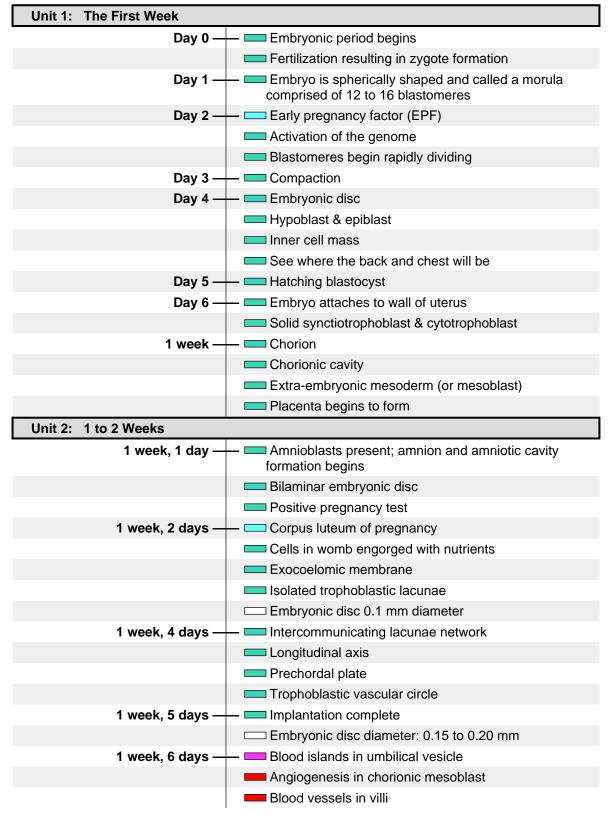
Prenatal Development Timeline

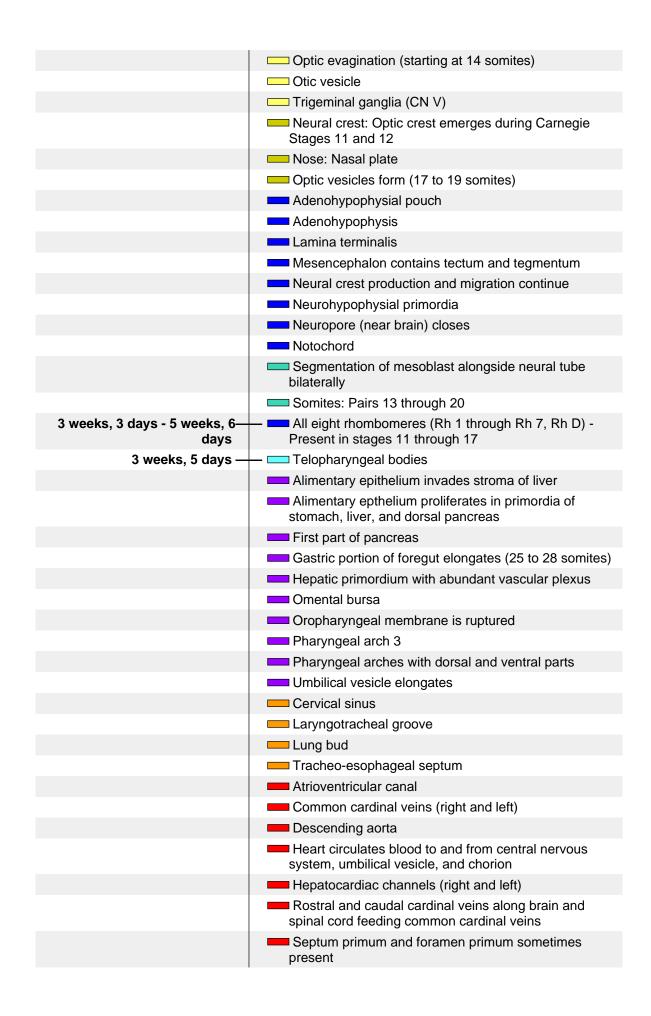
Nervous	Cardiovascular	Muscular	Early Events
Special Senses	Respiratory	C Skeletal	Growth Parameters
📩 Blood & Immune	Gastrointestinal	Endocrine	C General
m Skin/Integument	Renal/Urinary	Reproductive	Movement

