

# 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: olive;">■</span> Renal/Urinary     | <span style="color: lightgreen;">■</span> Reproductive | <span style="color: green;">■</span> Movement         |

## Unit 1: The First Week

|               |   |  |
|---------------|---|--|
| Day 0         | — | <span style="color: white;">■</span> Embryonic period begins   |
| Day 1         | — | <span style="color: teal;">■</span> Fertilization resulting in zygote formation  |
| Day 1 - Day 1 | — | <span style="color: teal;">■</span> Fertilization - development begins with a single-cell embryo!!!  |
| Day 2         | — | <span style="color: cyan;">■</span> Early pregnancy factor (EPF)<br><span style="color: teal;">■</span> Activation of the genome<br><span style="color: teal;">■</span> Zygote divides into two blastomeres (perhaps 30 hours or so after fertilization)<br><span style="color: teal;">■</span> Zygote divides into two blastomeres (perhaps 30 hours or so after fertilization) |
| Day 3         | — | <span style="color: teal;">■</span> Embryo is spherically shaped with 12 to 16 cells   |
| Day 4         | — | <span style="color: teal;">■</span> Embryonic disc<br><span style="color: teal;">■</span> Free floating blastocyst<br><span style="color: teal;">■</span> Inner cell mass<br><span style="color: teal;">■</span> See where the back and chest will be  |
| Day 5         | — | <span style="color: teal;">■</span> Hatching blastocyst  |
| Day 6         | — | <span style="color: teal;">■</span> Embryo attaches to wall of uterus  |
| 1 week        | — | <span style="color: teal;">■</span> Chorion<br><span style="color: teal;">■</span> Hypoblast & epiblast<br><span style="color: teal;">■</span> Placenta begins to form   |

## Unit 2: 1 to 2 Weeks

|                |   |   |
|----------------|---|---|
| 1 week, 1 day  | — | <span style="color: cyan;">■</span> Positive pregnancy test<br><span style="color: teal;">■</span> Amnioblasts present; amnion and amniotic cavity formation begins                     |
| 1 week, 2 days | — | <span style="color: teal;">■</span> Cells in womb engorged with nutrients   |
| 1 week, 4 days | — | <span style="color: teal;">■</span> Longitudinal axis   |
| 1 week, 5 days | — | <span style="color: teal;">■</span> Implantation complete<br><span style="color: teal;">■</span> Yolk sac   |
| 1 week, 6 days | — | <span style="color: red;">■</span> Primordial blood vessels<br><span style="color: teal;">■</span> Amnion with single cell layer<br><span style="color: teal;">■</span> Chorionic villi |
| 2 weeks        | — | <span style="color: teal;">■</span> Yolk sac<br><span style="color: teal;">■</span> Yolk sac  |
































## Unit 3: 2 to 3 Weeks

|                 |   |   |
|-----------------|---|---|
| 2 weeks, 1 day  | — | <span style="color: teal;">■</span> 3 germ layers<br><span style="color: teal;">■</span> Rostral-caudal orientation                                       |
| 2 weeks, 2 days | — | <span style="color: magenta;">■</span> Erythroblasts in yolk sac<br><span style="color: magenta;">■</span> Three types of blood-forming cells in yolk sac |













|                        |   |
|------------------------|---|
|                        | Amnion with two cell layers   |
|                        | Secondary villi   |
| <b>2 weeks, 4 days</b> | Foregut, midgut, and hindgut  |
|                        | Brain is first organ to appear  |
|                        | Connecting stalk  |
| <b>2 weeks, 5 days</b> | Neural plate induced by notochordal process   |
| <b>2 weeks, 6 days</b> | Numerous blood islands in umbilical vesicle   |
|                        | Foregut   |
|                        | Stomodeum forming   |
|                        | Beginnings of the heart can be seen   |
|                        | Blood vessels emerge simultaneously in umbilical vesicle, embryo proper, amnion, and connecting stalk |
|                        | Dorsal aortae (paired)  |
|                        | Paired tubular heart  |
|                        | Forebrain, midbrain, and hindbrain  |
|                        | Neural groove deepens substantially   |
|                        | Three main divisions of brain   |
|                        | Neural crest: Rostral and facial  |
| <b>3 weeks</b>         | Blood and blood vessels   |


















