Human Growth and Development
“Practical”

University of Mosul / College of Nursing

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2024 / 2025

Third Stage / First Trimester

Human Growth and Development

"Practical"

Growth: Are the quantitative (measurable) changes in physical size of the body and its parts, an increase in number and size of cells that results in increased size and weight of the whole or any of its parts such as increases in cells, tissues, structures, and systems.

- Physical increase in whole or any of its part of the body
- Parameters (Anthropometric Measurement) of a child's growth can be easily measured with accuracy through the following:
  1. Weight
  2. Head circumference
  3. Length or height
  4. Bone Age
  5. Dentition

1- **Weight**

- Important indicator of child's nutritional status and general growth
- Used to calculate medication dosages for children
- Should be measured at every visit.

2- Head circumference

- Related to intracranial volume
- Normal brain growth = expected rate of increase in head circumference
- Abnormal lags may indicate serious problems

3- Length or height

- Compared with head circumference and weight measurement for overall indicator of physical growth
- Length is measuring infant from crown of head to heel when place child in recumbent position and during the first two years
- Standing height measurement for children three years or older.

4- Bone Age:

- An indicator of physiological development
- Distinct from chronological age
- More advanced in girls - by 1 yr in early childhood; 2 yrs in mid childhood
- Assessed by number, shape & size of ossification centers and density size & shape of ends of bones

Which bones to Xray?

- Newborn – Xray of foot & knee
- Infant 3-9 months– shoulder
- 1-13 years– wrist & hands
- 12-14 years– elbow & hip

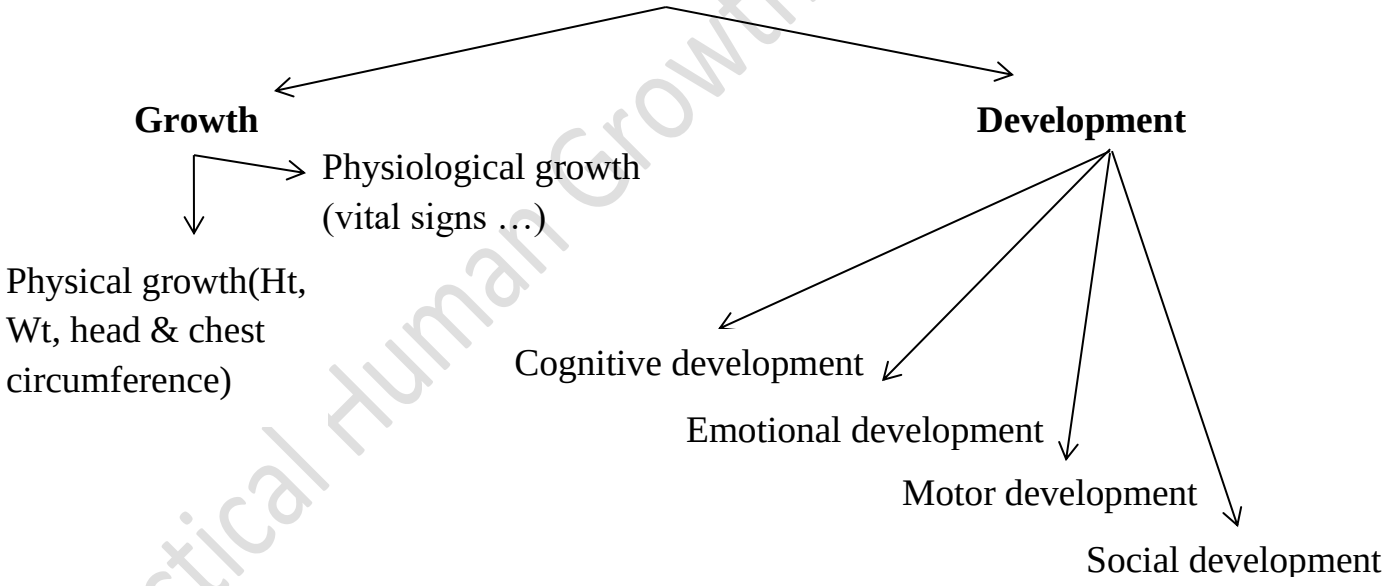
5- Dentition

- Refers to eruption of teeth and follows sequential pattern
- Eruption of primary "temporary" teeth – 6-30 months
  i. Twenty primary teeth
  ii. Eruption of permanent teeth - around 6 years of age
  iii. Normally 32 permanent teeth

Development: a gradual change and expansion; advancement from lower to more advanced stages of complexity, that refers to behavioral changes in functional abilities and skills. Thus, developmental changes are qualitative, that is, not easily measured.

Maturation: an increase in competence and adaptability; aging; usually used to describe a qualitative change; a change in the complexity of a structure that makes it possible for that structure to begin functioning; to function at a higher level

Types of Growth and Development



Stages of Growth and Development

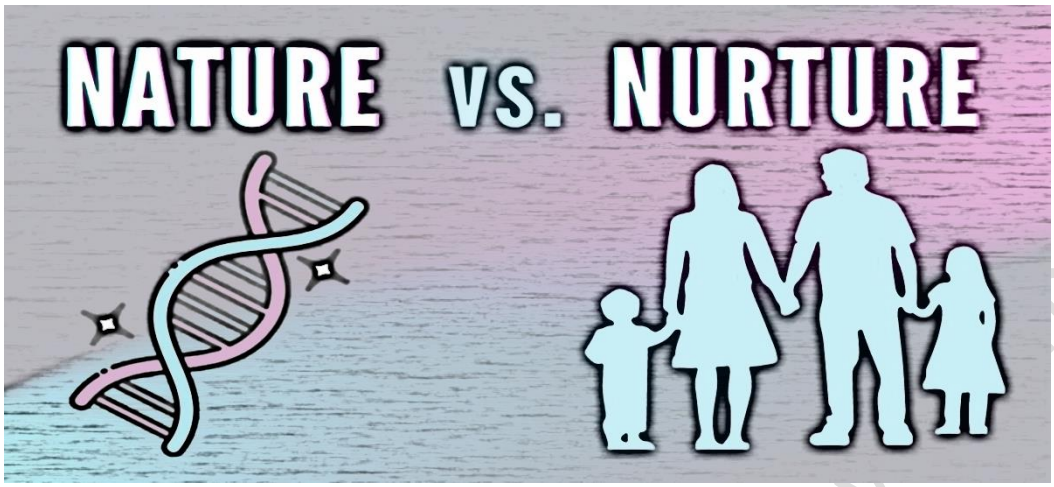
Stage	sub stage	Age
Pre-natal	Embryonic	Conception - 8 w
	Fetal stage	8-40 or 42 w
Infancy	Neonatal	Birth to 27 or 28 days.
	Infant	I month to 12 months.
Early childhood	Toddler	I year to 3 years.
	Pre-school age	3 years to 6 years
Middle childhood	School age	6 years to 12 years
Later childhood	Pre-pubertal	11 years to 13 years.
	Adolescence	13-to 18 or 21 years
Adulthood	Young adult	18-35 years
	Middle adult	35-55 or 65 years
	Old adult	65- above

Factors Affecting Growth and Development:

Nature vs. Nurture

To what extent do hereditary factors and environmental influence shape the various personal traits and characteristics of a child?

This has been a debated topic in growth and development. The debate has also been called heredity versus environment or maturation versus learning.



