 Endolymphatic appendage
	 Otic invagination
	 Otic vesicle closes
	 Terminal-vomerolateral neural crest
	 Brain: Commissural plate
	 Cerebellum
	 Common afferent tract
	 Fourth ventricle
	 Interstitial nucleus (part of medial longitudinal fasciculus)
	 Isthmus rhombencephali (a new neuromere)
	 Oculomotor (CN III) and trochlear nuclei (CN IV) in mesencephalon (midbrain) and isthmus respectively
	 Retinal and lens discs
	 Amnion surrounds connecting stalk and vitelline stalk
	 Hyoid arch subdivides into dorsal and ventral segments
	 Limb buds - the first sign of arms and legs
	 Lower limb buds
	 Umbilical cord emerging
	 Upper and lower limb buds

#### Unit 5: 4 to 5 Weeks

4 weeks, 4 days

	 Thymus
	 Parathyrogenic zones
	 Thyroglossal duct
	 Thyroid pedicle lengthens
	 Dorsal contour develops depression at level of sclerotomes 4 and 5
	 Muscular plates between upper and lower limb buds
	 Glomerular capsules, partially vascularized
	 Mesonephric corpuscle
	 Metanephrogenic cap emerges from ureteric bud
	 Ureteric buds
	 Angiogenesis within peri-esophageal mesenchyme
	 Epiploic foramen
	 Lesser sac (omental bursa)
	 Small intestine forming coils
	 Tongue: Hypopharyngeal eminence
	 Arytenoid swellings (right and left)








































	Capillary network surrounds pulmonary mesenchyme
	Epithelial lamina of larynx
	Lungs: Right and left primary (or main stem) bronchi
	Mesenchyme covering esophagus and respiratory tree separates
	Mesenchyme surrounds bronchi
	Pleura (mesothelium) surrounds part of mesenchyme
	Right main bronchus longer than left
	Atria walls thin, ventricle walls thick and trabeculated
	Atrioventricular cushions not fused
	Common pulmonary vein drains pulmonary plexuses into left atrium
	Conotruncal ridges or cushions (remnants of cardiac jelly)
	Epicardium
	Left subclavian artery feeds left axillary artery, left vertebral artery, and left thyrocervical trunk
	Outflow tract still with one lumen
	Posterior communicating arteries
	Pulmonary arch (sixth aortic arch) forms from aorta and aortic sac
	Pulmonary capillary network fed by pulmonary arteries, drain into left atrium
	Sino-atrial (SA) node
	Superior mesenteric artery and vein
	Upper limb buds with early marginal blood vessel
	Brachial plexus
	Cervical plexus
	Dorsal roots
	Hypoglossal nerve roots unite (CN XII)
	Lens and retina invaginate to form optic cup
	Primordium of cochlear duct
	Rami communicantes
	Spinal nerves reach muscle primordia
	Upper limb buds innervated
	External ear: Auricular hillocks merging
	Eyes located on sides of head
	Lens pits
	Lens vesicle open to surface (lens pore)
	Nose: Nasal pits
	Nose: Nasal plate (or disc) flat or concave
	Pigment in retina (external layer of optic cup)
	D1 and D2 no longer identifiable within diencephalon
	75% of midbrain covered by marginal layer
	All 16 secondary neuromeres
	Brain enlarges 50% since Carnegie Stage 13

	Brain: Cerebral hemispheres appear and begin rapid growth
	Brain: Lateral ventricles
	Cerebellum with intermediate and ventricular layers
	Cerebellum: Primordium found in alar plate of rhombomere 1
	Corpora striata primordia connected by commissural plate
	Cranial nerve 3
	Di-telencephalic sulcus
	Dorsal and ventral thalami
	Dorsal funiculus
	Hypothalamic sulcus
	Hypothalamus
	Mamillary region
	Medial and lateral longitudinal fasciculi
	Median ventricular eminence
	Pontine flexure
	Preoptic sulcus extends between optic evaginations
	Preoptico-hypothalamo-tegmental tract
	Primary meninx surrounds most of brain
	Rhombic lip
	Spinal cord wall with three zones: ventricular (ependymal) zone, mantle (intermediate) zone, and marginal zone
	Subthalamus with medial striatal ridge emerging
	Synencephalon
	Tegmentum
	Tentorium cerebelli, medial portion
	Terminal-vomeronasal crest contacts brain (olfactory area)
	Torus hemisphericus (TH)
	Velum transversum
	Ventral longitudinal fasciculus
	Ventral segment of hyoid arch subdivides
4 weeks, 5 days	Primordium of antitragus emerges from ventral subsegment of hyoid arch
	Gonad framework found in coelomic epithelium
	Thyroid detached from epithelium of pharynx in some embryos
	Lower limb bud rounded proximally and tapered distally
	Mesenchymal skeleton in upper and lower limbs
	Right and left neural processes
	Sclerotomic material around notochord (rhombomere D level)
	Vertebrae well defined
	Vertebral centra





