**Unit 4: 3 to 4 Weeks**

|                        |   |
|------------------------|---|
| <b>3 weeks, 1 day</b>  | Midgut emerging   |
|                        | Respiratory outgrowth   |
|                        | Atria (right and left) far apart                              |
|                        | Circulatory system function begins                            |
|                        | Endocardial tubes fuse forming tubular heart                  |
|                        | Heart begins beating  |
|                        | Pericardium   |
|                        | Primary head vein   |
|                        | Sinus venosus   |
|                        | Tubular heart begins folding                                  |
|                        | Umbilical arteries  |
|                        | Umbilical veins (right and left)                              |
|                        | Neural tube   |
|                        | Body cavities   |
|                        | Hyoid arch  |
| <b>3 weeks, 3 days</b> | Thyroid complete  |
|                        | Cystic primordium   |
|                        | Liver   |
|                        | Membrane between future mouth and throat may begin to rupture |
|                        | Neuropore (near brain) closes                                 |
|                        | Notochord   |
| <b>3 weeks, 5 days</b> | First part of pancreas  |
|                        | Pharyngeal arch 3   |
|                        | Lung bud  |

























|                |   |
|----------------|---|
|                |  Descending aorta                                  |
|                |  Internal carotid arteries                         |
|                |  Unidirectional circulation                        |
|                |  Brain involves 40% of neural tube                 |
|                |  Lowermost spinal cord formation begins            |
|                |  Neural tube closes (lower back)                   |
|                |  Somites: Pairs 21 through 29                      |
|                |  Upper limb primordium at level of somites 8 to 10 |
|                |  Progressively C-shaped embryo                     |
| <b>4 weeks</b> |  Skin is so thin, you can see through it!          |
|                |  Esophagus primordia                               |
|                |  Intestines growing in length                      |
|                |  Pancreas: Ventral pancreas                        |
|                |  Pharynx   |
|                |  Small & large intestines                          |
|                |  Bronchial buds                                    |
|                |  Lungs begin filling chest cavity                  |
|                |  Trachea   |
|                |  Circulatory system "well established"             |
|                |  Functioning two-chamber heart                     |
|                |  Heart chambers bulging with fluid               |
|                |  Heart now functions as two parallel pumps       |
|                |  Heart rate (about) 113 beats/min                |
|                |  Most cranial nerve ganglia                      |
|                |  Cerebellum                                      |
|                |  Fourth ventricle                                |
|                |  Amnion surrounds embryo                         |
|                |  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**

|                                  |   |
|----------------------------------|---|
| <b>4 weeks, 3 days</b>           |  Early eyes  |
| <b>4 weeks, 3 days - 5 weeks</b> |  Germ cells migrate to gonads                              |
| <b>4 weeks, 4 days</b>           |  Lungs: Right and left primary (or main stem) bronchi      |
|                                  |  Sinu-atrial (SA) node                                     |
|                                  |  Eyes located on sides of head                             |
|                                  |  Lens pits   |
|                                  |  Brain enlarges 50% since Carnegie Stage 13                |
|                                  |  Brain: Cerebral hemispheres appear and begin rapid growth |
|                                  |  Brain: Lateral ventricles                                 |
| <b>4 weeks, 5 days</b>           |  Caecum  |
|                                  |  Blood vessels penetrate diencephalon                      |
|                                  |  Coronary arteries (terminal end)                          |

|                |   |
|----------------|---|
|                |  Nose: Nasal pits                            |
|                |  Optic chiasm                                |
|                |  Brain with five main sections               |
|                |  First nerve fibers                          |
|                |  Hypothalamus                                |
|                |  Most cranial nerves seen                    |
|                |  Synapses among motor neurons in spinal cord |
|                |  Third ventricle                             |
| <b>5 weeks</b> |  ACTH [adrenocorticotropin hormone]          |
|                |  Growth hormone                              |
|                |  Pituitary gland                             |
|                |  Limb buds form hand plates                  |
|                |  Permanent kidneys                           |
|                |  Bronchial tree branching accelerates        |
|                |  Lobar pattern mimics adult pattern          |
|                |  Pacemaker cells                             |
|                |  Head is one third of entire embryo          |