1. **Hereditary: (Nature)**

– Traits, capacities, and limitations that a person inherits from parents at the moment of conception

– Examples: hair and eye color, body type, and inherited diseases

2. **Environmental factors: (Nurture)**

– Environmental influences that occur after conception

– Influences begin with the mother's health before birth and the child's environment thereafter. that's contain of the following:

a. Pre-natal environment

1-Factors related to mothers during pregnancy:

- Nutritional deficiencies
- Diabetic mother
- Exposure to radiation
- Infection with German measles

- Smoking

- Use of drugs

2-Factors related to fetus

- Mal-position in uterus
- Faulty placental implantation

b. Post-Natal Environment

1. External environment:

- Socio-economic status of the family

- Child's nutrition

- Climate and season

- Child's ordinal position in the family

- Number of siblings in the family

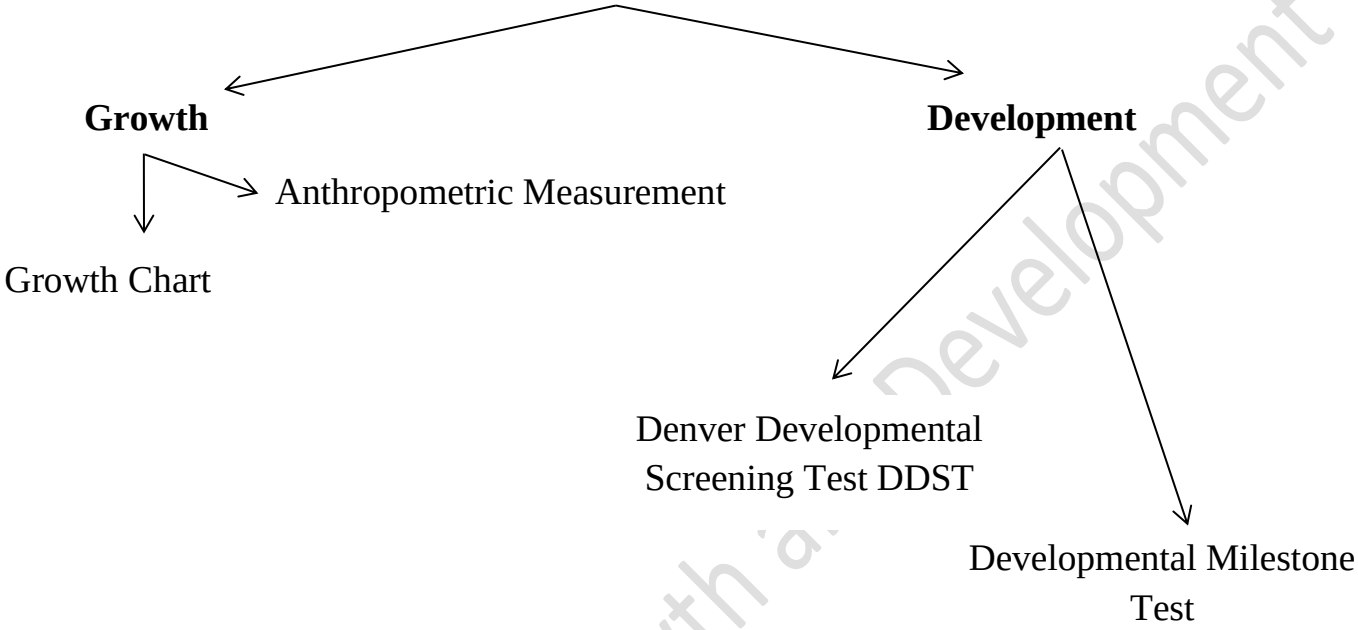
- Family structure (single parent or extended family …)

2. Internal environment

- Child's intelligence
- Hormonal influences
- Emotions

Growth and development Measurement

Types of Growth and Development Measurement



1. Growth Chart

The growth chart is a visual display of child's physical growth. Growth charts are used to compare child's height, weight and head circumference against children of same age.

Types of growth chart

1. Weight for age (birth to 36 months).
2. Length-for-age (birth to 36 months).
3. Head circumference for age (birth to 36 months).
4. Weight for length (birth to 36 months).
5. Weight for age (2 years to 20 years).
6. Stature for age (2 years to 20 years).
7. Body mass index for age (2 years to 20 years).

Important or uses of growth chart:

1. **Growth monitoring:** main use is growth monitoring of child.
2. **Diagnostic tool:** for mortality, morbidity and health status.
3. **Planning & policy making:** by grading malnutrition.
4. **Educational tool:** mother can be educated regarding care of her child.
5. **Tool for action:** it helps the health workers to determine type of intervention needed.
6. **Tool for teaching:** Growth chart also gives information like
   - Birth date & weight.
   - Immunization of child.
   - Immunization of mother.
   - Child health record.

Growth Charts

The physical growth of children has long been recognized as an important indicator of health and wellness. Growth charts have been used to assess whether a child is receiving adequate nutrition and to screen for potentially inadequate growth that might be indicative of adverse health conditions. Traditionally, attention has focused on under nutrition.

CDC recommends that health care providers:

1. Use the WHO growth standards to monitor growth for infants and children ages 0 to 2 years of age in Iraq.
2. Use the CDC growth charts for children age 2 years and older in Iraq.

Steps of Measurement Growth Chart

Measuring growth using a growth chart typically involves several steps. Here's a general outline:

1. **Gather Equipment**:
    - Use a stadiometer for height measurement.
    - Use a scale for weight measurement.
    - A measuring tape can also be useful for measuring head circumference in infants.
2. **Prepare the Child**:
    - Ensure the child is comfortable and calm.
    - Remove shoes and heavy clothing for accurate measurements.
3. **Measure Height**:
    - Have the child stand straight against the stadiometer.
    - Ensure their heels, back, and head are touching the measuring surface.
    - Record the height in centimeters or inches.
4. **Measure Weight**:
    - Weigh the child on a calibrated scale.
    - Ensure the scale is zeroed before weighing.
    - Record the weight in kilograms or pounds.
5. **Measure Head Circumference (if applicable)**:
    - For infants, wrap a measuring tape around the largest part of the head.
    - Record the measurement in centimeters or inches.

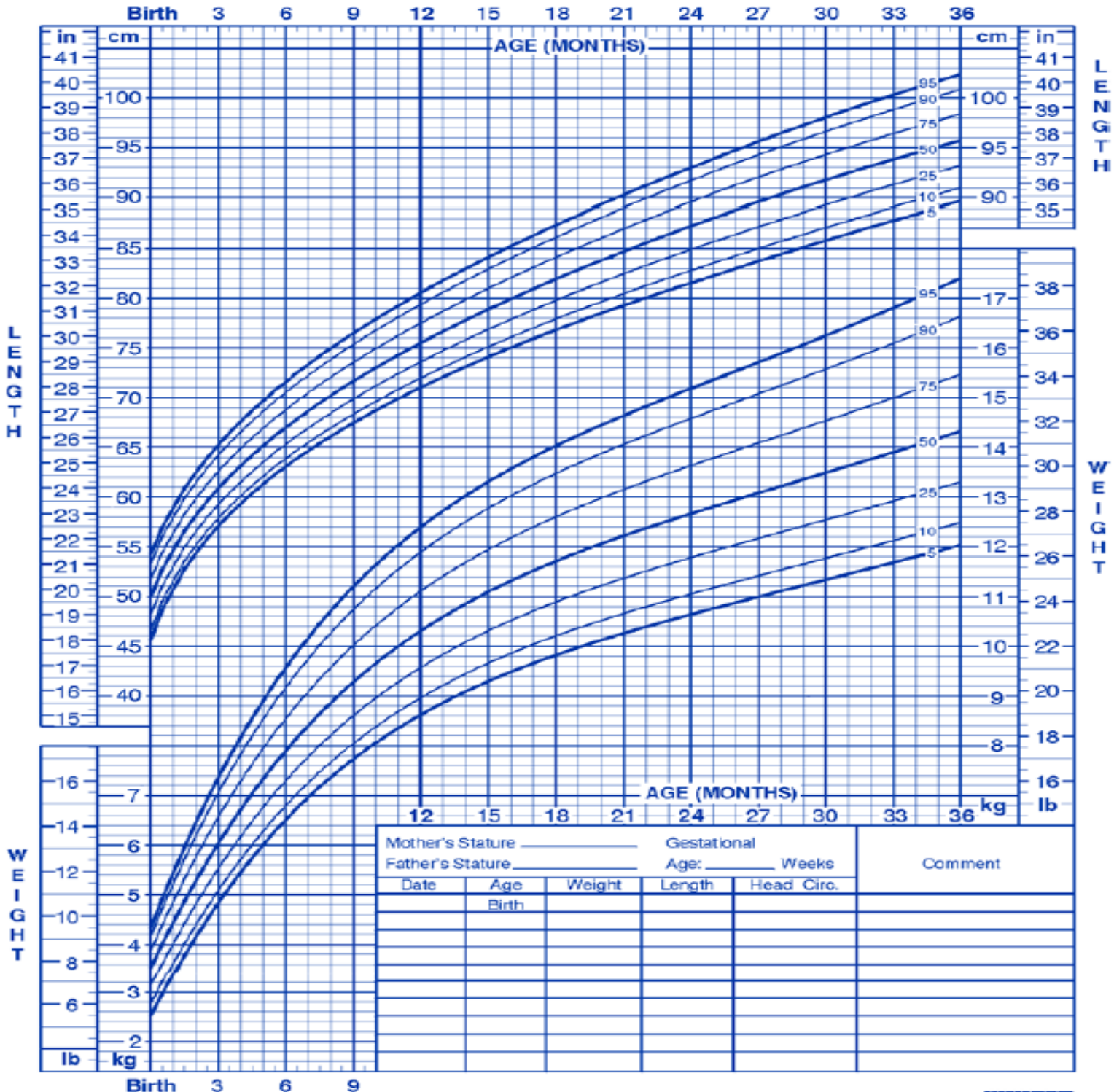
6. **Plot Measurements on Growth Chart**:
    - Use appropriate growth charts (e.g., WHO or CDC charts) based on age and sex.
    - Plot the height, weight, and head circumference on the chart.
7. **Interpret Results**:
    - Compare the plotted points to the percentile curves on the growth chart.
    - Assess growth patterns over time and identify any potential concerns.
8. **Document and Discuss**:
    - Keep a record of the measurements for future reference.
    - Discuss the findings with parents or caregivers, including any follow-up actions if necessary.