	Primary urogenital sinus
	Ureteric bud extends to pelvis of the ureter
	Bladder and rectum are separating caudal to ureters
	Dense mesenchyme surrounds much of gastrointestinal tract
	Esophagus elongates, passes dorsal to carina and between main stem bronchi
	Gall bladder and cystic duct
	Liver: Hepatic ducts
	Ventral pancreas appears as an offshoot of the cystic duct
	Lobar bud swellings denote areas of secondary bronchi
	Remnants of coelomic epithelium forming visceral pleura
	Atrioventricular cushions apposed
	Blood flow divided into right and left streams through atrioventricular canal, ventricles, outflow tract, and aortic sac
	Blood vessels penetrate diencephalon
	Capillary plexus surrounds esophagus
	Capillary plexus surrounds lung buds
	Cardiac mesenchyme surrounds ventricles and outflow tract
	Coronary arteries (terminal end)
	Foramen secundum begins in septum primum
	Left ventricle with thicker walls and greater volume than right
	Right subclavian artery originates from brachiocephalic artery and feeds right thyrocervical trunk and axillary and vertebral arteries
	Semilunar cusps
	Capsule present around lens
	Corneal epithelium overlying optic cup
	Ear: Endolymphatic duct
	Geniculate and vestibulocochlear ganglia separating
	Lens body now present containing some lens fibers
	Lower limb buds innervated
	Optic stalk
	Utricle, endolymphatic duct, and endolymphatic sac
	Utriculo-endolymphatic fold
	External ear primordia emerges from caudolateral portion of mandibular arch
	Face: Lateral and medial nasal processes bilaterally
	Lateral nasal processes along dorsolateral lip of nasal pits
	Lens vesicles closed, pores absent
	Nose: Nasal discs recede forming nasal pits
	Optic chiasm

	■ Adult lamina terminalis
	■ Amygdaloid area
	■ Cerebellar plate
	■ Cerebellum with marginal layer
	■ Fibers of dorsal funiculus reach level of C1
	■ First axodendritic synapses in cervical spinal cord
	■ First nerve fibers
	■ Habenular nucleus
	■ Habenulo-interpeduncular tract
	■ Lateral striatal ridge (derived from telencephalon and comprised mainly of neostriatum)
	■ Lateral ventricular eminence
	■ Locus caeruleus
	■ Longitudinal zones in diencephalon
	■ Marginal layer throughout most of diencephalon
	■ Material for sympathetic trunks scattered in cervical region
	■ Median striatal ridge (paleostriatum)
	■ Mesencephalic tract of CN 5
	■ Most cranial nerves seen
	■ Olfactory fibers reach brain
	■ Optic groove (also called preoptic recess)
	■ Postoptic recess
	■ Primordium of epiphysis
	■ Rhombomeres still identifiable
	■ Superior colliculi and its commissure
	■ Superior medullary velum
	■ Supramamillary commissure
	■ Synapses among motor neurons in spinal cord
	■ Tectobulbar tract
	■ Tentorium
	■ Third ventricle
	■ Trigemino-cerebellar tract
	■ Trochlear nerve root and decussation (CN IV)
	■ Hand plate emerges from distal upper limb bud
	□ Frontonasal prominence
5 weeks	■ Arytenoid and epiglottal swellings
	■ Lobar pattern mimics adult pattern
	■ T-shaped laryngeal inlet
	■ Pacemaker cells
<b>Unit 6: 5 to 6 Weeks</b>	
5 weeks, 2 days	■ Apical epidermal ridges
	■ Mammary ridge
	■ Maxillary and premaxillary fields still widely separated
	■ Nipples emerge from mammary crest

	 Gonad region separates from mesonephros
	 Gonadal primordium
	 Labioscrotal swelling
	 Urogenital fold and groove
	 Suprarenal gland: Cortex primordium
	 Suprarenal gland: Medulla
	 Thyroid detaches from pharynx
	 Thyroid with right and left lobes connected by an isthmus
	 Cartilage in mandibular arch
	 Hand area with central carpal region and digital plate with marginal vein
	 Pre-chondrocranium: Otic capsule, nasal capsule, and parachordal condensations
	 Primordia of primary palate
	 Ribs: Primordia now present for all 12 pairs
	 Vertebral column with 36 levels of ganglia and myotomes
	 Extra-ocular premuscle masses receive cranial nerve fibers [oculomotor (CN III), trochlear (CN IV), and abducens (CN VI) nerves]
	 Gluteal mesoderm
	 Infrahyoid premuscle masses
	 Limb mesoderm
	 Sternocleidomastoid-trapezius premuscle mass with spinal accessory nerve (CN11)
	 Thigh and thigh mesoderm
	 Tongue premuscle mass
	 Metanephros at level of sacrum
	 Urethral plate
	 Lesser omentum (ventral mesogastrun)
	 Peritoneal cavity
	 Rectum
	 Stomach: Greater and lesser curvatures
	 Yolk stalk disappears
	 Bronchial tree expanding
	 Cervical sinus diminished in size
	 Epiglottis
	 Primitive Larynx
	 Anterior, middle, and posterior cerebral arteries
	 Atrioventricular (AV) node
	 Atrioventricular cushions fuse with interventricular septum
	 Circle of Willis almost complete
	 Conotruncal septum