**Unit 6: 5 to 6 Weeks**

|   |   |
|---|---|
| <b>5 weeks, 1 day</b>                   |  Wrist joints are forming  |
| <b>5 weeks, 2 days</b>                  |  Thyroid detaches from pharynx  |
|   |  Atrioventricular (AV) node  |
|   |  Circle of Willis almost complete  |
|   |  Cochlear nerve present  |
|   |  Musculocutaneous, radial, ulna, and median nerves enter upper limb bud    |
|   |  All cranial nerves identifiable   |
| <b>5½ weeks</b>                         |  Initial tooth formation   |
| <b>5½ weeks - 6 weeks</b>               |  Subtle movement begins  |
| <b>5 weeks, 4 days</b>                  |  Cartilage formation   |
| <b>5 weeks, 5 days</b>                  |  Nerve cells differentiating   |
| <b>5 weeks, 5 days - 7 weeks, 1 day</b> |  Melanocytes in epidermis  |
| <b>5 weeks, 6 days</b>                  |  Cartilage in occipital sclerotomes (1-4)                                  |
|   |  Primordial vermiform appendix   |
|   |  All spinal nerves present   |
|   |  Dura begins forming in basal area   |
|   |  Frontal and temporal poles of cerebral hemispheres                        |
|   |  Somites: Pairs 38 and 39  |
|   |  Synapses in spinal cord between interneurons and primary afferent neurons |
| <b>6 weeks</b>                          |  Face withdraws from light touch around mouth                              |
|   |  Blood forming in liver  |
|   |  Nipples along side of trunk   |
|   |  Adrenal glands  |
|   |  Glucagon in pancreas  |

|  |  |
|--|--|
|  | <input type="checkbox"/> Handplates develop subtle flattening              |
|  | <input type="checkbox"/> Joints  |
|  | <input type="checkbox"/> Tooth buds (primary teeth)                        |
|  | <input checked="" type="checkbox"/> Diaphragm is largely formed            |
|  | <input checked="" type="checkbox"/> Intestines fill base of umbilical cord |
|  | <input checked="" type="checkbox"/> External ears                          |
|  | <input checked="" type="checkbox"/> Synapses form in spinal cord           |
|  | <input type="checkbox"/> Crown-heel length 1.6 cm                          |

**Unit 7: 6 to 7 Weeks**

|                        |   |
|------------------------|---|
| <b>6 weeks, 2 days</b> | <input type="checkbox"/> Elbow regions sometimes identifiable                                 |
|                        | <input type="checkbox"/> Hands polygon-shaped   |
|                        | <input type="checkbox"/> Toe rays sometimes present   |
|                        | <input checked="" type="checkbox"/> Submandibular gland primordia                             |
|                        | <input checked="" type="checkbox"/> Inferior vena cava  |
|                        | <input checked="" type="checkbox"/> Origin of left coronary artery                            |
|                        | <input checked="" type="checkbox"/> Optic fibers  |
|                        | <input checked="" type="checkbox"/> Eyelid folds sometimes present                            |
|                        | <input checked="" type="checkbox"/> Brainwave activity has begun                              |
|                        | <input checked="" type="checkbox"/> Cerebrospinal fluid production begins                     |
| <b>6½ weeks</b>        | <input checked="" type="checkbox"/> The hands begin to move                                   |
|                        | <input type="checkbox"/> Volar pads on palms  |
|                        | <input type="checkbox"/> Bones first form in the collar bones and lower jaw                   |
| <b>6 weeks, 5 days</b> | <input type="checkbox"/> Beginnings of occipital and sphenoid bones                           |
|                        | <input type="checkbox"/> Cartilaginous styloid process  |
|                        | <input type="checkbox"/> Humerus, radius, and ulna  |
|                        | <input checked="" type="checkbox"/> Deltoid muscle  |
|                        | <input checked="" type="checkbox"/> Anal membrane   |
|                        | <input checked="" type="checkbox"/> Lung, left: Oblique fissure defines upper and lower lobes |
|                        | <input checked="" type="checkbox"/> Circulus arteriosus (Circle of Willis) complete           |
|                        | <input checked="" type="checkbox"/> Origin of right coronary artery                           |
|                        | <input checked="" type="checkbox"/> Tricuspid and mitral valves                               |
|                        | <input checked="" type="checkbox"/> Primitive nasal cavity                                    |
|                        | <input checked="" type="checkbox"/> Eyelids: Upper and lower lids present and growing         |
|                        | <input checked="" type="checkbox"/> Occipital pole of cerebral hemispheres                    |
| <b>6 weeks, 6 days</b> | <input type="checkbox"/> Feet polygon-shaped  |
|                        | <input checked="" type="checkbox"/> Cloacal membrane ruptures                                 |
| <b>7 weeks</b>         | <input checked="" type="checkbox"/> Head rotates  |
|                        | <input checked="" type="checkbox"/> Leg movements   |
|                        | <input checked="" type="checkbox"/> B lymphocytes in liver                                    |
|                        | <input checked="" type="checkbox"/> Ovaries   |
|                        | <input checked="" type="checkbox"/> Testes begin to differentiate                             |
|                        | <input checked="" type="checkbox"/> Insulin in pancreas                                       |
|                        | <input type="checkbox"/> Foot plates notched  |
|                        | <input checked="" type="checkbox"/> Hiccups   |