Regular monitoring and consistent methodology are key for accurate growth assessment.

Birth to 36 months: Boys
Length-for-age and Weight-for-age percentiles

NAME _____

RECORD # _____



Mother's Stature _____ Gestational

Father's Stature _____ Age: _____ Weeks

Date	Age	Weight	Length	Head Circ.	Comment
	Birth				

Published May 30, 2000 (modified 4/20/01).

SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).

http://www.cdc.gov/growthcharts

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Birth to 36 months: Girls
Length-for-age and Weight-for-age percentiles

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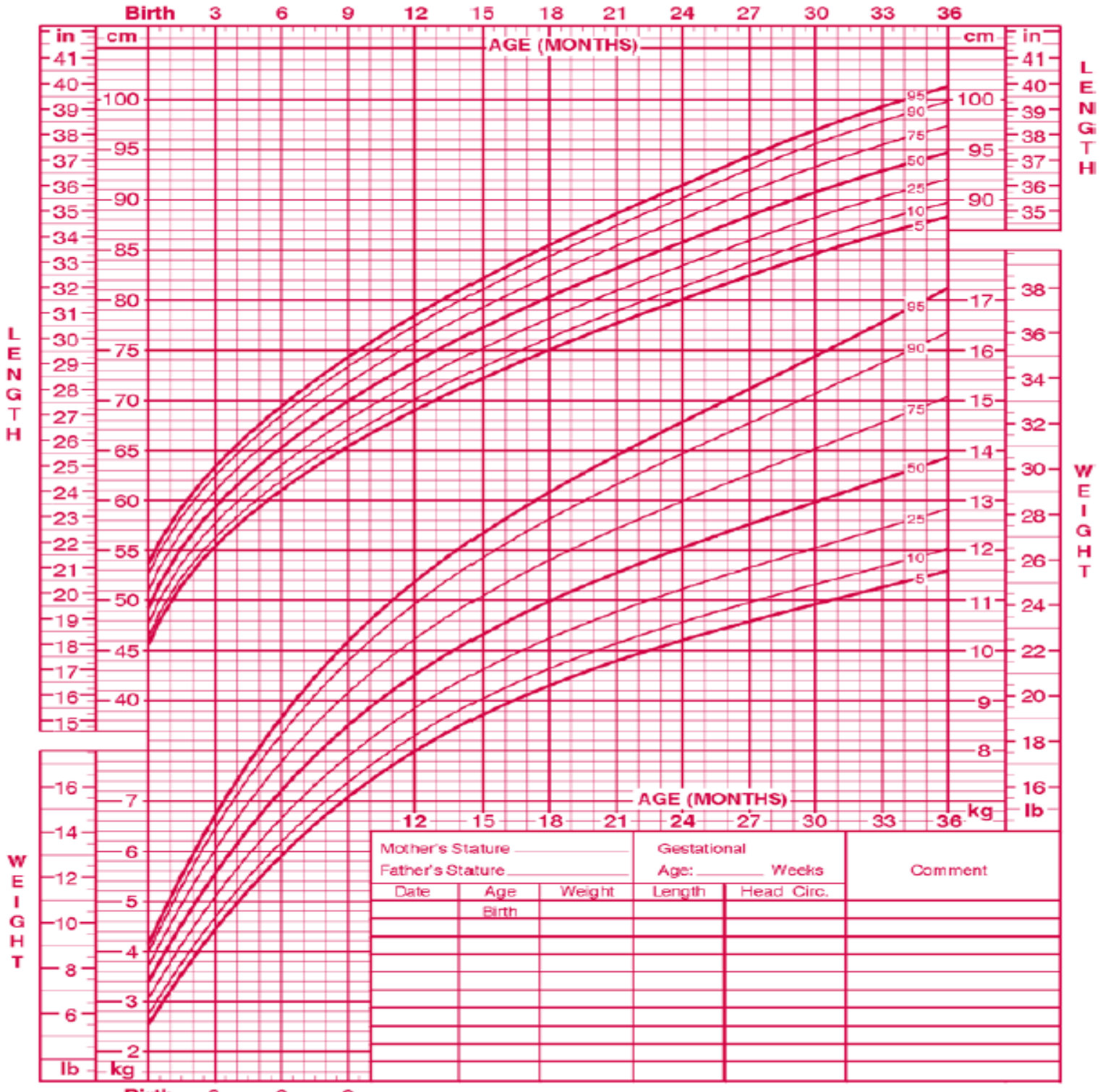

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Birth to 36 months: Boys
Head circumference-for-age and Weight-for-length percentiles

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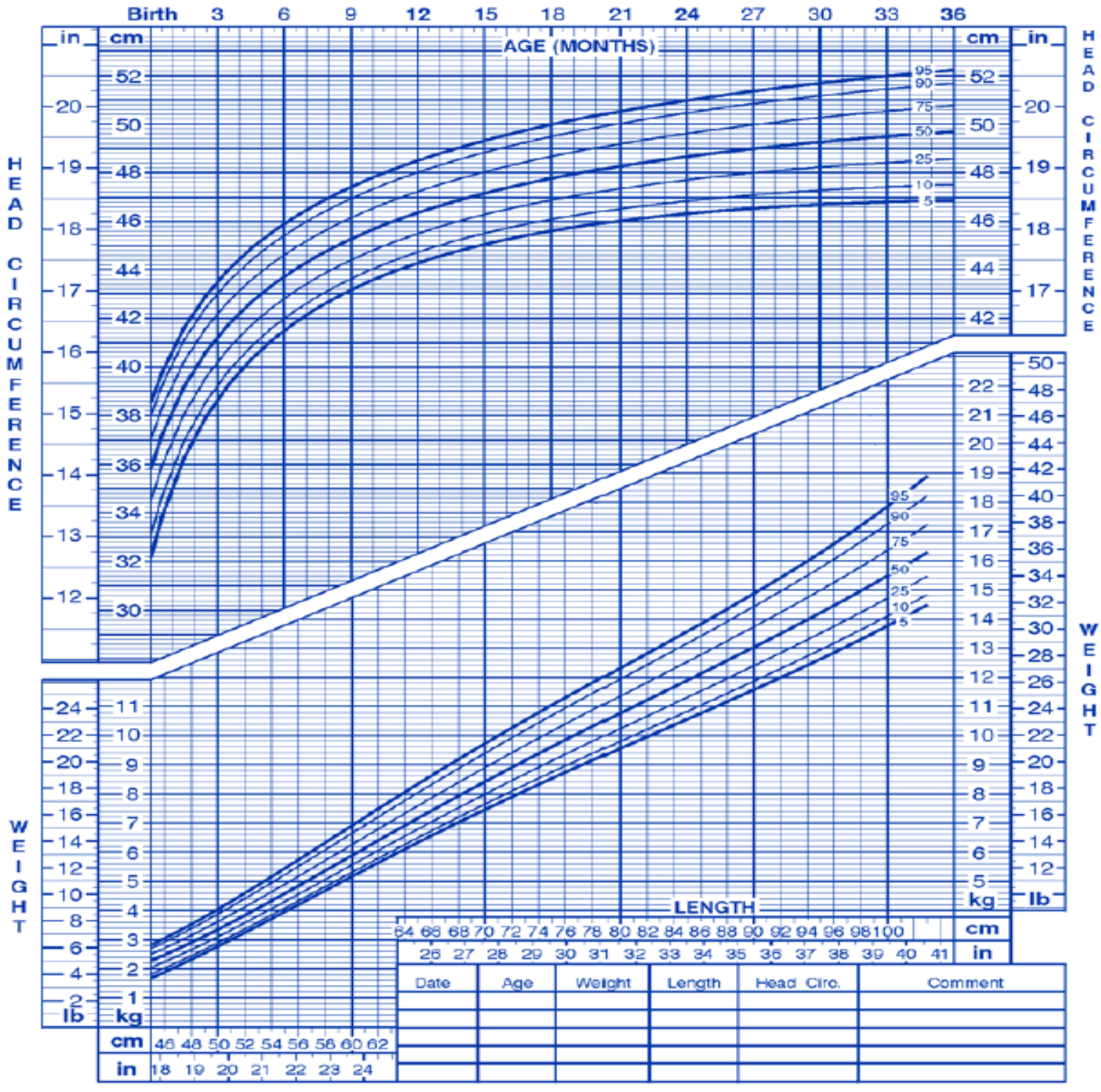

