

Module 1

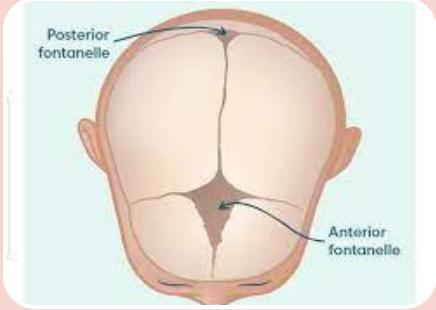
Theory material 2:

Normal Motor, Speech Development,
and Growth in Children



VIRTUAL CHILDREN'S HOSPITAL FOR
LEARNING PEDIATRIC NURSING

Infancy (birth -1 year) (I)



FONTANELLE CLOSURE

- Anterior (larger)
- Diamond- shaped
 - Close in 12-18 month
- Posterior (smaller)
- Triangle shaped
 - Closes 8-12 weeks



WEIGHT & LENGHT








- 6 months:
- Should double form birth weight
- 12 months:
- Should triple from birth weight
- Should be growing 1-3 cm every month



TEETH

First teeth to show are the lower central incisors (usually show around 10 months of age)

Infancy (birth -1 year) (II)

	MOTOR SKILLS	LANGUAGE
2 MONTHS	 <ul style="list-style-type: none"> Raises head & chest Head control improving Moves head side to side Should be SMILING 	Makes verbal noise (coos)
4 MONTHS	 <ul style="list-style-type: none"> Begins to PLAY Rolls from prone to supine Holds & reaches for toys Head leads body when pulled to sit 	Babbling (copies noises)
6 MONTHS	 <ul style="list-style-type: none"> Can sit up w/support STRANGER ANXIETY begins Tripod sit 	Babbles (nonspecific)
8-9 MONTHS	 <ul style="list-style-type: none"> Sits without support Crawling Stands with pulling & holds onto object PINCER GRASP OBJECT PERMANENCE 	
10-12 MONTHS	 <ul style="list-style-type: none"> Walking Separation anxiety 	Simple words like "dada"

MEMORY TRICK

Rolls on the floor rhymes with four!

Realizing that objects that are out of sight still exist



VIRTUAL CHILDREN'S HOSPITAL FOR LEARNING PEDIATRIC NURSING

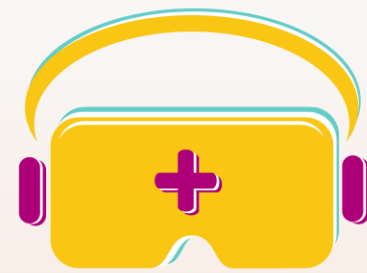
Toddler 1-3 years (I)



VIRTUAL CHILDREN'S HOSPITAL FOR
LEARNING PEDIATRIC NURSING

	15 months	18 months	24 months	30 months
Gross Motor	<ul style="list-style-type: none"> ✓ Walks independently 	<ul style="list-style-type: none"> ✓ Climbs stairs ✓ Pulls toys 	<ul style="list-style-type: none"> ✓ Kicks a ball ✓ Able to stand on tiptoes ✓ Climbs on & off furniture 	
Fine Motor	<ul style="list-style-type: none"> ✓ Feeds self-finger foods ✓ Uses index finger to point ✓ Full pincer grasp developed 	<ul style="list-style-type: none"> ✓ Uses their hands a lot for: reaching, grabbing, releasing, stacking blocks ✓ Turns book pages Removes shoes and socks ✓ Stacks four cubes 	<ul style="list-style-type: none"> ✓ Builds tower of 6-7 cubes ✓ Right/left-handed ✓ Scribbles, paints, & imitates strokes ✓ Turns doorknobs ✓ Puts round pegs into holes 	
Receptive Language	<ul style="list-style-type: none"> ✓ Understands 100-150 words ✓ Follows commands without gestures ✓ Looks at adults when communicating 	<ul style="list-style-type: none"> ✓ Understands “no” ✓ Understands 200 words ✓ Says: “what’s this?” 	<ul style="list-style-type: none"> ✓ Points to named body parts/pictures in books ✓ Listens to simple stories ✓ Says: “my” & “mine” 	<ul style="list-style-type: none"> ✓ Follows a series of 2 independent commands





VIRTUAL CHILDREN'S HOSPITAL FOR
LEARNING PEDIATRIC NURSING

Toddler 1-3 years (II)