|  |   |
|--|---|
|  | <ul style="list-style-type: none"> <li><span style="color: magenta;">■</span> Tendons attach muscle to bone</li> <li><span style="color: red;">■</span> The heart has four chambers and is nearly complete.</li> <li><span style="color: red;">■</span> The heart rate peaks at 165 to 170 beats per minute.</li> <li><span style="color: gray;">□</span> Crown-heel length 2.2 cm</li> </ul> |
|--|---|

**Unit 8: 7 to 8 Weeks**

|                                 |  |
|---------------------------------|--|
| <b>7 weeks, 1 day</b>           | <ul style="list-style-type: none"> <li><span style="color: gray;">□</span> Upper limbs with slightly flexed elbows</li> <li><span style="color: blue;">■</span> Sacrocaudal spinal cord formation (secondary neurulation) complete</li> </ul>  |
| <b>7 weeks, 1 day - 8 weeks</b> | <ul style="list-style-type: none"> <li><span style="color: purple;">■</span> Stomach: Folds in stomach wall</li> </ul>   |
| <b>7 weeks, 2 days</b>          | <ul style="list-style-type: none"> <li><span style="color: red;">■</span> Arteries and veins of heart complete</li> </ul>  |
| <b>7 weeks, 3 days</b>          | <ul style="list-style-type: none"> <li><span style="color: gray;">□</span> Wrists slightly flexed</li> <li><span style="color: yellow;">■</span> Eyelids growing rapidly</li> <li><span style="color: blue;">■</span> Cerebral hemispheres cover more than half of diencephalon</li> </ul>   |
| <b>7½ weeks</b>                 | <ul style="list-style-type: none"> <li><span style="color: green;">■</span> Hands begin to touch face</li> <li><span style="color: green;">■</span> The hands touch each other as do the feet!</li> <li><span style="color: pink;">□</span> Fingertips thicken</li> <li><span style="color: pink;">□</span> Plantar pads toes</li> <li><span style="color: gray;">□</span> The knee joints have arrived</li> <li><span style="color: red;">■</span> EKG pattern similar to adult</li> </ul>  |
| <b>7 weeks, 4 days</b>          | <ul style="list-style-type: none"> <li><span style="color: gray;">□</span> The fingers are free</li> </ul>   |
| <b>7 weeks, 5 days</b>          | <ul style="list-style-type: none"> <li><span style="color: gray;">□</span> Bone-forming cells called osteoblasts emerge</li> <li><span style="color: gray;">□</span> Hands can reach one another and fingers can overlap</li> <li><span style="color: blue;">■</span> Brain: Internal capsule with connections to epithalamus, dorsal thalamus, and mesencephalon</li> <li><span style="color: blue;">■</span> Cerebral hemispheres cover 75% of diencephalon</li> <li><span style="color: blue;">■</span> Cortical plate expanding rapidly</li> </ul>   |
| <b>7 weeks, 6 days</b>          | <ul style="list-style-type: none"> <li><span style="color: gray;">□</span> The toes are free</li> </ul>  |
| <b>8 weeks</b>                  | <ul style="list-style-type: none"> <li><span style="color: green;">■</span> Complex response to touch</li> <li><span style="color: green;">■</span> More frequent hand-to-face contact</li> <li><span style="color: green;">■</span> Mouth opens &amp; closes</li> <li><span style="color: green;">■</span> Squinting</li> <li><span style="color: green;">■</span> The embryo floats and rolls over in the womb</li> <li><span style="color: pink;">□</span> Hairs first appear in eyebrows &amp; around mouth</li> <li><span style="color: pink;">□</span> Skin multi-layered, loses transparency</li> <li><span style="color: cyan;">□</span> Male embryos are making testosterone already!</li> <li><span style="color: gray;">□</span> The embryo's joints are similar to adult joints</li> <li><span style="color: magenta;">■</span> Diaphragm complete</li> <li><span style="color: magenta;">■</span> Esophagus: Longitudinal muscles</li> <li><span style="color: olive;">■</span> Urethra</li> <li><span style="color: olive;">■</span> Urine production and release</li> <li><span style="color: purple;">■</span> Peristalsis in large intestine</li> <li><span style="color: orange;">■</span> Occasional breathing motions begin</li> <li><span style="color: red;">■</span> Blood supply to the brain closely resembles adult pattern</li> </ul> |