Date	Age	Weight	Length	Head Circ.	Comment

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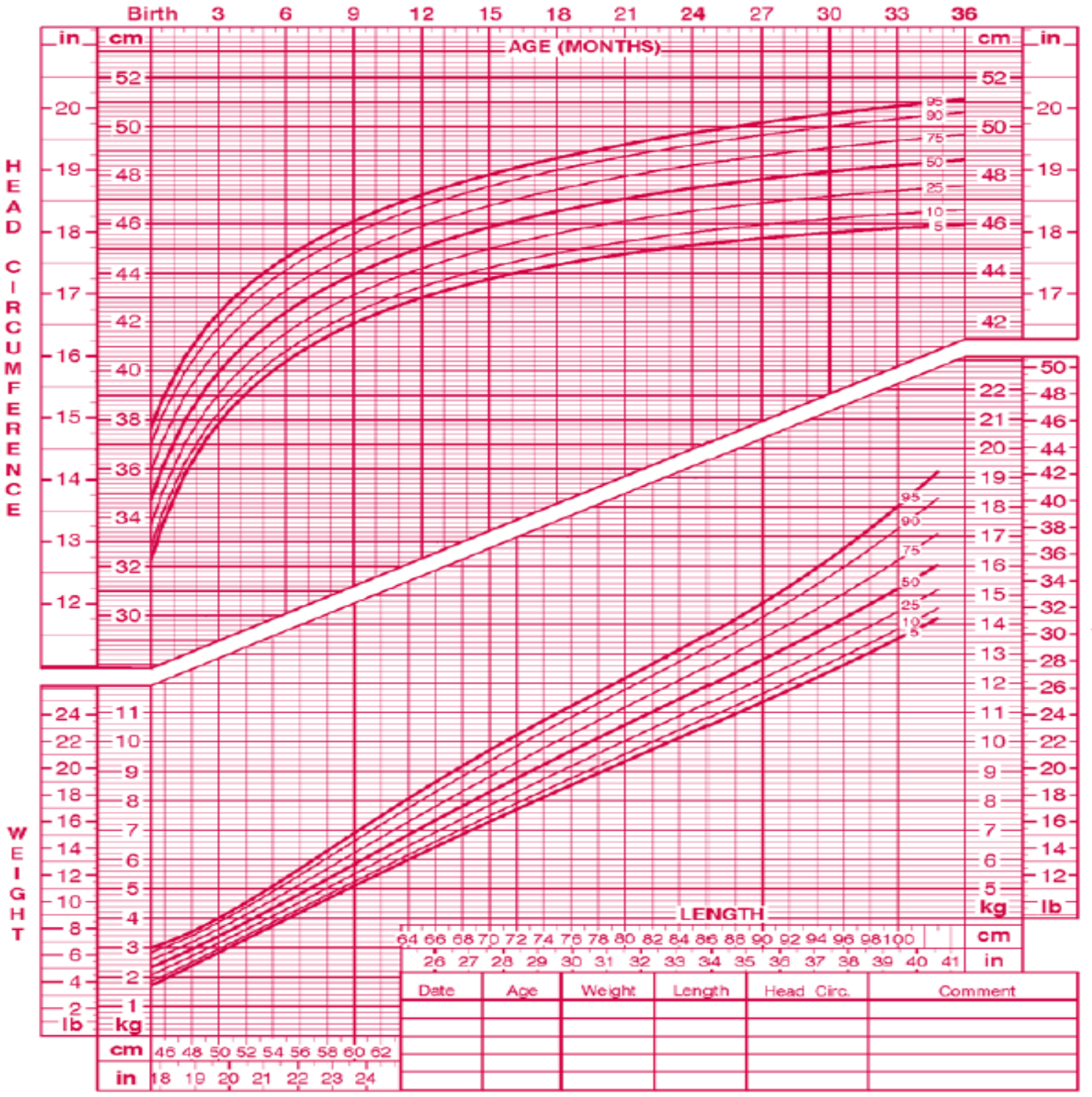

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2 to 20 years: Boys
Stature-for-age and Weight-for-age percentiles

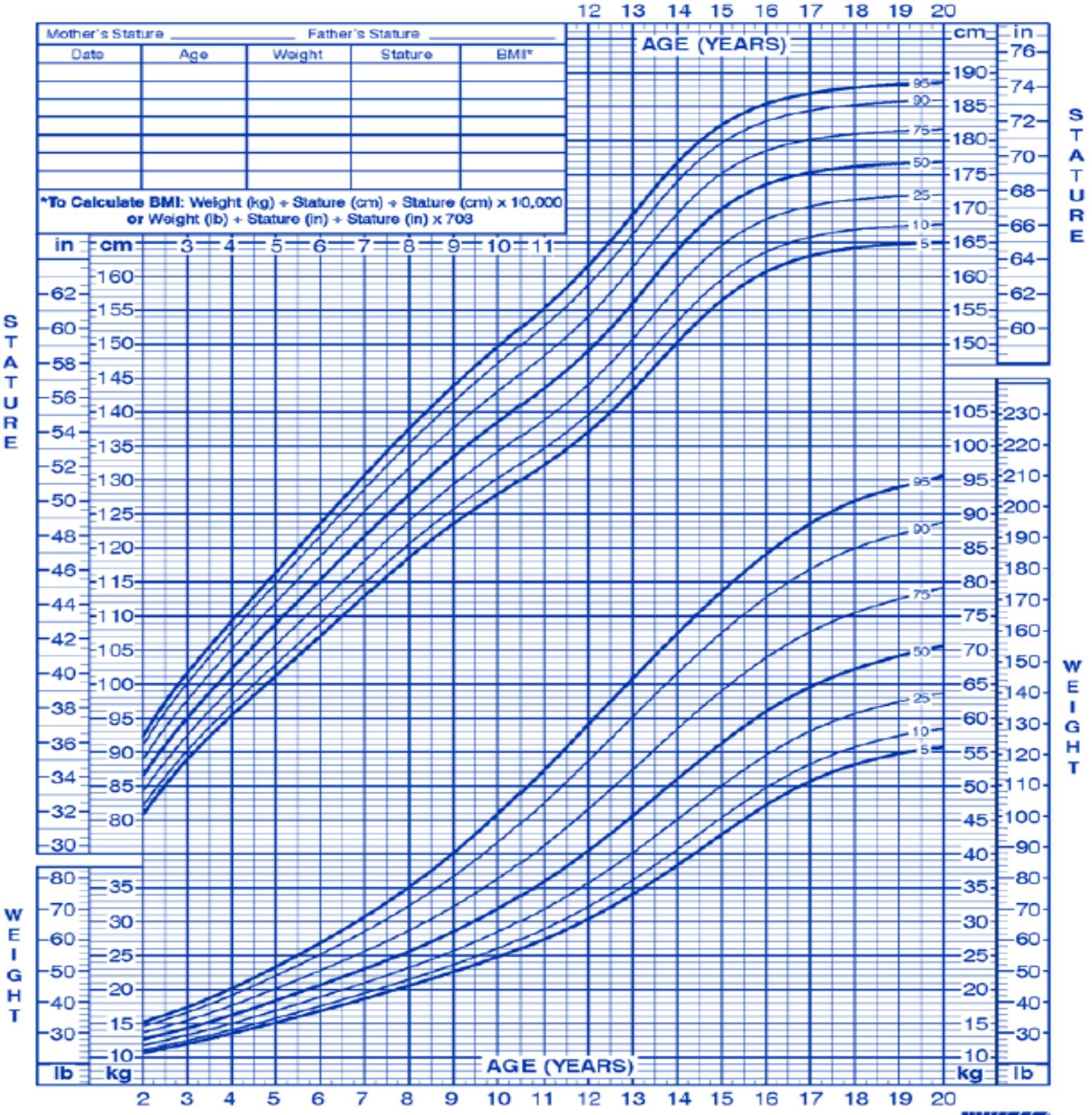
NAME _____

RECORD # _____

Mother's Stature _____ Father's Stature _____

Date	Age	Weight	Stature	BMI*

*To Calculate BMI: Weight (kg) ÷ Stature (cm) ÷ Stature (cm) x 10,000
or Weight (lb) ÷ Stature (in) ÷ Stature (in) x 703