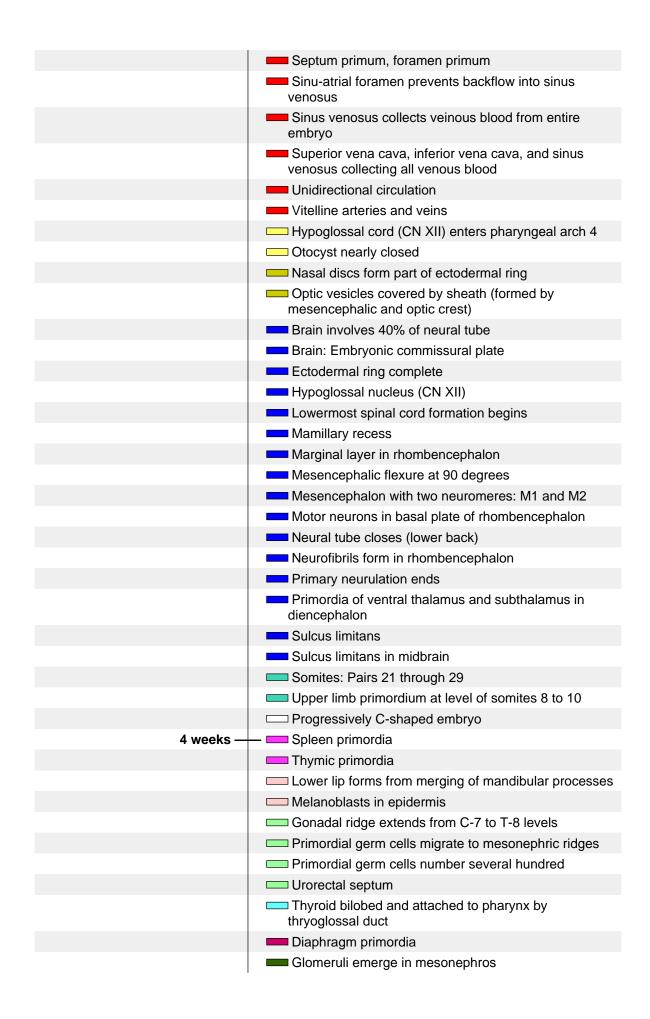


	Connecting stalk
	Primordial blood vessels
	Amnion with single cell layer
	Chorionic villi
2 weeks —	 Embryonic epiblast gives rise to primitive streak and primitive node and
	Volk sac
	Yolk sac
Unit 3: 2 to 3 Weeks	
2 weeks, 1 day —	— 💷 3 germ layers
	Cloacal membrane
	Primitive groove
	Rostral-caudal orientation
2 weeks, 2 days —	— 💳 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
2 weeks, 4 days —	— 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)
2 weeks, 5 days —	— Prechordal plate with 2 retinal fields
2 weeks, 6 days —	— — Numerous blood islands in umbilical vesicle
	Septum transversum (primitive diaphragm)
	Foregut
	Cropharyngeal 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)
	Onblical vents (fight and left) Optic primordia fill neuromere D2
	Optic principal in neuronnere D2 Otic pits
	Chiasmatic plate