	15 months	18 months	24 months	30 months
Expressive Language	<ul style="list-style-type: none"> ✓ Repeats words ✓ Babbles sentences 	<ul style="list-style-type: none"> ✓ Vocab: 15-20 words ✓ Uses names of familiar objects 	<ul style="list-style-type: none"> ✓ Vocab: 40-50 words ✓ Sentences of 2-3 words (ex. "want cookie") ✓ Use descriptive words: hungry, hot, cold 	<ul style="list-style-type: none"> ✓ Vocab: 150-300 words
Signs of Delay	<ul style="list-style-type: none"> ✓ Persistent tiptoe walking ✓ Does not develop a mature walking pattern 	<ul style="list-style-type: none"> ✓ Not walking ✓ Not speaking 15 words ✓ Does not understand the function of common household items 	<ul style="list-style-type: none"> ✓ Does not: use two-word sentences, imitate actions, or follow basic instructions ✓ Cannot push a toy with wheels 	



Preschool 3-5 years (I)

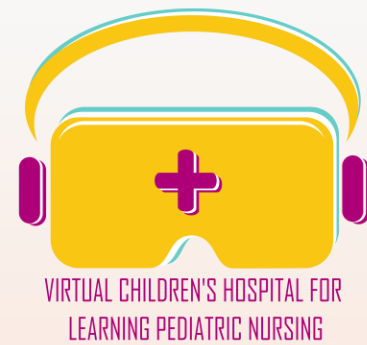
	3 years	4 years	5 years
Gross Motor	<ul style="list-style-type: none"> ✓ Climbs well and runs easily ✓ Pedals tricycle ✓ Walks up & down stairs with alternating feet ✓ Bends over without falling 	<ul style="list-style-type: none"> ✓ Throws ball overhead ✓ Kicks ball forward ✓ Can bounce a ball back ✓ Hops on one foot ✓ Alternating feet going up & down steps 	<p>May be able to:</p> <ul style="list-style-type: none"> ✓ Skip ✓ Swim ✓ Skate ✓ Climb ✓ Swing
Fine Motor	<ul style="list-style-type: none"> ✓ Undresses self ✓ Copies circles ✓ Tower of 9-10 ✓ Holds a pencil ✓ Screws and unscrews lids ✓ Turns book pages one at a time 	<ul style="list-style-type: none"> ✓ Uses scissors ✓ Copies capital letter ✓ Draws circles, squares, & traces a cross or diamond ✓ Draws a person with 2-4 body parts ✓ Laces shoes 	<p>Can draw a person and some letters</p> <p>May dress/undress themselves</p> <p>Can use a fork, spoon, & knife</p> <p>Mostly cares for own toileting needs</p>



Preschool 3-5 years (II)

	3 years	4 years	5 years
Communication	<ul style="list-style-type: none"> ✓ Understands most sentences ✓ Understands physical relation (in, on, under) ✓ Follows a 3-part command ✓ Half of the conversation understood by outside family ✓ Says: "why?" ✓ 3 or 4-word sentences ✓ Talks about past ✓ Vocab: 1,000 words ✓ Says their name, age, & gender ✓ Uses pronouns and plurals 	<ul style="list-style-type: none"> ✓ Speaks in complete sentences ✓ Tells a story ✓ 75% of speech understood by outside observers ✓ Stays on topic in conversation ✓ Knows the name of familiar animals ✓ Knows at least one color ✓ Uses language to engage in make-believe ✓ Can count a few numbers ✓ Vocab: 1,500 words 	<ul style="list-style-type: none"> ✓ Most of the child's speech can be understood ✓ Explains how an item is used ✓ Participates in long & detailed conversations ✓ Talks about past, future, and imaginary events ✓ Answers questions that use "why" and "when" Can count to 10 ✓ Says name & address ✓ Recalls part of a story ✓ Speech should be completely intelligible, even if the child has articulation difficulties ✓ Speech is generally grammatical correct ✓ Vocab: 2,000 words

Preschool 3-5 years (III)