	Endocardial cushions (rostroventral and caudodorsal) begin fusing around atrioventricular canal forming right and left atrioventricular canals and two separate blood streams
	External carotid artery
	Foramen primum disappearing
	Hepatic portal vein
	Infundibulum of right ventricle
	Jugular lymph sac
	Lateral atrioventricular cushions
	Mesencephalic artery
	Myelencephalic artery
	Perilental blood vessels
	Primitive cavernous sinus drains primitive maxillary and supraorbital veins
	Primitive renal plexus
	Right ventricle feeds sixth (pulmonary) aortic arches; left ventricle feeds fourth aortic arches
	Semilunar valves (aortic and pulmonary) are forming
	Ventricles each with three parts: inlet, trabecular pouch, and outflow tract
	Ventricles enlarge and deepen side-by-side forming an ever growing interventricular septum
	Celiac plexus
	Cochlear nerve present
	Femoral and obturator nerves innervate rostralateral part of lower limb
	Hypoglossal nerve (CN XII) reaches tongue
	Intercostal nerves
	Lumbar and sacral plexuses
	Musculocutaneous, radial, ulna, and median nerves enter upper limb bud
	Nasal pits face more ventrally, still widely separated
	Nasofrontal groove
	Olfactory fibers connect nasal pits with brain
	Olfactory fibers enter brain
	Olfactory tubercle present
	Peroneal and tibial nerves innervate caudomedial part of lower limb
	Phrenic nerve
	Pigment in retina visible externally
	Primordium of cochlear pouch
	Tibial nerve innervates foot area
	Auricular hillocks on hyoid arch (antitragus and helix)
	Auricular hillocks on mandibular arch (tragus and crus)
	Blind nasal sac
	Nasal fin

	■ Alar lamina emerging with dense rhombic lip
	■ All cranial nerves identifiable
	■ Archipallium, paleopallium, and neopallium
	■ Area epithelialis
	■ Brain: Primordial plexiform layer in area of future temporal lobe
	■ Cajal-Retzius cells
	■ Commissure of the trochlear nerve
	■ Diencephalic subthalamic nucleus
	■ Dorsal and ventral thalami separated by groove
	■ Dorsal funiculus fibers reach medulla oblongata
	■ Epiphysis cerebri
	■ Glial cells identifiable adjacent to neurons
	■ Greater petrosal nerve
	■ Hippocampus: Gyrus dentatus
	■ Infundibular recess and infundibulum
	■ Interventricular foramen large
	■ Marginal ridge
	■ Medial and lateral ridges of corpus striatum are continuous
	■ Median forebrain bundle
	■ Neurohypophysial outgrowth
	■ Olfactory tubercle
	■ Pontine flexure deepens
	■ Posterior commissure
	■ Recurrent laryngeal nerve
	■ Reticular formation more defined
	■ Retinal fissure closes
	■ Splanchnic nerve
	■ Sulcus limitans hippocampi
	■ Superior laryngeal nerve
	□ Second pharyngeal arch more prominent
	□ Third pharyngeal arch recedes
<b>5½ weeks</b>	■ Initial tooth formation
<b>5½ weeks - 6 weeks</b>	■ Subtle movement begins
<b>5 weeks, 5 days - 7 weeks, 1 day</b>	■ Melanocytes in epidermis
<b>5 weeks, 6 days</b>	■ Facial growth centers grow and begin merging forming nose and upper jaw
	■ Genital eminence forms phallus or genital tubercle
	■ Gonad grows into oval shape with irregular surface
	■ Auditory ossicles identifiable in mesenchyme
	■ Cartilage in occipital sclerotomes (1-4)
	■ Digital rays in hand plate
	■ Femur: Chondrification begins
	■ Foot with rounded digital plate






































	 Hypoglossal foramen (or canal) through sclerotome 4 (area of future occipital bone)
	 Odontogenic epithelium emerges in six areas (four maxillary and two mandibular)
	 Primary palate components (right and left) fuse in midline
	 Primitive palatine groove
	 Primordium of cartilage within nasal septum
	 Vertebral centra begin chondrification
	 Primordia of orbital muscles
	 Calices
	 Mesonephros can produce urine
	 Pelvis of the ureter with three main divisions
	 Vesico-urethral canal
	 Biliary ducts within liver
	 Dorsal and ventral pancreas fuse but retain separate ducts
	 Duodenum enlarges proximal to and distal to bile and pancreatic ducts
	 Esophagus developing a submucous coat surrounding epithelium
	 Intestinal loop begins umbilical herniation
	 Primordial vermiform appendix
	 Stomach regions include gastric canal, fundus, corpus (or body), and pyloric antrum
	 Trachea: Precursors of tracheal cartilages
	 Condensing mesenchyme around junction between left and right atria and cardiac tube is precursor to mitral and tricuspid valves
	 Outflow tract rotates counterclockwise
	 Right and left atrioventricular canals totally separated
	 All parasympathetic cranial nerve ganglia identifiable
	 All spinal nerves present
	 Cell islands in olfactory tubercle
	 Crescentic lens cavity
	 Geniculate ganglion separate from vestibulocochlear nerve
	 Globular process emerges from each medial nasal process
	 Nasal fin connecting nasal disc and surface epithelium
	 Nasofrontal grooves
	 Olfactory tubercle with cellular islands
	 Hyomandibular groove enlarges (onset of concha and external auditory meatus formation)
	 Medial rims of nasal pits form nasal septum
	 Nostril becomes continuous with nasal sac
	 Primary lens fibers
	 Retinal fissure closed





