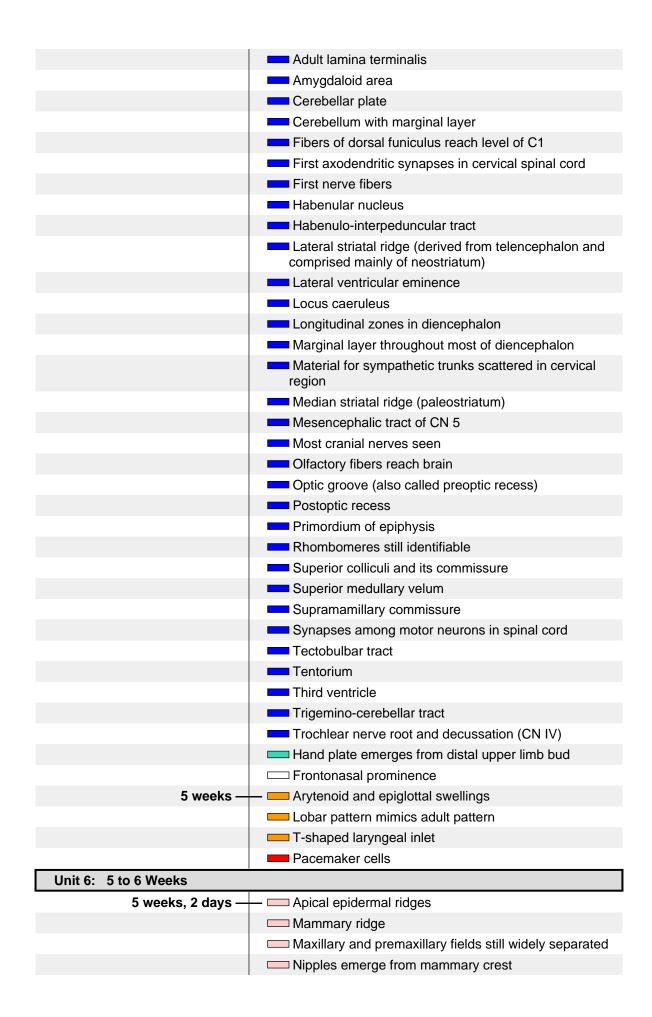


	Small arteries emerging throughout mesoderm
	Ventricle walls trabeculated
	Vertebral arteries
	Vitelline veins empty exclusively into hepatic plexus
	Most cranial nerve ganglia
	Trigeminal, glossopharyngeal, and vagal preganglia
	Basement membrane of otic disc surrounds otic vesicle
	Endolymphatic appendage
	Ctic invagination
	Otic vesicle closes
	Terminal-vomeronasal neural crest
	Brain: Commissural plate
	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 sudivides 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 pedical 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
	Small intestine forming coils Tongue: Hypopharyngeal eminence
	-

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
Atrioventricula 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 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
Sinu-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
- Drain chiarges 5070 since Carneyle Staye 15

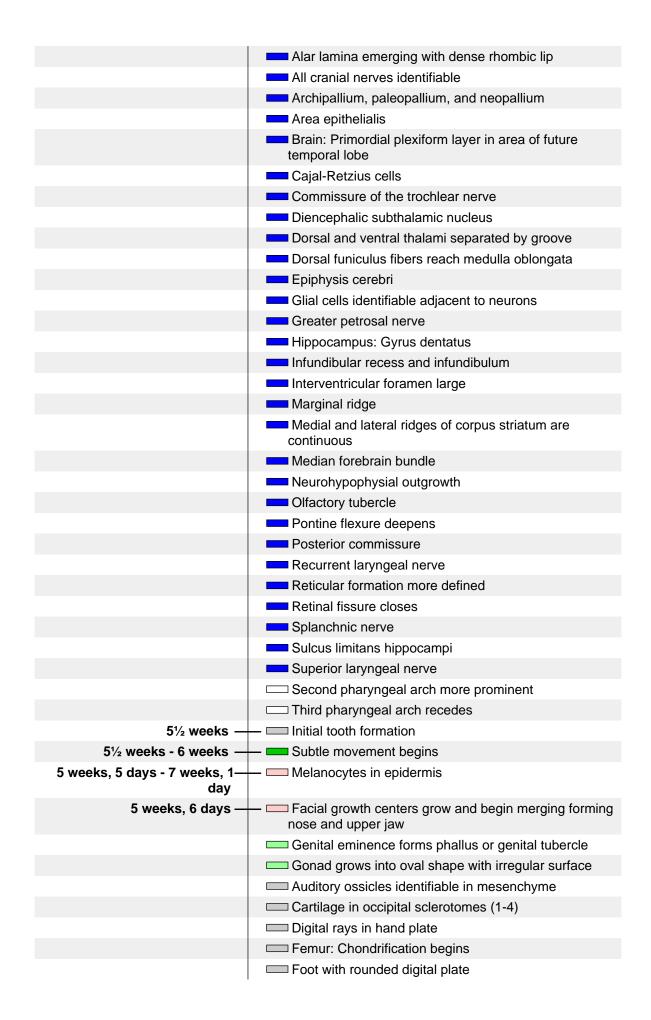
	Brain: Cerebral hemispheres appear and begin rapid growth
	Brain: Lateral ventricles
	Cerebellum with intermediate and ventricular layers
	Cerebellum: Primordium found in alar plate of rhombomere 1
	Corpora striata primordia connected by commissural plate
	Cranial nerve 3
	Di-telencephalic sulcus
	Dorsal 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 Esophague selongates, passes dorsal to carina and between main stem bronchi Gall bladder and cystic duct Uver: 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 cushions apposed Blood vessels penetrate diencephalon Capillary plexus surrounds esophagus Capillary plexus surrounds ung buds Caridac mesenchyme surrounds ventricles and outflow tract, and aortic sac 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 verterial rateries Geniculate and vestibulocochear ganglia separating Lens body now present containing some lens fibers Doylic stalk Utricle, endolymphatic duct, and endolymphatic sac Utricle, endolymphatic fiold External ear primordia emerges from caudolateral portion of mandbular arch Divis stalk Utricle endolymphatic duct, and endolymphatic sac Utricle endolymphatic field External ear primordia emerges from caudolateral portion of mandbular arch External ear primordia emerges from caudolateral portion of mandbular arch Optic stalk Utricle, endolymphatic duct, and endolymph	
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Optic stalkUtricle, endolymphatic duct, and endolymphatic sacUtriculo-endolymphatic foldExternal ear primordia emerges from caudolateral portion of mandibular archFace: Lateral and medial nasal processes bilaterallyLateral nasal processes along dorsolateral lip of nasal pitsLens vesicles closed, pores absentNose: Nasal discs recede forming nasal pits	Lens body now present containing some lens fibers
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 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 	Coptic stalk
 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 	Utricle, endolymphatic duct, and endolymphatic sac
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	Utriculo-endolymphatic fold
Lateral nasal processes along dorsolateral lip of nasal pits Lens vesicles closed, pores absent Nose: Nasal discs recede forming nasal pits	
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Nose: Nasal discs recede forming nasal pits	
	Lens vesicles closed, pores absent
	Nose: Nasal discs recede forming nasal pits