|  |   |
|--|---|
|  | <input type="checkbox"/> Cranial nerve distribution mimics adult pattern                        |
|  | <input type="checkbox"/> Retina: Four of the ten adult layers present                           |
|  | <input type="checkbox"/> Tympanic membrane  |
|  | <input type="checkbox"/> "The hindbrain "presents striking resemblance to that of the newborn." |
|  | <input type="checkbox"/> Brain represents 43% of embryo   |
|  | <input type="checkbox"/> Grey and white matter  |
|  | <input type="checkbox"/> Right- and left-handedness emerges                                     |
|  | <input type="checkbox"/> Crown-heel length 4.3 cm   |
|  | <input type="checkbox"/> Embryo contains approximately 1 billion (10 <sup>9</sup> ) cells       |
|  | <input type="checkbox"/> Embryonic Period Ends  |
|  | <input type="checkbox"/> The embryo has more than 4,000 parts (adults have about 4,500)         |

**Unit 9: 8 to 9 Weeks**

|                 |  |
|-----------------|--|
| <b>8½ weeks</b> | <input type="checkbox"/> Eyelids completely fused  |
|                 | <input type="checkbox"/> Neurons synapse in cerebral cortex (marginal zone)  |
| <b>9 weeks</b>  | <input type="checkbox"/> Bends hip & knee if sole of foot touched  |
|                 | <input type="checkbox"/> Drinking fluid is becoming routine  |
|                 | <input type="checkbox"/> Sucking the thumb   |
|                 | <input type="checkbox"/> The young fetus now sighs, stretches, moves the head, opens the mouth, and moves the tongue |
|                 | <input type="checkbox"/> Tongue movement   |
|                 | <input type="checkbox"/> Female fetuses have early reproductive cells in their ovaries                               |
|                 | <input type="checkbox"/> Thyroid gland weighs 2 grams  |
|                 | <input type="checkbox"/> Small intestine peristalsis   |
|                 | <input type="checkbox"/> Face, hands, and feet sense light touch   |

**Unit 10: 9 to 10 Weeks**

|                           |  |
|---------------------------|--|
| <b>9 weeks - 10 weeks</b> | <input type="checkbox"/> Early vocal cords                           |
|                           | <input type="checkbox"/> My weight will rise more than 75% this week |
| <b>9½ weeks</b>           | <input type="checkbox"/> I yawn when I want                          |
| <b>9 weeks, 4 days</b>    | <input type="checkbox"/> Yawns                                       |
| <b>10 weeks</b>           | <input type="checkbox"/> Eyes roll downward reflexively              |
|                           | <input type="checkbox"/> Palatine tonsils                            |
|                           | <input type="checkbox"/> Fingernails and toenails begin to grow!     |
|                           | <input type="checkbox"/> Three-layered epidermis                     |
|                           | <input type="checkbox"/> Tiny unique fingerprints have arrived!      |
|                           | <input type="checkbox"/> Now, all the bones are getting harder       |
|                           | <input type="checkbox"/> Tooth buds (secondary teeth)                |
|                           | <input type="checkbox"/> Glomeruli formation begins                  |
|                           | <input type="checkbox"/> Physiologic herniation ends                 |
|                           | <input type="checkbox"/> Corpus callosum begins                      |
|                           | <input type="checkbox"/> Crown-heel length 7.5 cm                    |

**Unit 11: 10 to 11 Weeks**

|                            |   |
|----------------------------|---|
| <b>10 weeks - 12 weeks</b> | <input type="checkbox"/> Langerhans cells enter epidermis |
|----------------------------|---|

|                  |   |   |
|------------------|---|---|
| <b>10½ weeks</b> | — | □ Volar and plantar pads regress                    |
| <b>11 weeks</b>  | — | ■ The face now makes complex expressions            |
|                  |   | ■ Immunological competence                          |
|                  |   | □ Intermediate layer                                |
|                  |   | □ Nose & lips completely formed                     |
|                  |   | ■ Now you can tell if your baby is a girl or a boy! |
|                  |   | ■ Thyroid gland weighs 12 grams                     |
|                  |   | ■ Intestines absorb water & glucose                 |
|                  |   | ■ Auditory cells: inner & outer hair cells          |
|                  |   | □ Crown-heel length                                 |