	Capillaries between adenohypophysis and hypothalamus
	Commissure of the oculomotor nerves
	Cortical nucleus in amygdaloid body
	Dentate and isthmic nuclei in cerebellum
	Dura begins forming in basal area
	Epiphysis cerebri with intermediate layer
	First hint of septal nucleus
	Frontal and temporal poles of cerebral hemispheres
	Gustatory fibers separate from common afferent tract
	Hemispheric stalk
	Intermediate layer in tectum mesencephali
	Interventricular foramen
	Mesencephalon with intermediate layer
	Somites: Pairs 38 and 39
	Spinal cord reaches caudal tip of body
	Subarachnoid space
	Synapses in spinal cord between interneurons and primary afferent neurons
	Ventral thalamus with intermediate layer
	Anterior choroid artery
6 weeks	Blood forming in liver
	Milk lines
	Handplates develop subtle flattening
	Medial skull cartilages: Parachordal, hypophyseal, and trabecular
	Tooth buds (primary teeth)
	Intestines fill base of umbilical cord
	Crown-heel length 1.6 cm

#### Unit 7: 6 to 7 Weeks

6 weeks, 2 days	Angiogenesis begins inside gonads
	Gonad grows into oval shape with irregular surface
	Ostium (abdominal) of uterine tube at rostral end of paramesonephric duct (in female embryos)
	Paramesonephric duct forms from rostral end of mesonephric duct
	Testicular cords in gonads of male embryos
	Testicular cords in male gonad
	Elbow regions sometimes identifiable
	Embryo with cervical and lumbar flexures
	Embryo with dorsal concavity
	Finger rays with early interdigital notching
	Humerus, radius, and ulna
	Humerus: Chondrocytes in phases one through three
	Scapula and clavicle









































	 Semicircular ducts form in order: anterior, posterior, and lateral
	 Sternum: Episternal cartilage created from fusion of right and left sternal bars
	 Tibia and fibula
	 Toe rays sometimes present
	 Deltoid muscle
	 External and internal abdominal oblique muscles
	 Levator scapulae muscle
	 Longus cervicis and semispinalis cervicis muscles
	 Pectoralis major muscles
	 Platysma muscle
	 Rectus abdominis muscle
	 Rectus capitus posterior and semispinalis capitis muscles
	 Serratus anterior muscles
	 Splenius and longissimus muscles
	 Stapedius muscle
	 "Common excretory duct is disappearing"
	 Cloacal membrane ruptures (stages 18-19)
	 Primordia of secretory tubules
	 Esophagus with muscular and submucous coats
	 Submandibular gland primordia
	 Bronchial tree with subsegmental buds
	 Bronchial tree with well established segmental bronchi
	 Lingula of left upper lobe
	 Aortic and pulmonary valves assuming shape of a cup
	 Brachiocephalic veins, right and left
	 Inferior vena cava
	 Interventricular septum: membranous part begins forming
	 Left coronary artery arises from aorta
	 Mesenchyme ridges in place of future mitral and tricuspid valves
	 Pulmonary and aortic blood flows completely separate
	 Secondary interventricular foramen sometimes closing (stage 18-21) interventricular septum
	 Septum secundum and foramen ovale (stages 18-21)
	 Bucconasal membrane
	 Bucconasal membrane detaches opening up nasal airway
	 Crus commune
	 Ethmoidal epithelium emerges from upper medial nasal wall
	 Frontonasal angle (marks location of future nasal bridge)







































	Mesenchyme thickenings mark beginning of "sclera and its muscular attachments"
	Nasal tip emerges
	Nerve fibers in retina
	Optic fibers
	Retina's outer lamina heavily pigmented
	Vomerolateral nerve and ganglion
	Vomerolateral organ marked by groove and located in fold of lower medial nasal wall
	Choanae
	Conjunctival sac marked by groove
	Cornea and conjunctiva
	Ear: Stapes primordium surrounds stapodial artery
	External ear: Crus helices forming from auricular hillocks two and three (from mandibular arch)
	Eyelid folds sometimes present
	Nasal fin splits forming choanae and buccolateral membrane
	Nasolacrimal duct begins as epithelial strand emanating from nasomaxillary groove
	Nostrils, nasal wings, and nasal septum easily seen
	Olfactory bulb sometimes with olfactory ventricle
	Primary lens fibers filling lens vesicle cavity
	Adenohypophysis no longer open to pharyngeal cavity
	Archistriatum
	Brain: Dentate nucleus in internal cerebellar swellings
	Brain: Pineal recess emerges representing anterior lobe of epiphysis
	Cerebrospinal fluid production begins
	Choroid plexuses in fourth and lateral ventricles
	Corpus striatum much larger extending to preoptic sulcus; has subtle groove
	External cerebellar swellings contain future flocculus
	Four amygdaloid nuclei
	Fourth ventricle: Choroid folds
	Hippocampus reaches olfactory region
	Interpeduncular fossa
	Neurohypophysis walls are folded
	Nucleus ambiguus of the vagus (CN10)
	Prosencephalic septum
	Red nucleus
	Substantia nigra
	Supra-optic commissure
6½ weeks	Volar pads on palms
6 weeks, 5 days	Greater thymic bud
	Cheeks form by merging of maxillary and mandibular processes