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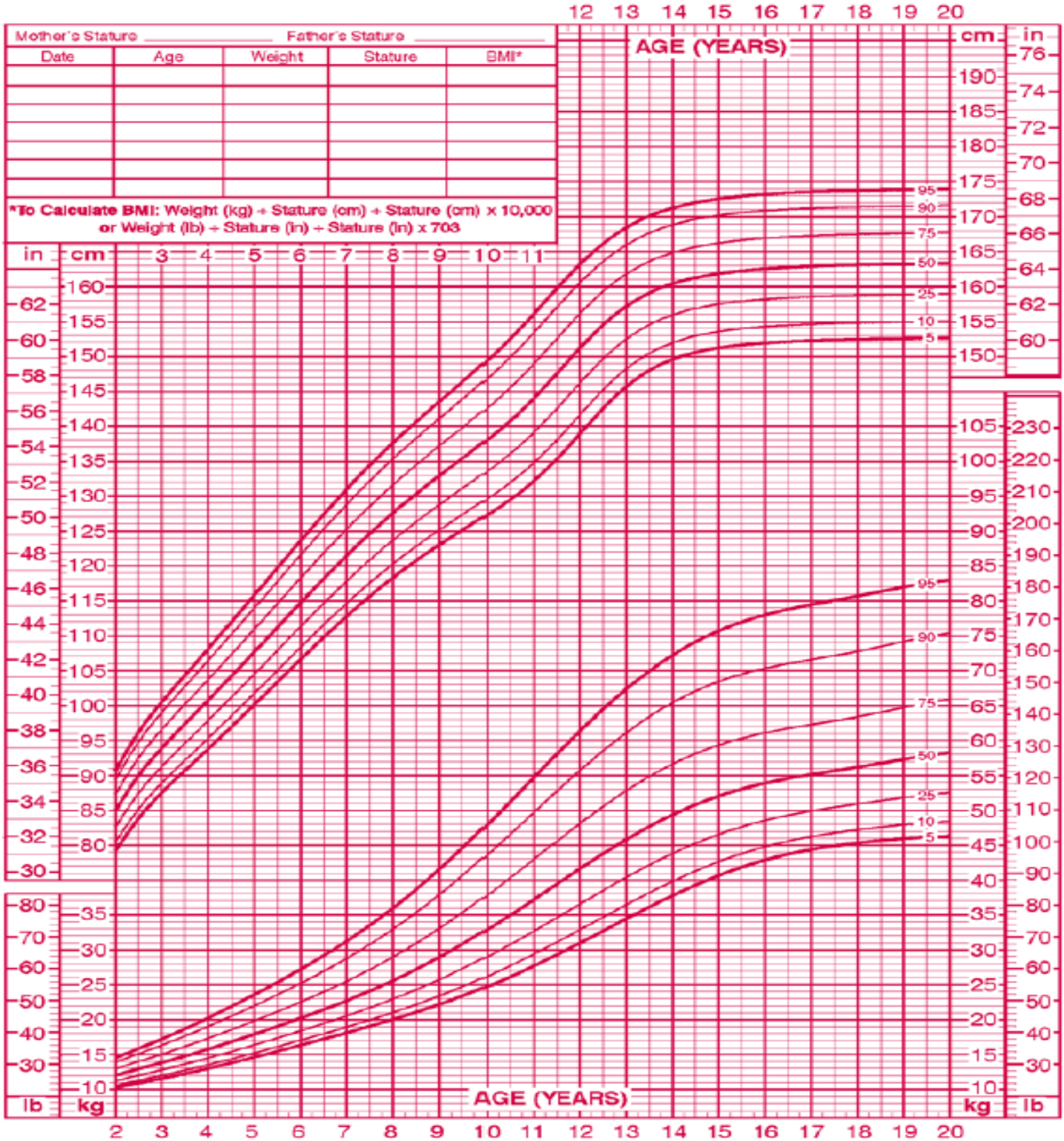

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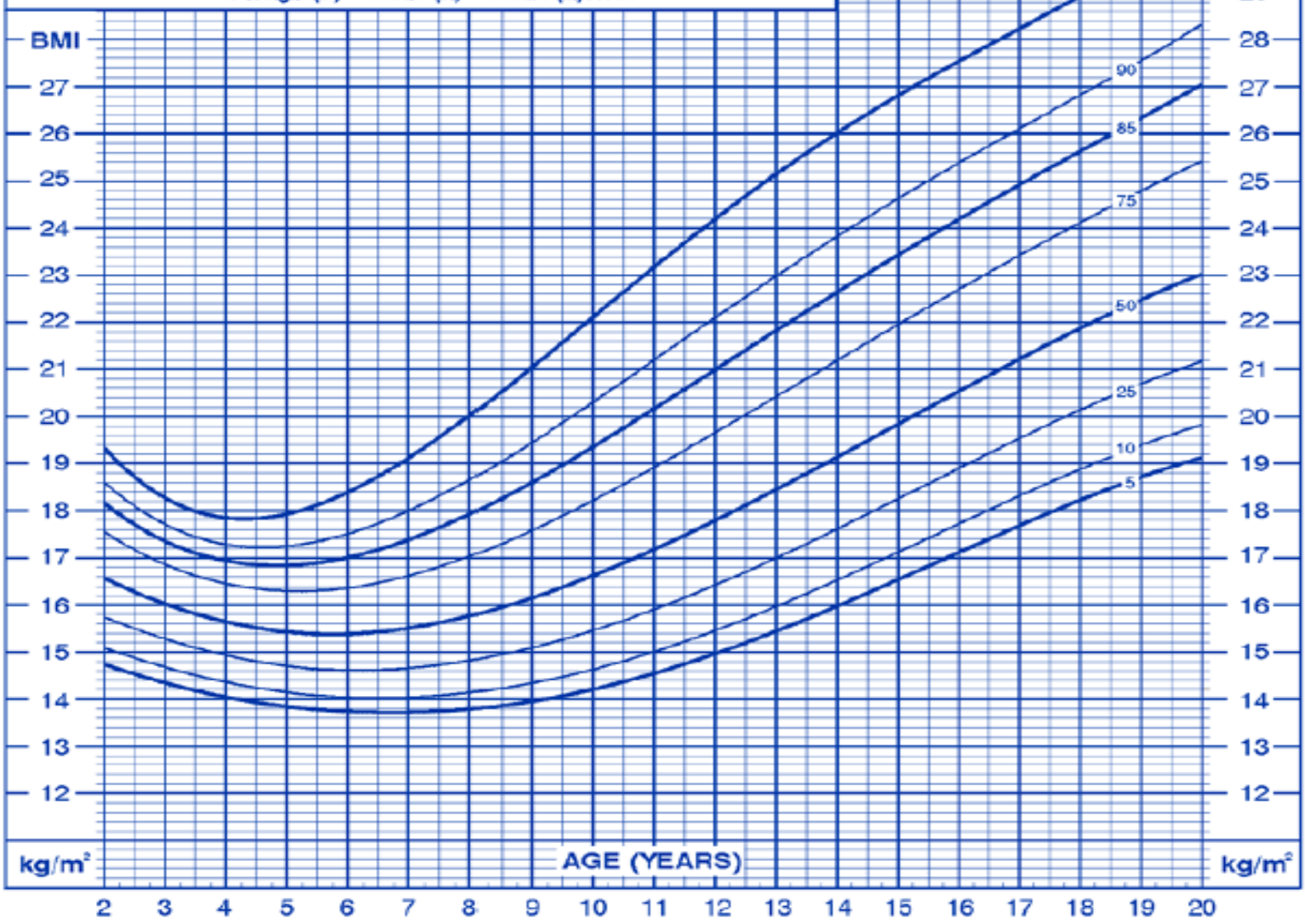
2 to 20 years: Boys
Body mass index-for-age percentiles