**Unit 12: 11 to 12 Weeks**

|                            |   |  |
|----------------------------|---|--|
| <b>11 weeks - 12 weeks</b> | — | □ Weight increases by 60% this week                      |
| <b>12 weeks</b>            | — | ■ Hands touch the mouth up to 50 times per hour          |
|                            |   | ■ T lymphocytes leave thymus                             |
|                            |   | ■ Many different hormones are present in pituitary gland |
|                            |   | ■ Thyroid gland produces hormone                         |
|                            |   | □ Palate fuses   |
|                            |   | □ Upper limbs reach final proportion                     |
|                            |   | ■ Bladder resembles smooth muscle                        |
|                            |   | ■ Bile production begins in liver                        |
|                            |   | ■ Bowel movements  |
|                            |   | ■ There are taste buds all over the mouth                |
|                            |   | ■ Corpus callosum  |
|                            |   | □ Crown-heel length 12 cm                                |
|                            |   | □ Head circumference 10 cm                               |

**Unit 13: 3 to 4 Months**

|                 |   |  |
|-----------------|---|--|
| <b>13 weeks</b> | — | □ Teeth are growing                                |
|                 |   | ■ Cilia lining airways                             |
|                 |   | ■ Most of body sensitive to touch                  |
|                 |   | □ Crown-heel length 15 cm                          |
| <b>14 weeks</b> | — | ■ Girls move their jaws more than the boys do      |
|                 |   | ■ Light touch to mouth evokes turn toward stimulus |
|                 |   | ■ 4-lobed cerebral cortex                          |
|                 |   | ■ Cerebellum resembles adult structure             |
|                 |   | □ Crown-heel length 17 cm                          |
|                 |   | □ Fat deposits in cheeks                           |
| <b>15 weeks</b> | — | ■ Stem cells arrive in bone marrow                 |
|                 |   | □ Body fat emerges throughout the body             |
|                 |   | ■ Glucagon in fetal bloodstream                    |
|                 |   | ■ Digestive enzymes                                |
|                 |   | □ Crown-heel length 19.5 cm                        |
| <b>16 weeks</b> | — | ■ Quickening                                       |
|                 |   | □ Fat deposits upper & lower limbs                 |
|                 |   | □ Tooth enamel                                     |



|  |  |
|--|--|
|  | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: orange; margin-right: 5px;"></span> Bronchial tree nearly complete</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; margin-right: 5px;"></span> Hormonal stress response to invasive procedures</li> <li><span style="display: inline-block; width: 15px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> Crown-heel length 21 cm</li> </ul> |
|--|--|

**Unit 14: 4 to 5 Months**

|                 |   |
|-----------------|---|
| <b>17 weeks</b> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; margin-right: 5px;"></span> Retina has discrete layers</li> </ul>   |
| <b>18 weeks</b> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: pink; margin-right: 5px;"></span> Cream-like substance protects skin</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: lightcoral; margin-right: 5px;"></span> Sweat glands</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: cyan; margin-right: 5px;"></span> Insulin secretion</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: orange; margin-right: 5px;"></span> Speaking motion of larynx</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: blue; margin-right: 5px;"></span> Corpus callosum complete</li> </ul>   |
| <b>19 weeks</b> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: lightcoral; margin-right: 5px;"></span> Melanin production</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: lightgreen; margin-right: 5px;"></span> Number of oogonia peak (at about 7 million) within fetal ovaries</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: blue; margin-right: 5px;"></span> Daily cycles in biological rhythms</li> </ul>   |
| <b>20 weeks</b> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: lightcoral; margin-right: 5px;"></span> All skin layers and structures</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: orange; margin-right: 5px;"></span> Surfactant production (low levels)</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; margin-right: 5px;"></span> Hearing and responding to sound begins</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; margin-right: 5px;"></span> Hearing and responding to sound begins</li> <li><span style="display: inline-block; width: 15px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> Crown-heel length 28 cm</li> <li><span style="display: inline-block; width: 15px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> Head circumference 20 cm</li> </ul> |