	 Mammary gland primordium
	 Mammary ridge disappears leaving only mammary gland primordium
	 Female duct
	 Gonads extend from levels T-10 to L-2
	 Rete ovarii (in female embryos)
	 Rete testis begins emerging from seminiferous cords (Stage 19-23) (in male embryos)
	 Tunica albuginea in male embryos
	 Suprarenal gland: Cortex
	 Suprarenal gland: Medulla populated by prechromaffin cells
	 Beginnings of occipital and sphenoid bones
	 Bilateral cartilaginous sternal bars tie ribs together; sternal bars join cranially to form the episternal bar in the midline
	 Cartilage within otic capsule envelops semicircular canals and cochlear duct
	 Cartilaginous styloid process
	 Ear: Cartilaginous malleus, incus, and stapes (the middle ear ossicles)
	 Ectomeninx covers lateral and dorsal surfaces of brain (laying the foundation for the flat bones of the skull)
	 Intervertebral discs form from caudal condensed portion of sclerotomes
	 Ischium and ilium
	 Labiodental lamina: Inner dental lamina and outer labiogingival band
	 Laryngeal cartilages
	 Limbs point forward (ventrally)
	 Orbitosphenoid cartilage located within ectomeninx near optic stalk
	 Ossification begins in maxilla (stages 19 -20)
	 Primitive palate (or intermaxillary segment)
	 Rib primordia become cartilaginous
	 Ribs each have an identifiable head and shaft
	 Trachea: Tracheal cartilage
	 U-shaped labiodental lamina form along upper and lower oral cavity
	 Vertebral column represented by cartilaginous centrum, neural arch, and short transverse process
	 Esophagus: Muscularis layer adjacent to esophageal plexus
	 Gluteal muscle group
	 Iliopsoas muscles
	 Infrahyoid muscles
	 Internal intercostal muscles
	 Limb extensor muscles located dorsally






































	■ Limb flexor muscles located ventrally
	■ Midgut: Muscularis
	■ Muscle tissue forming around phrenic nerve within septum transversum portion of diaphragm
	■ Pharyngeal constrictor muscle
	■ Premuscle mass of the muscles of mastication innervated by mandibular nerve
	■ Quadratus lumborum muscle
	■ Rhomboid and scalene muscles
	■ Sternocleidomastoid and trapezius muscles distinct and innervated by separate branches of spinal accessory nerve (CN XI)
	■ Thenar and hypothenar eminences
	■ Tongue forms from swellings in floor of pharynx
	■ Tongue: Extrinsic muscles identifiable
	■ Tongue: Intrinsic muscles identifiable
	■ Transversospinal and erector spinae muscle groups
	■ Upper limb flexors innervated by musculocutaneous, median, and ulnar nerves
	■ Major calyces, cranial and caudal, with collecting tubules within metanephrogenic mass
	■ Mesonephros extends from T-9 to L-3
	■ Metanephros extends from T-12 to L-2
	■ Renal capsule covers distal collecting tubules
	■ Renal vesicles form in part of metanephros
	■ Ureter forms from "proximal segment of metanephric diverticulum"
	■ Urogenital sinus comprised of three parts: Bladder, pelvic, and phallic portions
	■ Anal folds adjacent to anal membrane
	■ Anal membrane
	■ Duodenum: "Assumes the shape of an arc"
	■ Greater omentum
	■ Lateral palatine process
	■ Liver: rapid growth, right side greater than left
	■ Median mandibular groove disappears as mandibular processes merge in midline
	■ Palatine fossa (from pharyngeal pouch 2)
	■ Primitive oral cavity
	■ Primitive rima oris replaces stomodeum
	■ Stomach wall layers: Mucosa, submucosa, muscularis, and serosa
	■ Submandibular and parotid gland buds
	■ Submandibular gland duct
	■ Bronchial tree: First generation of subsegmental bronchi complete
	■ Glottis, primitive









































	<ul style="list-style-type: none"> <li>Lung sac, right: Oblique and horizontal fissures define upper, lower, and middle lobes</li> </ul>
	<ul style="list-style-type: none"> <li>Lung sac: Apex and base</li> </ul>
	<ul style="list-style-type: none"> <li>Lung, left: Oblique fissure defines upper and lower lobes</li> </ul>
	<ul style="list-style-type: none"> <li>"Septum primum fuses with endocardial cushions" obliterating ostium primum and creating the ostium secundum</li> </ul>
	<ul style="list-style-type: none"> <li>Apex of left ventricle</li> </ul>
	<ul style="list-style-type: none"> <li>Circulus arteriosus (Circle of Willis) complete</li> </ul>
	<ul style="list-style-type: none"> <li>External iliac arteries</li> </ul>
	<ul style="list-style-type: none"> <li>Iliac lymph sac</li> </ul>
	<ul style="list-style-type: none"> <li>Intercostal and subcostal arteries</li> </ul>
	<ul style="list-style-type: none"> <li>Internal thoracic artery and costocervical trunk</li> </ul>
	<ul style="list-style-type: none"> <li>Mesenteric lymph sac</li> </ul>
	<ul style="list-style-type: none"> <li>Mesonephric artery feeds mesonephros, gonads, and suprarenal glands</li> </ul>
	<ul style="list-style-type: none"> <li>Papillary muscles</li> </ul>
	<ul style="list-style-type: none"> <li>Pontine, superior cerebellar, and anterior and posterior inferior cerebellar arteries replace myelencephalic and metencephalic arteries</li> </ul>
	<ul style="list-style-type: none"> <li>Primitive marginal sinus drains diencephalon</li> </ul>
	<ul style="list-style-type: none"> <li>Primitive tentorial sinus drains cerebral vesical</li> </ul>
	<ul style="list-style-type: none"> <li>Primitive transverse and sigmoid sinuses</li> </ul>
	<ul style="list-style-type: none"> <li>Pulmonary arteries (right and left)</li> </ul>
	<ul style="list-style-type: none"> <li>Right coronary artery arises from aorta</li> </ul>
	<ul style="list-style-type: none"> <li>Splenic vein</li> </ul>
	<ul style="list-style-type: none"> <li>Tricuspid and mitral valves</li> </ul>
	<ul style="list-style-type: none"> <li>Anterior chamber between iridopupillary membrane and thickened ectoderm</li> </ul>
	<ul style="list-style-type: none"> <li>Auditory tube and primitive tympanic cavity form from tubotympanic recess pharyngeal pouch 1)</li> </ul>
	<ul style="list-style-type: none"> <li>Celiac, superior mesenteric, and inferior mesenteric preaortic ganglia</li> </ul>
	<ul style="list-style-type: none"> <li>Choana</li> </ul>
	<ul style="list-style-type: none"> <li>Cochlear duct tip grows upward</li> </ul>
	<ul style="list-style-type: none"> <li>Esophageal plexus formed by vagal nerves (CN X)</li> </ul>
	<ul style="list-style-type: none"> <li>Facial nerve (CN VII) branches: Chorda tympani, greater petrosal, posterior auricular, and digastric</li> </ul>
	<ul style="list-style-type: none"> <li>Facial nerve (CN VII) reaches cervicomandibular region</li> </ul>
	<ul style="list-style-type: none"> <li>Glossopharyngeal nerve (CN IX) innervates stylopharyngeus premuscle mass</li> </ul>
	<ul style="list-style-type: none"> <li>Hypoglossal nerve (CN XII) innervates separating tongue muscles</li> </ul>
	<ul style="list-style-type: none"> <li>Linguogingival groove</li> </ul>
	<ul style="list-style-type: none"> <li>Nasolacrimal duct forms from maxillonasal groove</li> </ul>
	<ul style="list-style-type: none"> <li>Nasolacrimal ducts extend from medial eyes to primitive nasal cavity</li> </ul>