NAME _____

RECORD # _____

Date	Age	Weight	Stature	BMI*	Comments

*To Calculate BMI: Weight (kg) ÷ Stature (cm) ÷ Stature (cm) x 10,000
or Weight (lb) ÷ Stature (in) ÷ Stature (in) x 703



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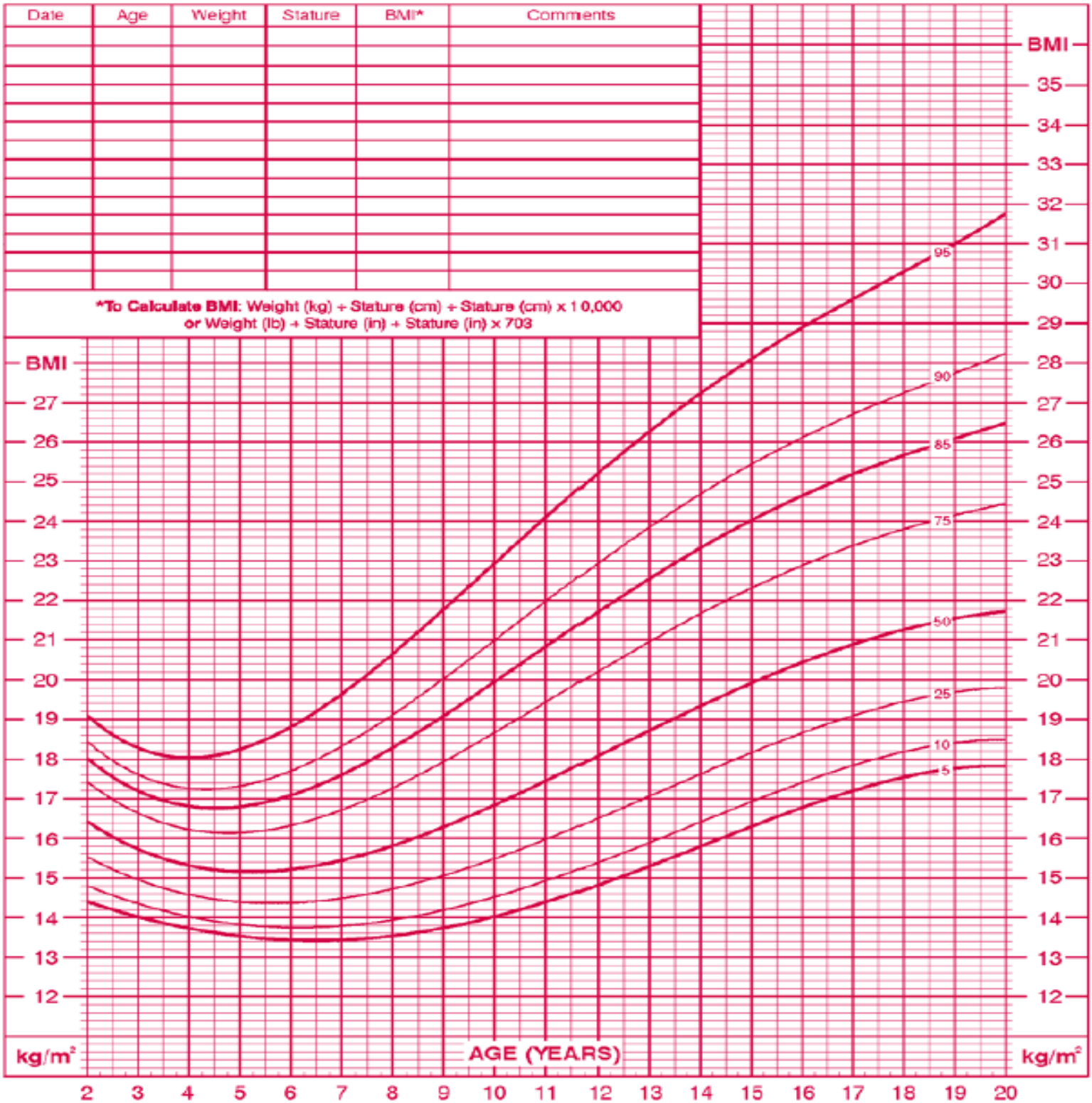

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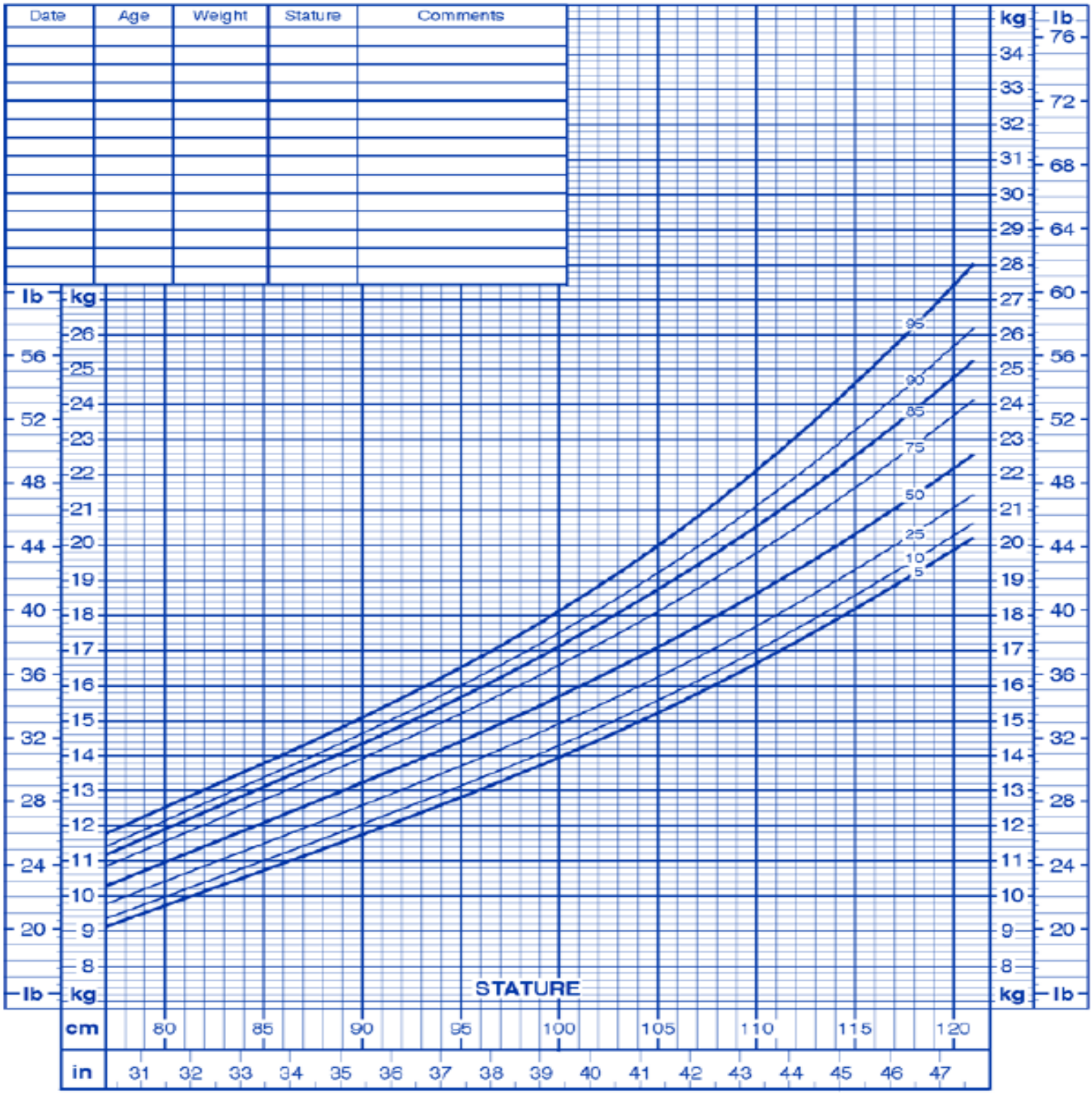
NAME _____