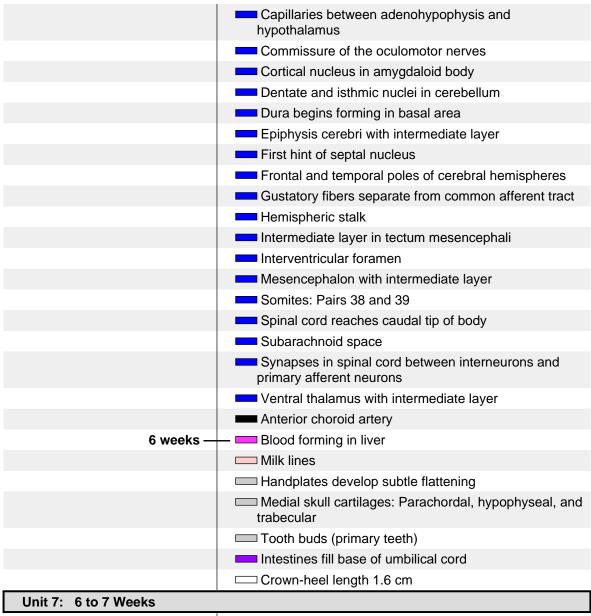


Conad region separates from mesonephros
Conadal primordium
Labioscrotal swelling
Urogenital fold and groove
Suprarenal gland: Cortex primordium
C Suprarenal gland: Medulla
Thyroid detaches from pharynx
Thyroid with right and left lobes connected by an isthmus
Cartilage in mandibular arch
Hand area with 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 rostrolateral 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
Clfactory 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



	Hypoglossal foramen (or canal) through sclerotome 4 (area of future occipital bone)
	Odontogenic epithelium ermerges in six areas (four maxillary and two mandibular)
	Primary palate components (right and left) fuse in midline
	Primitive palatine groove
	\Box 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)
	external auditory meatus formation) Medial rims of nasal pits form nasal septum
	Medial rims of nasal pits form nasal septum