**Unit 15: 5 to 6 Months**

|                            |  |
|----------------------------|--|
| <b>20 weeks - 24 weeks</b> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; margin-right: 5px;"></span> Eyelids separate, eyes open and close</li> </ul>   |
| <b>21 weeks</b>            | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: lightcoral; margin-right: 5px;"></span> Stratum corneum</li> </ul>   |
| <b>21 weeks - 22 weeks</b> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> If born prematurely from this point on, survival is possible</li> </ul>   |
| <b>22 weeks</b>            | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; margin-right: 5px;"></span> Cornea structure</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: blue; margin-right: 5px;"></span> Behavioral states</li> </ul>                                      |
| <b>23 weeks</b>            | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> Brain weight 100 grams</li> </ul>   |
| <b>24 weeks</b>            | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; margin-right: 5px;"></span> Blink-startle response; females before males</li> <li><span style="display: inline-block; width: 15px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> Crown-heel length 34.5 cm</li> </ul> |

**Unit 16: 6 to 7 Months**

|                            |   |
|----------------------------|---|
| <b>25 weeks</b>            | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: purple; margin-right: 5px;"></span> Intestinal lining contains all adult cell types</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; margin-right: 5px;"></span> Rods &amp; cones</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; margin-right: 5px;"></span> The ability to taste</li> </ul>              |
| <b>26 weeks</b>            | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: lightcoral; margin-right: 5px;"></span> Additional fat deposits decrease wrinkles</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: lightcoral; margin-right: 5px;"></span> Tear production</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; margin-right: 5px;"></span> The ability to smell has arrived</li> </ul> |
| <b>26 weeks - 38 weeks</b> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: blue; margin-right: 5px;"></span> Brain weight increases 400% to 500%</li> </ul>  |
| <b>27 weeks</b>            | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; margin-right: 5px;"></span> Pupils react to light</li> </ul>  |
| <b>28 weeks</b>            | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; margin-right: 5px;"></span> Distinguishes sounds of different frequencies</li> <li><span style="display: inline-block; width: 15px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> Crown-heel length 39.5 cm</li> </ul>   |

**Unit 17: 7 to 8 Months**

|                 |   |
|-----------------|---|
| <b>30 weeks</b> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: orange; margin-right: 5px;"></span> Breathing motions are common even though there is no air in the womb</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: blue; margin-right: 5px;"></span> 6-layered cerebral cortex</li> </ul> |
|-----------------|---|

|                 |   |
|-----------------|---|
|                 | <input type="checkbox"/> Head circumference 30 cm                                 |
| <b>32 weeks</b> | <input checked="" type="checkbox"/> Esophagus: Lower esophagus muscles functional |
|                 | <input checked="" type="checkbox"/> Glomeruli formation complete                  |
|                 | <input checked="" type="checkbox"/> Alveoli                                       |
|                 | <input checked="" type="checkbox"/> Memory - music preferences                    |
|                 | <input type="checkbox"/> Crown-heel length 45 cm                                  |

**Unit 18: 8 to 9 Months**

|                            |   |
|----------------------------|---|
| <b>32 weeks - 36 weeks</b> | <input checked="" type="checkbox"/> Prenatal food affects newborn taste preferences |
| <b>34 weeks</b>            | <input type="checkbox"/> Rapid weight gain  |
| <b>35 weeks</b>            | <input checked="" type="checkbox"/> Firm grip                                       |
|                            | <input type="checkbox"/> Amniotic fluid volume peaks                                |
| <b>36 weeks</b>            | <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**

|                 |  |
|-----------------|--|
| <b>37 weeks</b> | <input checked="" type="checkbox"/> Fetus drinks an estimated 15 oz (or 450cc) of amniotic fluid/day           |
| <b>38 weeks</b> | <input checked="" type="checkbox"/> Air breathing begins   |
|                 | <input checked="" type="checkbox"/> By term, the typical umbilical cord measures 20 to 24 inches (50 to 60 cm) |
|                 | <input checked="" type="checkbox"/> Heart beats 54 million times before birth                                  |
|                 | <input checked="" type="checkbox"/> Major circulatory changes  |
|                 | <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"/> Fetus initiates labor   |
|                 | <input type="checkbox"/> Head circumference 35 cm  |
|                 | <input type="checkbox"/> Time to be born!  |