	 Nerve fibers begin extending from retina
	 Optic fibers enter chiasmatic plate
	 Primitive nasal cavity
	 Primordial vitreous body
	 Superior, middle, and inferior cervical ganglia
	 Trigeminal nerve (CN V) with ophthalmic, maxillary, and mandibular divisions reach their destinations
	 Vagal trunks, anterior and posterior, extending into abdomen
	 Eyelids: Upper and lower lids present and growing
	 Sacculle and cochlear duct
	 Adenohypophysis: Lateral lobes of pars tuberalis
	 Adenohypophysis: Pars intermedia emerging
	 Brain: Internal capsule formation underway
	 Cerebral hemispheres cover half of diencephalon
	 Dorsal and ventral cochlear nuclei
	 Fourth ventricle: Lateral recesses
	 Ganglion of nervus terminalis
	 Globus pallidus externus in the diencephalon
	 Habenular commissure
	 Intermediate layer in dorsal thalamus
	 Lemniscal decussation
	 Lower limb nerves (femoral, obturator, sciatic, common peroneal, and tibial) identifiable
	 Medial accessory olivary nucleus
	 Neurohypophyseal bud
	 Nuclei of forebrain septum
	 Nucleus accumbens
	 Occipital pole of cerebral hemispheres
	 Optic stalk with barely discernible lumen
	 Paraphysis marks dividing line in roof between telencephalon and diencephalon
	 Primitive filum terminale
	 Radial nerve innervates upper limb extensors
	 Rhombomeres no longer distinguishable
	 Subcommissural organ
	 Zona limitans intrathalamica between dorsal and ventral thalami
6 weeks, 6 days	 Cloacal membrane ruptures
7 weeks	 Head rotates
	 Ovaries
	 The heart has four chambers and is nearly complete.
	 The heart rate peaks at 165 to 170 beats per minute.
	 Crown-heel length 2.2 cm
<b>Unit 8: 7 to 8 Weeks</b>	
7 weeks, 1 day	 Facial processes no longer distinguishable

	 Ovaries full of primitive oogonia, intermediate pregranulosa cells, and mesenchyme
	 Testes with short straight tubules
	 Upper limbs with slightly flexed elbows
	 Diaphragm: Central tendon
	 Renal vesicles with S-shaped lumina
	 Submandibular gland: Solid epithelial ducts enlarge and begin to branch
	 Adenohypophysis with new capillaries on rostral surface
	 Scalp vascular plexus
	 Cochlear duct tip growing horizontally
	 Lens cavity completely filled
	 Optic commissure
	 Optic fibers extend to optic chiasma
	 Cornea with three layers
	 Brain: Inferior colliculus (in mesencephalon)
	 Cerebral hemispheres expand beyond lamina terminalis
	 Cerebral hemispheres extend over two-thirds of diencephalon
	 Interpeduncular groove
	 Medial septal nucleus
	 Nigrostriatal fibers
	 Nucleus of diagonal band
	 Sacrocaudal spinal cord formation (secondary neurulation) complete
	 Sensory pathways: Cuneate and gracile decussating fibers
	 Septum verum
	 Spinothalamic tract
<b>7 weeks, 1 day - 8 weeks</b>	 Stomach: Folds in stomach wall
<b>7 weeks, 2 days</b>	 Arteries and veins of heart complete
<b>7 weeks, 3 days</b>	 Volar pads begin to emerge on fingertips
	 Chondrocranium with dorsum sellae and hypophysial fossa
	 Dens (of second cervical vertebrae)
	 Sternoclavicular joint and manubrium
	 Trachea: Thyroid cartilage
	 Wrists slightly flexed
	 Gluteus medius and gluteus minimus muscles
	 Iliacus muscles
	 Mylohyoid and infrahyoid muscles
	 Orbicularis oculi muscles
	 Submandibular gland: Solid ducts with definitive branches
	 Anterior and posterior choroid arteries