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
	Capula and clavicle

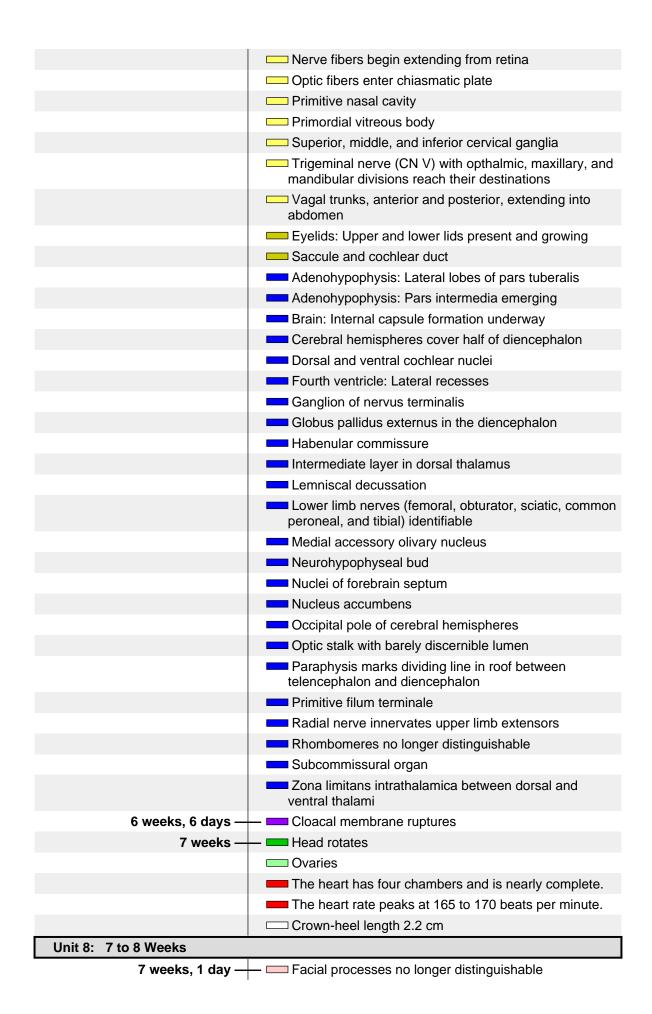
Semicircular ducts form in order: anterior, posterior, and lateral
Sternum: Episternal cartilage created from fusion of right and left sternal bars
Tibia and fibula
Toe rays sometimes present
Deltoid muscle
External and internal abdominal oblique muscles
Levator scapulae muscle
Longus cervicis and semispinalis 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)