RECORD # _____

Weight-for-stature percentiles: Boys

Date	Age	Weight	Stature	Comments



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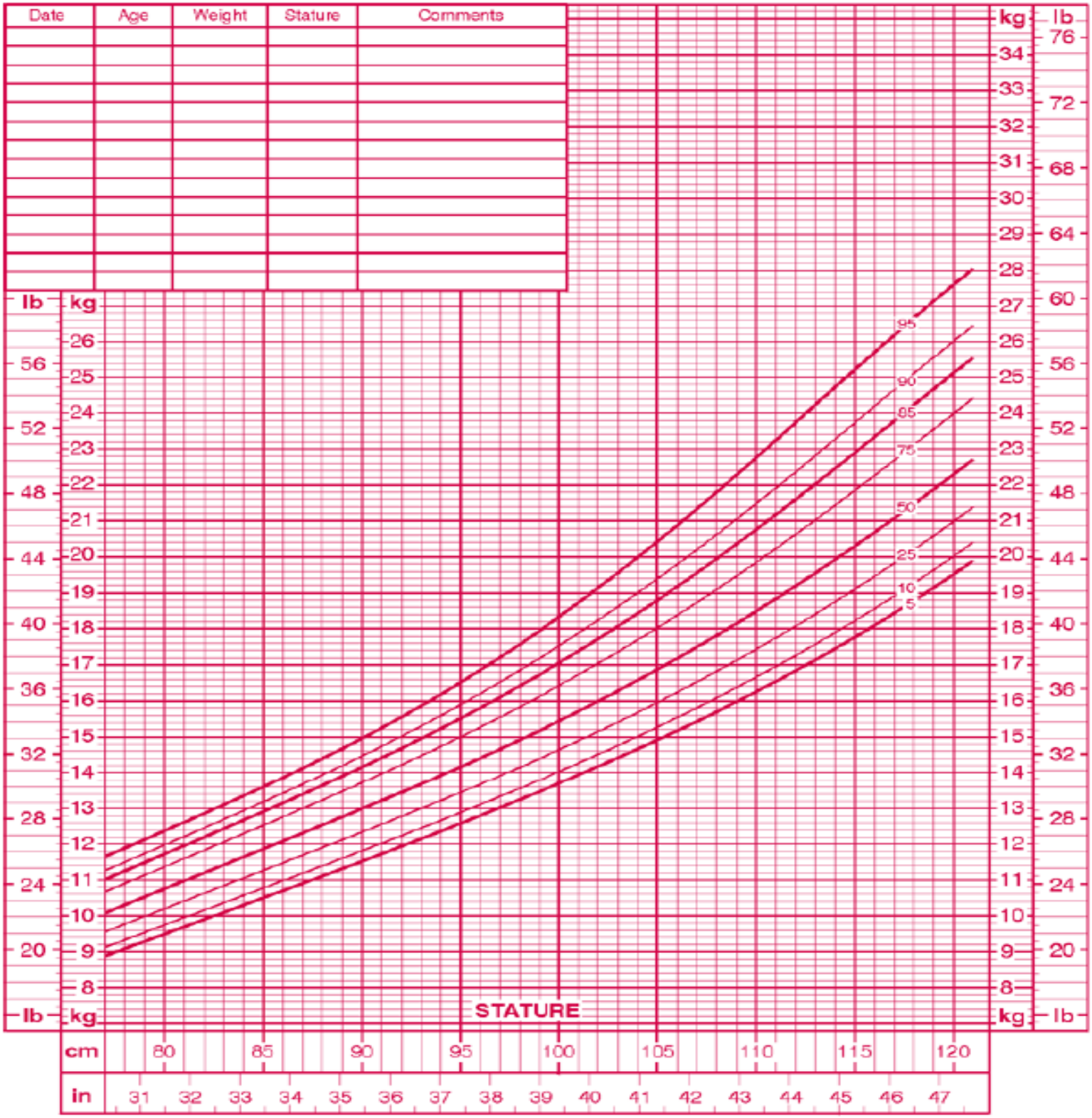
NAME _____

RECORD # _____

Weight-for-stature percentiles: Girls

Date	Age	Weight	Stature	Comments



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Z-scores

Z-scores are commonly used in pediatric health to assess children's growth and development compared to established standards. These scores help determine how a child's height, weight, or body mass index (BMI) compares to their peers of the same age and sex.

The weight-for-length/height z-score (WHZ) compares a child's weight to the weight of a child of the same length/height and sex to classify nutritional status.

To use the charts to classify children's nutritional status:

1. Find the correct table for the child´s age (0–23 months or 24–59 months) and sex (boy or girl).

2. Find the figure closest to the child's length/height in the left column.

3. Move the finger to the right to find the range that contains the child's weight.

4. The label at the top of the column with the range containing the child's weight tells the child's nutritional status.

Applications of Z-scores for Children:

1. **Growth Charts**: Pediatricians use growth charts that plot Z-scores for height and weight. A Z-score of 0 means the child is at the median for their age and sex, while positive or negative scores indicate how many standard deviations the child's measurements are from the median.

2. **Assessing Nutrition**: Z-scores can help identify underweight or overweight children. For example, a Z-score below -2 might indicate undernutrition, while a score above +2 could suggest obesity.

3. **Developmental Monitoring**: Z-scores can assess developmental milestones and cognitive abilities compared to normative data.

Interpretation:

- **Z-score between -1 and +1**: Average range.
- **Z-score between -2 and -1 or +1 and +2**: Slightly below or above average.
- **Z-score below -2 or above +2**: Indicates potential concern and may warrant further evaluation.

The following indices are expressed as percentiles or Z-scores:

1. **"Weight-for-age"** indicates a child's body weight for their age and sex relative to the reference population. It is an important indicator of a child's nutritional status, such as underweight or overweight in children aged less than two years old.

2. **"Height (or length)-for-age"** indicates a child's height (or supine length in children less than two years old) for their age and sex relative to the reference population. It is used in clinical practice to monitor a child's growth and is influenced by genetic potential (parents' heights), nutritional factors, and the 'tempo' of growth, which is a measure of how rapid or

slow in timing to achieve final adult height and is closely related to puberty timing.

3. **"BMI-for-age"** indicates a child's BMI for their age and sex relative to the reference population. It is used (usually in children aged older than two years) to indicate weight status independent for height, and is used to define childhood overweight, obesity and thinness categories.

4. **"Weight-for-height (or length)-for-age"** indicates a child's weight status independent of their height relative to a reference population, typically in children aged under two years old. It is often used to indicate whether children are overweight, obese or underweight. (Note: these indices are often referred to as simply "weight-for-height" and "weight-for-length").