	 Left superior vena cava disappears (Stages 21-23)
	 Scalp vascular plexus moving toward vertex
	 Cornea: Substantia propria layer
	 Fibers of optic nerve reach brain
	 Eyelids growing rapidly
	 Anterior and inferior horns of lateral ventricle
	 Brain: Insula within cerebral hemisphere
	 C-shaped lateral ventricle
	 Cerebral hemispheres cover 75% of diencephalon
	 Cerebral hemispheres cover more than half of diencephalon
	 Cortical plate within primordial plexiform layer
	 Glial and neurilemmal (Schwann) cells within cranial nerves
	 Globus pallidus internus
	 Internal fiber layer of cerebellum
	 Lateral olfactory tract
	 Primordium of dentate nucleus
	 Pyramidal cells in hippocampus
	 Subthalamic nucleus proper, entopeduncular nucleus, and globus pallidus externus within subthalamus
	 Sulcus transversus rhombencephali
	 Ventral part of lateral geniculate body
<b>7½ weeks</b>	 Fingertips thicken
	 Plantar pads toes
	 EKG pattern similar to adult
<b>7 weeks, 5 days</b>	 Endolymphatic and jugular foramina
	 Hands can reach one another and fingers can overlap
	 Optic foramen, foramen rotundum, internal acoustic foramen
	 Osteoblasts emerge
	 Pelvis: Obturator foramen
	 Obturator internus muscles
	 Rectus femoris muscle
	 Large glomeruli present within metanephros
	 Submandibular gland: Secondary branching with lumen formation starting at oral end of duct
	 Costodiaphragmatic recess of pleural cavity
	 Chordae tendineae (Stages 22 and 23)
	 Intradural veins (sinuses)
	 Scalp vascular plexus 75% of the way to the vertex
	 Cochlear duct's second loop growing upward
	 Scleral condensation
	 Tragus and antitragus taking shape
	 Eyelids continue growing rapidly over the surface of the cornea

	 Optic nerve acquires a sheath
	 Brain: Claustrum
	 Brain: Cortical plate within cerebral hemispheres
	 Brain: Internal capsule with connections to epithalamus, dorsal thalamus, and mesencephalon
	 Brain: Putamen
	 Cerebral hemispheres cover 75% of diencephalon
	 Commissural plate thickens
	 Cortical plate expanding rapidly
	 Folds in roof of third ventricle
	 Nerve fibers between neopallial subplate and internal capsule
	 Thalamocortical fibers
<b>8 weeks</b>	 Ductus deferens
	 Interstitial cells forming within testis
	 Testicular tubules
	 Male embryos are making testosterone already!
	 Anterior inferior iliac spine
	 Costal cartilage
	 Enamel organ
	 Femur: Head and acetabular fossa
	 Glenoid fossa
	 Greater trochanter
	 Head of humerus
	 Inguinal ligament
	 Joint development: Cavitation underway in hip, knee, and ankle (in some embryos)
	 Joint development: Cavitation underway in shoulder, elbow, and wrist (in some embryos)
	 Nucleus pulposus (from notochord)
	 Ossification underway in scapula and distal phalanges in some embryos
	 Pubic symphysis
	 Scapular spine and notch
	 Skull: Foramen magnum (wide)
	 Skull: Ossification underway in some embryos
	 Superior and inferior pubic rami
	 Ulna: Styloid process and olecranon
	 Vertebrae cartilaginous (33 or 34 in number)
	 Anterior digastric muscles
	 Depressor anguli oris muscle
	 Esophagus: Longitudinal muscles
	 Obliquus superior capitis muscle
	 Obturator externus, gluteus maximus, and hamstring muscles
	 Posterior belly of the digastric muscle

	Psoas tendon
	Rectus sheath with anterior and posterior lamina
	Temporal and lateral pterygoid muscles
	Zygomaticus major muscle
	Kidneys at level of first three lumbar vertebrae
	Metanephros: Numerous large glomeruli
	Metanephros: Secretory tubules elongating and becoming convoluted
	Sinusal tubercle
	Urethra
	Gastrolial ligament
	Nerves reaching intestinal loop
	Submandibular gland: Lumen present in terminal portions of duct
	Submandibular gland: Mesodermal sheath surrounds gland
	Unfused uvula (edge of unfused palatine shelf) and secondary palate
	Pseudoglandular stage begins
	Azygos vein
	Blood supply to the brain closely resembles adult pattern
	Hemiazygos veins
	Inferior epigastric artery
	Inferior vena cava valve at junction of right atrium
	Scalp vascular plexus nearing vertex
	Submandibular glands: Angiogenesis begins around epithelial tree (ducts)
	Superior sagittal sinus
	Cochlear duct's 2.5 coils nearly complete
	Cranial nerve distribution mimics adult pattern
	Eye: Secondary vitreous body
	Lens: Secondary lens fibers emerging
	Retina: Eight layers present
	Retina: Four of the ten adult layers present
	Tympanic membrane
	Eyelids fusing laterally and medially
	Optic tract reaches ventral portion of lateral geniculate body
	"The rhombencephalon...presents striking resemblance to that of the newborn."
	Amygdala area
	Brain represents 43% of embryo
	Brain: Caudate nucleus and putamen within corpus striatum
	Cerebellar commissures
	Cerebellum with external germinal layer