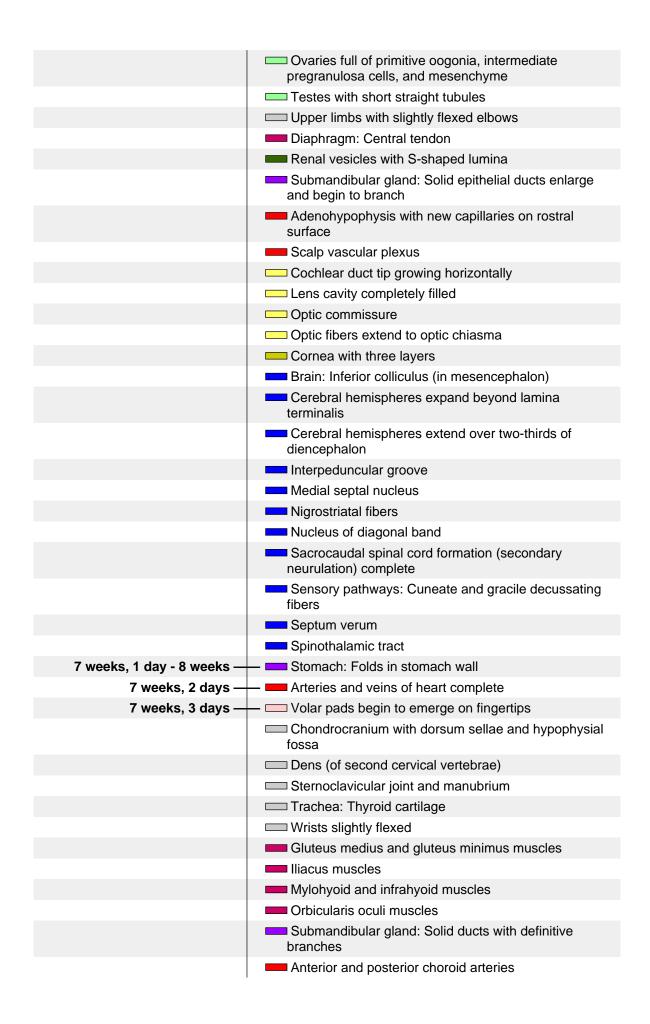
Mesenchyme thickenings mark beginning of "sclera and its muscular attachments" Nasal tip emerges Nerve fibers in retina Optic fibers Retina's outer lamina heavily pigmented Vomeronasal nerve and ganglion Vomeronasal nerve and ganglion Vomeronasal organ marked by groove and located in fold of lower medial nasal wall Choanae Conjunctival sac marked by groove Cornea and conjunctiva Ear: Stapes primordium surrounds stapedial artery External ear: Crus helicis forming from auricular hillocks two and three (from mandibular arch) Eyelid folds sometimes present Nasal fin splits forming choanae and bucconasal membrane Nasolacrimal duct begins as epithelial strand emandring from nasomaxillary groove Nostrils, nasal wings, and nasal septum easily seen Olfactory bulb sometimes with olfactory ventricle Primary lens fibers filling lens vesicle cavity Achenstriatum Brain: Dentate nucleus in internal cerebellar swellings Brain: Pineal recess emerges representing anterior lobe of epiphysis Cerebrospinal fluid production begins Corpus striatum much larger extending to preopic suicus; has subtile groove External cerebellar swellings contain future flocculus Fourt anygdaloid nuclei Fourt anygdaloid nuclei Fourt mychalous contain future flocculus Four anygdaloid nuclei Fourt anygdaloid nuclei Fourt anygdaloid nuclei Fourt anygdaloid nuclei Substantia nigra Sub		
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 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 6 weeks, 5 days Greater thymic bud Cheeks form by merging of maxillary and mandibular 		External cerebellar swellings contain future flocculus
 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 6 weeks, 5 days Greater thymic bud Cheeks form by merging of maxillary and mandibular 		Four amygdaloid nuclei
 Interpeduncular fossa Neurohypophysis walls are folded Nucleus ambiguus of the vagus (CN10) Prosencephalic septum Red nucleus Substantia nigra Supra-optic commissure 6 weeks, 5 days Greater thymic bud Cheeks form by merging of maxillary and mandibular 		Fourth ventricle: Choroid folds
 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 		Hippocampus reaches olfactory region
 Nucleus ambiguus of the vagus (CN10) Prosencephalic septum Red nucleus Substantia nigra Supra-optic commissure 61½ weeks — Volar pads on palms 6 weeks, 5 days — Greater thymic bud Cheeks form by merging of maxillary and mandibular 		Interpeduncular fossa
 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 		Neurohypophysis walls are folded
 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 		Nucleus ambiguus of the vagus (CN10)
Substantia nigra Supra-optic commissure 6½ weeks		Prosencephalic septum
6½ weeks Supra-optic commissure 6½ weeks Volar pads on palms 6 weeks, 5 days Greater thymic bud Cheeks form by merging of maxillary and mandibular		Red nucleus
6 ¹ / ₂ weeks — Volar pads on palms 6 weeks, 5 days — Greater thymic bud Cheeks form by merging of maxillary and mandibular		Substantia nigra
6 weeks, 5 days — Greater thymic bud Cheeks form by merging of maxillary and mandibular		Supra-optic commissure
Cheeks form by merging of maxillary and mandibular	6½ weeks —	— Colar pads on palms
	6 weeks, 5 days —	— — Greater thymic bud

Mammary gland primordium
Mammary ridge disappears leaving only mammary gland primordium
Emale 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 illium
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 tranverse 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