	3 years	4 years	5 years
Signs of Delay	<ul style="list-style-type: none"> ✓ Difficulty with stairs ✓ Falls a lot while walking ✓ Can't build a 4+ block tower ✓ Extreme difficulty separating from parents ✓ No make-believe play ✓ Can't copy a circle ✓ No short paragraphs Doesn't understand simple instructions ✓ Unclear speech & drooling ✓ Little interest in other kids 	<ul style="list-style-type: none"> ✓ Can't jump in place or ride a tricycle ✓ Can't stack 4 blocks Can't throw a ball overhead ✓ Does not grasp crayon with thumb and fingers ✓ Difficulty with scribbling ✓ Can't copy a circle ✓ Doesn't say 3+ word sentences ✓ Can't use the words "me" & "you" ✓ Ignores other children or doesn't show interest in interactive games ✓ Still clings or cries if parents leave 	<ul style="list-style-type: none"> ✓ Sad often ✓ Little interest in playing with other kids ✓ Unable to separate from their parents ✓ Is extremely aggressive, fearful, passive, or timid ✓ Easy distracted (can't concentrate for 5 minutes) ✓ Can not do ADLs by themselves (brush teeth, undress, wash & dry hands, etc.) ✓ Rarely engages in fantasy play

Measuring a child's growth/Paediatric anthropometrics

Paediatric anthropometry involves physical measurements such as height, weight, length, and head circumference. These values are plotted on the appropriate growth chart once measured.

Tracking a child's growth at each visit with their healthcare team helps:

1. Identify nutrition-related health issues.
2. Highlight significant information about a child's growth pattern.





VIRTUAL CHILDREN'S HOSPITAL FOR
LEARNING PEDIATRIC NURSING

Measuring weight

Prepare the Scale: Use a calibrated and accurate scale, preferably digital, for precise measurements. Ensure the scale is placed on a hard, flat surface.

Remove Excess Clothing: To get the most accurate weight, remove the child's shoes, heavy clothing, and any accessories. Diapers should be dry to avoid extra weight.

Zero the Scale: Before placing the child on the scale, make sure it is set to zero.

Position the Child:

- For infants, use a baby scale. Gently place the baby on the scale, ensuring they are lying still.
- For toddlers and older children, have them stand still on the scale with feet slightly apart and arms at their sides.

Read the Measurement: Record the weight as displayed. For infants, jot down the reading immediately, as they may move.

Double-Check if Necessary: If the child moves or if the reading seems off, repeat the process to ensure accuracy.



Measuring height & length

Prepare the Measuring Tool: Use a stadiometer (a vertical ruler attached to a sliding horizontal headpiece) for the most accurate measurement, or a tape measure for toddlers or babies.

Remove Shoes and Heavy Clothing: The child should be barefoot or wearing socks, with any bulky clothing removed.

Position the Child:

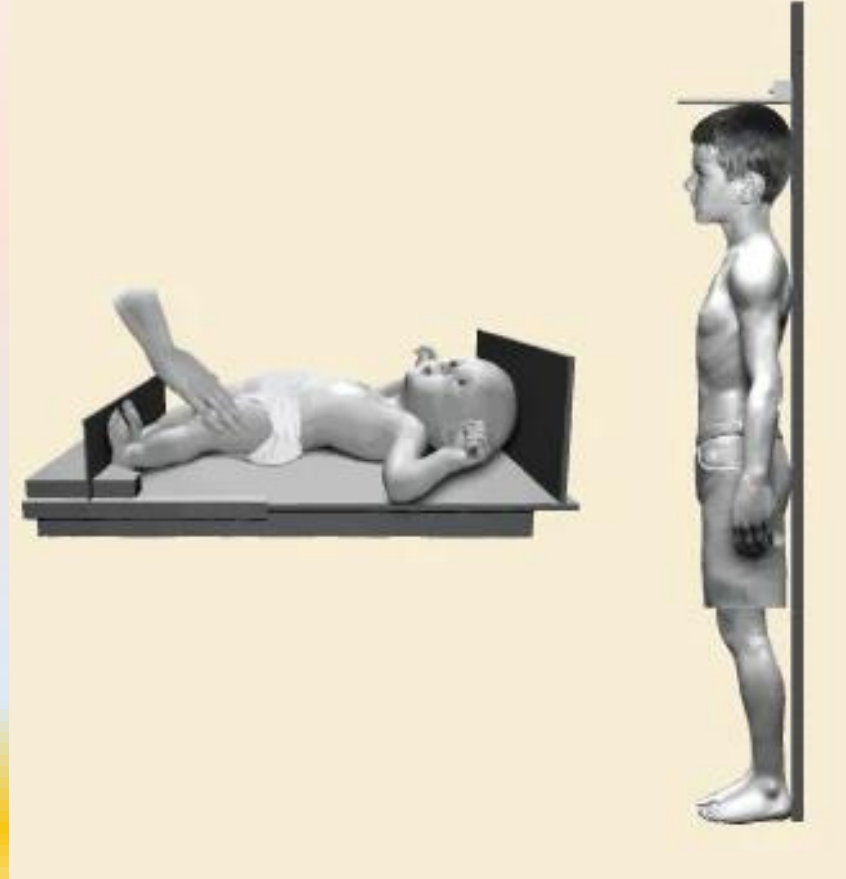
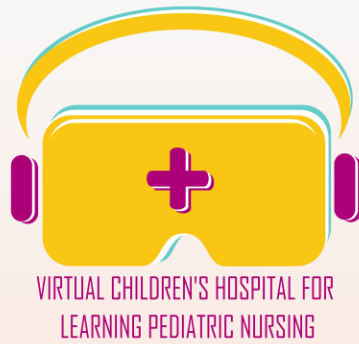
- For children who can stand, have them stand on a flat, hard surface. Ensure their heels, buttocks, shoulders, and head are touching the wall or stadiometer.
- The child should stand straight with their feet together, arms at their sides, and looking straight ahead.