	Cerebral hemispheres cover lateral portion of diencephalon
	Choroid plexus now lobular
	Cortical plate covers nearly all of neopallial surface
	Dura lines entire vertebral canal
	Fasciculus cuneatus and fasciculus gracilis form the decussation of the medial lemnisci
	Greater palatine nerve
	Grey and white matter
	Hippocampus reaches temporal pole
	Inferior and superior cerebellar peduncles
	Most cisterns present
	Principal nucleus of inferior olivary nuclei
	Pyramidal decussations
	Right- and left-handedness emerges
	Suprapineal recess
	Suprascapular nerve
	Vermis of cerebellum
	Crown-heel length 4.3 cm
	Embryonic Period Ends
	The 8-week embryo has formed more than 4,000 permanent body parts.

#### Unit 9: 8 to 9 Weeks

8 weeks, 1 day	Humerus: Bone marrow replaces cartilage
8 weeks, 1 day - 9 weeks	Anal canal patent
8½ weeks	Eyelids completely fused
	Neurons synapse in cerebral cortex (marginal zone)
9 weeks	Drinking fluid is becoming routine
	Sucking the thumb
	External capsule
	Olivary nucleus with five components

#### Unit 10: 9 to 10 Weeks

9 weeks - 10 weeks	Larynx recanalizes
10 weeks	Palatine tonsils
	Three-layered epidermis
	Now, all the bones are getting harder
	Tooth buds (secondary teeth)
	Physiologic herniation ends
	Commissure of the fornix
	Crown-heel length 7.5 cm

#### Unit 11: 10 to 11 Weeks

10 weeks - 12 weeks	Langerhans cells enter epidermis
10½ weeks	Volar and plantar pads regress
11 weeks	Intermediate layer
	Intestines absorb water & glucose

	<div></div> Small intestine lined with villi <div></div> Crown-heel length
<b>Unit 12: 11 to 12 Weeks</b>	
<b>12 weeks</b>	<div></div> Sebaceous glands <div></div> Many different hormones are present in pituitary gland <div></div> All facial muscles in final positions <div></div> Bowel movements <div></div> Liver: Bile production begins <div></div> Corpus callosum <div></div> Crura cerebri <div></div> Myelination in spinal cord <div></div> Crown-heel length 12 cm <div></div> Head circumference 10 cm
<b>Unit 13: 3 to 4 Months</b>	
<b>13 weeks</b>	<div></div> Teeth are growing <div></div> Crown-heel length 15 cm
<b>14 weeks</b>	<div></div> Girls move their jaws more than the boys do <div></div> Cerebellum resembles adult structure <div></div> Crown-heel length 17 cm
<b>15 weeks</b>	<div></div> Crown-heel length 19.5 cm
<b>16 weeks</b>	<div></div> Quickening <div></div> Colon lined with villi <div></div> Canalicular stage begins <div></div> Crown-heel length 21 cm
<b>Unit 14: 4 to 5 Months</b>	
<b>18 weeks</b>	<div></div> Apocrine sweat glands <div></div> Sweat glands
<b>19 weeks</b>	<div></div> Melanin production <div></div> Sulci on surface of cerebral hemispheres
<b>20 weeks</b>	<div></div> Peyer's patches <div></div> Surfactant production (low levels) <div></div> Crown-heel length 28 cm <div></div> Head circumference 20 cm
<b>Unit 15: 5 to 6 Months</b>	
<b>21 weeks</b>	<div></div> Periderm disappears <div></div> Stratum corneum
<b>22 weeks</b>	<div></div> Cornea structure <div></div> Behavioral states
<b>23 weeks</b>	<div></div> Brain weight 100 grams
<b>24 weeks</b>	<div></div> Crown-heel length 34.5 cm
<b>Unit 16: 6 to 7 Months</b>	
<b>25 weeks</b>	<div></div> Intestinal lining contains all adult cell types
<b>26 weeks</b>	<div></div> Terminal sac stage begins
<b>28 weeks</b>	<div></div> Crown-heel length 39.5 cm

Unit 17: 7 to 8 Months	
30 weeks	<input type="checkbox"/> Head circumference 30 cm
32 weeks	<input checked="" type="checkbox"/> Esophagus: Lower esophagus muscles functional
	<input type="checkbox"/> Crown-heel length 45 cm
Unit 18: 8 to 9 Months	
36 weeks	<input checked="" type="checkbox"/> Surfactant production accelerates
	<input type="checkbox"/> Brain weight 300 grams
	<input type="checkbox"/> Crown-heel length 48.5 cm
Unit 19: 9 Months to Birth	
37 weeks	<input checked="" type="checkbox"/> Fetus drinks an estimated 15 oz (or 450cc) of amniotic fluid/day
38 weeks	<input checked="" type="checkbox"/> Heart beats 54 million times before birth
	<input checked="" type="checkbox"/> Spinal cord ends at third lumbar vertebrae
	<input type="checkbox"/> Brain weight 350 grams
	<input type="checkbox"/> Crown-heel length 50 cm
	<input type="checkbox"/> Head circumference 35 cm
	<input type="checkbox"/> Time to be born!
66 weeks, 5 days	<input checked="" type="checkbox"/> Premuscle cells form sheets representing muscles of facial expression