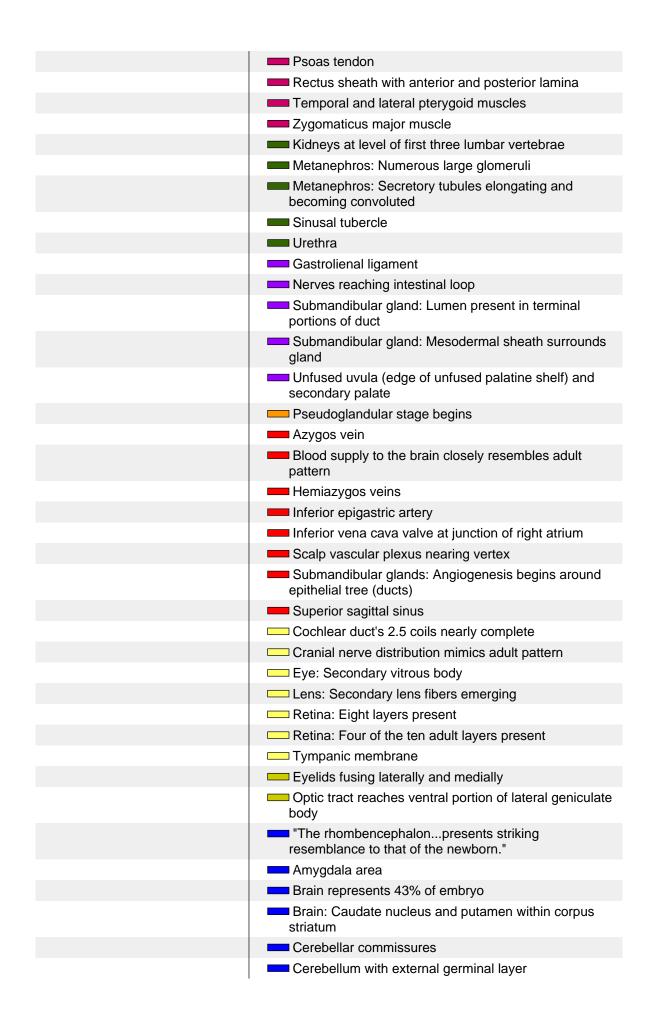
Lung sac, right: Oblique and horizontal fissures define upper, lower, and middle lobes
Lung sac: Apex and base
Lung, left: Oblique fissure defines upper and lower lobes
"Septum primum fuses with endocardial cushions" obliterating ostium primum and creating the ostium secundum
Apex of left ventricle
Circulus arteriosus (Circle of Willis) complete
External iliac arteries
Iliac lymph sac
Intercostal and subcostal arteries
Internal thoracic artery and costocervical trunk
Mesenteric lymph sac
Mesonephric artery feeds mesonephros, gonads, and suprarenal glands
Papillary muscles
Pontine, superior cerebellar, and anterior and posterior interior cerebellar arteries replace myelencephalic and metencephalic arteries
Primitive marginal sinus drains diencephalon
Primitive tentorial sinus drains cerebral vesical
Primitive transverse and sigmoid sinuses
Pulmonary arteries (right and left)
Right coronary artery arises from aorta
Splenic vein
Tricuspid and mitral valves
Anterior chamber between iridopupillary membrane and thickened ectoderm
Auditory tube and primtive tympanic cavity form from tubotympanic recess pharyngeal pouch 1)
Celiac, superior mesenteric, and inferior mesenteric preaortic ganglia
Choana Choana
Cochlear duct tip grows upward
Esophageal plexus formed by vagal nerves (CN X)
Facial nerve (CN VII) branches: Chorda tympani, greater petrosal, posterior auricular, and digastric
Facial nerve (CN VII) reaches cervicomandibular region
Glossopharyngeal nerve (CN IX) innervates stylopharyngeus premuscle mass
Hypoglossal nerve (CN XII) innervates separating tongue muscles
Linguogingival groove
Nasolacrimal duct forms from maxillonasal groove
Nasolacrimal ducts extend from medial eyes to primitive nasal cavity







	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
8 weeks —	— 📖 Ductus deferens
	Interstitial cells forming within testis
	Testicular tubules
	Male embryos are making testosterone already!
	C Anterior inferior iliac spine
	Costal cartilage
	Enamel organ
	E Femur: Head and acetabular fossa
	C 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
	C Scapular spine and notch
	Skull: Foramen magnum (wide)
	Skull: Ossification underway in some embryos
	Superior and inferior pubic rami
	Ulna: Styloid process and olecranon
	Content of the second s
	Anterior digastric muscles
	Depressor anguli oris muscle
	Esophagus: Longitudinal muscles
	Obliquus superior capitus muscle
	Obturator externus, gluteus maximus, and hamstring muscles
	Posterior belly of the digastric muscle



	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 —	— Iangerhans cells enter epidermis
10½ weeks —	— I Volar and plantar pads regress
11 weeks —	— Intermediate layer
	Intestines absorb water & glucose
	-

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

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