Ensure Proper Alignment: The head should be in the Frankfort plane, which means the lowest point of the eye socket is level with the upper part of the ear opening.

Take the Measurement: Lower the headpiece of the stadiometer or mark the height on the wall with a piece of tape or a pencil, then measure from the floor up for accuracy.

Record the Height: Notate the measurement immediately.

For infants or toddlers who cannot stand, lay them flat and use a measuring tape to measure from the top of their head to the bottom of their feet, ensuring their legs are straight.





VIRTUAL CHILDREN'S HOSPITAL FOR
LEARNING PEDIATRIC NURSING

Measuring infant's head circumference

Head circumference measurements are typically taken from birth to two years old children as part of monitoring their growth and development.

Select a Flexible Measuring Tape: Use a non-stretchable measuring tape, such as a tailor's tape measure, for accuracy.

Position the Tape Correctly: Place the tape measure around the widest part of the child's head. This typically runs just above the eyebrows, above the ears, and around the back of the head at the point where it protrudes the most.

Ensure a Snug Fit: The tape should be snug against the head without pressing into the skin or compressing the hair.

Check the Position: Make sure the measuring tape is level around the entire head and not tilted at an angle.

Read the Measurement: Once the tape is positioned correctly, take the measurement where the end of the tape meets the main body of the tape.

Record the Measurement: Write down the head circumference immediately for accuracy.



Children's growth chart

Obtain the Growth Chart: Use a standard growth chart appropriate for the child's age and sex.

Collect Measurement Data: Measure the child's height, weight, and head circumference (if applicable) at each health visit. Ensure that measurements are taken accurately.

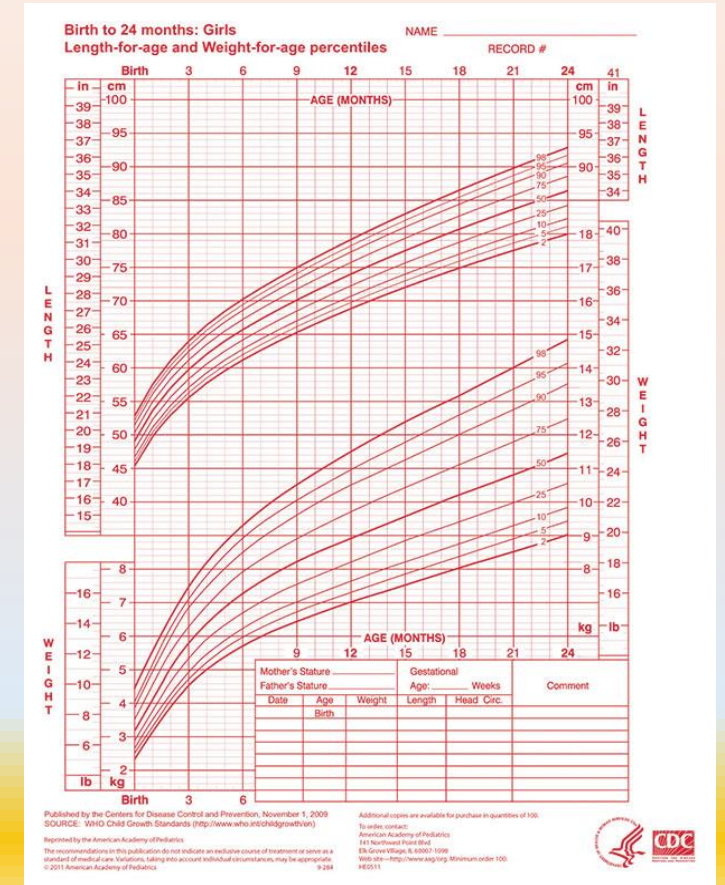
Plot the Measurements:

- On the growth chart, find the appropriate axis for the measurement (height, weight, or head circumference).
- Locate the child's age on the horizontal axis.
- Plot the measurement by marking a point where the child's measurement intersects with their age.

Analyze the Growth Pattern:

- Connect the points to visualize growth over time.
- Compare the plotted points to the percentile lines on the chart. This indicates how the child's growth compares to a national sample of children.

Evaluate Growth Percentiles: Understand what percentiles mean (e.g., being in the 75th percentile for weight means the child weighs more than 75% of children their age).



Children's normal growth




	Weight (kg)	Height (cm)	Weight (kg)	Height (cm)
0 Months	2.5 - 4.3	46.3 - 53.4	2.4 - 4.2	45.6 - 52.7
1 Month	3.4 - 5.7	51.1 - 58.4	3.2 - 5.4	50.0 - 57.4
2 Months	4.4 - 7.0	54.7 - 62.2	4.0 - 6.5	53.2 - 60.9
3 Months	5.1 - 7.9	57.6 - 65.3	4.6 - 7.4	55.8 - 63.8
4 Months	5.6 - 8.6	60.0 - 67.8	5.1 - 8.1	58.0 - 66.2
5 Months	6.1 - 9.2	61.9 - 69.9	5.5 - 8.7	59.9 - 68.2
6 Months	6.4 - 9.7	63.6 - 71.6	5.8 - 9.2	61.5 - 70.0
7 Months	6.7 - 10.2	65.1 - 73.2	6.1 - 9.6	62.9 - 71.6
8 Months	7.0 - 10.5	66.5 - 74.7	6.3 - 10.0	64.3 - 73.2
9 Months	7.2 - 10.9	67.7 - 76.2	6.6 - 10.4	65.6 - 74.7
10 Months	7.5 - 11.2	67.7 - 76.2	6.8 - 10.7	66.8 - 76.1
11 Months	7.4 - 11.5	70.2 - 78.9	7.0 - 11.0	68.0 - 77.5
12 Months	7.8 - 11.8	71.3 - 80.2	7.1 - 11.3	69.2 - 78.9

- In the first days of life, a newborn may lose up to 10% of their birth weight. Weight is regained by days 7-10. During the first 3-4 months, a baby gains an average of 20-30 grams per day, and from then until they reach one year old, they gain about 15-20 grams per day.
- During the first year of life, a healthy child grows an average of 2.5 cm per month, totalling 24-25 cm in a year. In the second year, growth is about 12-13 cm, and in the third year, it is about 7-8 cm per year. After the third year of life, the rate of growth decreases, and the child grows an average of 5 cm per year. During puberty, the growth rate increases again.
- At birth, a full-term infant typically has a head circumference of about 35-36 cm. During the first three months, it increases by up to 2 cm per month, from 4 to 6 months by approximately 1 cm per month, and from 7 to 12 months by up to 0.5 cm per month. After that, the head circumference can increase by up to 10 cm until the end of puberty.



References

- Chiocca, E. M. (2011). Assessment of Health and Illness in Children: An Overview. Lippincott Williams & Wilkins, Philadelphia: 1-16.
- Chiocca, E. M. (2020). Advanced Pediatric Assessment, Thread Edition. Springer Publishing Company. USA: 21-60.
- Gormley-Fleming, E & Peate, I.(2019). Fundamentals of Children's Applied Pathophysiology: An Essential Guide for Nursing and Healthcare Students. Wiley Blackwell, London.
- Miall, L., Rudolr, M., Smith, D. (2016). Paediatrics at Galance, Fourth Edition. Wiley Blackwell: 12-16.