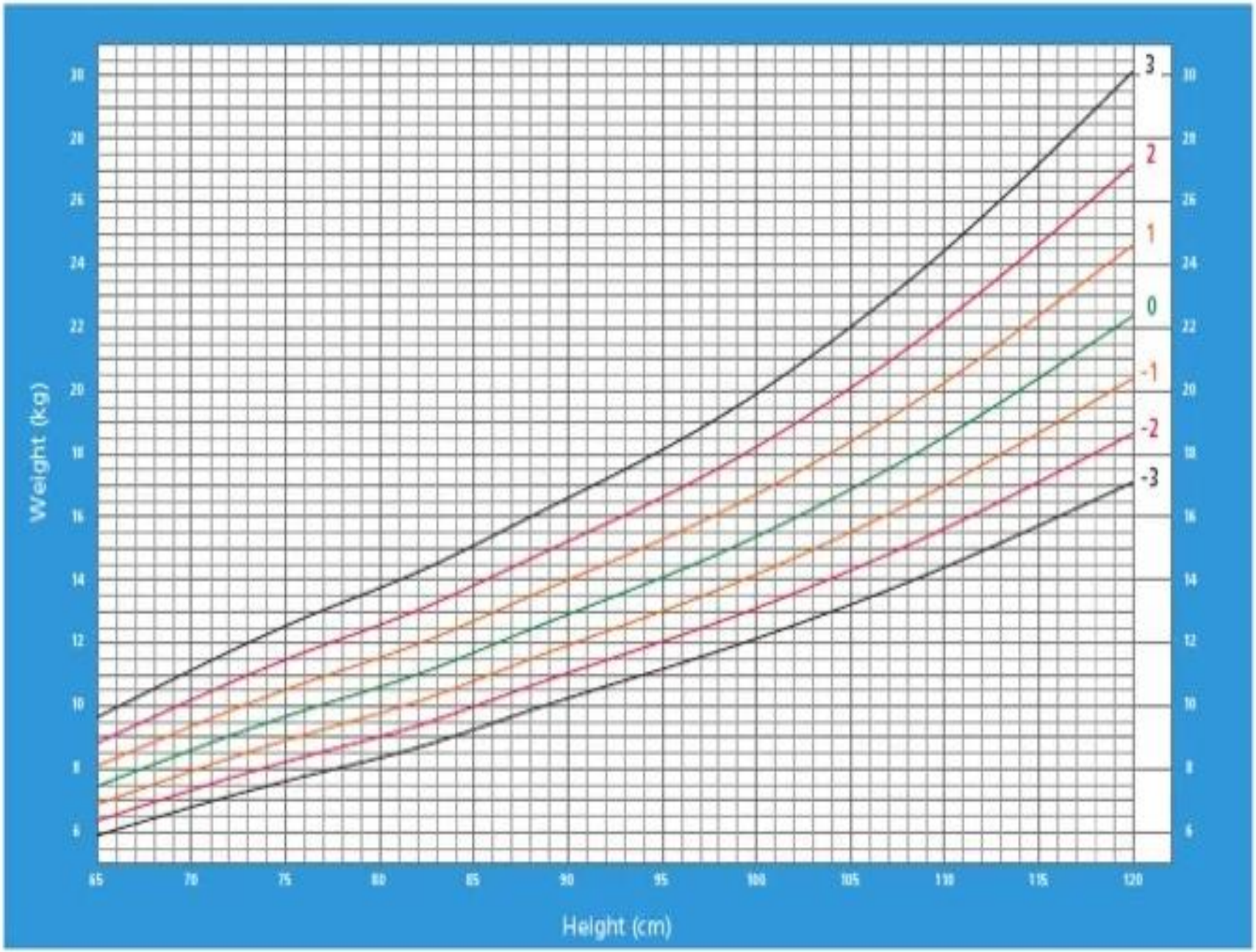
At birth, percentiles and Z-scores for a newborn infant's weight, length and ponderal index are usually adjusted for sex and gestational age at birth. These are used to indicate the rate of fetal growth during pregnancy.

Z-scores are also often used to 'clean' large datasets by excluding outlying data. Z-scores that lie outside +/- 4, 5 or 6 might be considered to be implausible and are changed to missing values

Weight-for-height BOYS

2 to 5 years (z-scores)

World Health Organization



WHO Child Growth Standards

BOYS 24–59 months, weight-for-height

Height (cm) ↓	SAM < -3	MAM ≥ -3 to < -2	Normal ≥ -2 to ≤ +2	Overweight > +2 to ≤ +3	Obesity > +3
	Weight (kg) →				
89	0–9.9	10.0–10.7	10.8–14.9	15.0–16.3	> 16.3
90	0–10.1	10.2–10.9	11.0–15.2	15.3–16.6	> 16.6
91	0–10.3	10.4–11.1	11.2–15.5	15.6–16.9	> 16.9
92	0–10.5	10.6–11.3	11.4–15.8	15.9–17.2	> 17.2
93	0–10.7	10.8–11.5	11.6–16.0	16.1–17.5	> 17.5
94	0–10.9	11.0–11.7	11.8–16.3	16.4–17.8	> 17.8
95	0–11.0	11.1–11.9	12.0–16.6	16.7–18.1	> 18.1
96	0–11.2	11.3–12.1	12.2–16.9	17.0–18.4	> 18.4
97	0–11.4	11.5–12.3	12.4–17.2	17.3–18.8	> 18.8
98	0–11.6	11.7–12.5	12.6–17.5	17.6–19.1	> 19.1
99	0–11.8	11.9–12.8	12.9–17.9	18.0–19.5	> 19.5
100	0–12.0	12.1–13.0	13.1–18.2	18.3–19.9	> 19.9
101	0–12.2	12.3–13.2	13.3–18.5	18.6–20.3	> 20.3
102	0–12.4	12.5–13.5	13.6–18.9	19.0–20.7	> 20.7
103	0–12.7	12.8–13.7	13.8–19.3	19.4–21.1	> 21.1
104	0–12.9	13.0–13.9	14.0–19.7	19.8–21.6	> 21.6
105	0–13.1	13.2–14.2	14.3–20.1	20.2–22.0	> 22.0
106	0–13.3	13.4–14.4	14.5–20.5	20.6–22.5	> 22.5
107	0–13.6	13.7–14.7	14.8–20.9	21.0–22.9	> 22.9
108	0–13.8	13.9–15.0	15.1–21.3	21.4–23.4	> 23.4
109	0–14.0	14.1–15.2	15.3–21.8	21.9–23.9	> 23.9
110	0–14.3	14.4–15.5	15.6–22.2	22.3–24.4	> 24.4
111	0–14.5	14.6–15.8	15.9–22.7	22.8–25.0	> 25.0
112	0–14.8	14.9–16.1	16.2–23.1	23.2–25.5	> 25.5
113	0–15.1	15.2–16.4	16.5–23.6	23.7–26.0	> 26.0
114	0–15.3	15.4–16.7	16.8–24.1	24.2–26.6	> 26.6
115	0–15.6	15.7–17.0	17.1–24.6	24.7–27.2	> 27.2
116	0–15.9	16.0–17.3	17.4–25.1	25.2–27.8	> 27.8
117	0–16.1	16.2–17.6	17.7–25.6	25.7–28.3	> 28.3
118	0–16.4	16.5–17.9	18.0–26.1	26.2–28.9	> 28.9
119	0–16.7	16.8–18.2	18.3–26.6	26.7–29.5	> 29.5
120	0–17.0	17.1–18.5	18.6–27.2	27.3–30.1	> 30.1

GIRLS 24–59 months, weight-for-height

Height (cm) ↓	SAM < -3	MAM ≥ -3 to < -2	Normal ≥ -2 to ≤ +2	Overweight > +2 to ≤ +3	Obesity > +3
	Weight (kg) →				
89	0–9.5	9.6–10.3	10.4–14.9	15.0–16.4	> 16.4
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91	0–9.9	10.0–10.8	10.9–15.5	15.6–17.1	> 17.1
92	0–10.1	10.2–11.0	11.1–15.8	15.9–17.4	> 17.4
93	0–10.3	10.4–11.2	11.3–16.1	16.2–17.8	> 17.8
94	0–10.5	10.6–11.4	11.5–16.4	16.5–18.1	> 18.1
95	0–10.7	10.8–11.6	11.7–16.7	16.8–18.5	> 18.5
96	0–10.8	10.9–11.8	11.9–17.0	17.1–18.8	> 18.8
97	0–11.0	11.1–12.0	12.1–17.4	17.5–19.2	> 19.2
98	0–11.2	11.3–12.2	12.3–17.7	17.8–19.5	> 19.5
99	0–11.4	11.5–12.4	12.5–18.0	18.1–19.9	> 19.9
100	0–11.6	11.7–12.7	12.8–18.4	18.5–20.3	> 20.3
101	0–11.9	12.0–12.9	13.0–18.7	18.8–20.7	> 20.7
102	0–12.1	12.2–13.2	13.3–19.1	19.2–21.1	> 21.1
103	0–12.3	12.4–13.4	13.5–19.5	19.6–21.6	> 21.6
104	0–12.5	12.6–13.7	13.8–19.9	20.0–22.0	> 22.0
105	0–12.8	12.9–13.9	14.0–20.3	20.4–22.5	> 22.5
106	0–13.0	13.1–14.2	14.3–20.8	20.9–23.0	> 23.0
107	0–13.3	13.4–14.5	14.6–21.2	21.3–23.5	> 23.5
108	0–13.6	13.7–14.8	14.9–21.7	21.8–24.0	> 24.0
109	0–13.8	13.9–15.1	15.2–22.1	22.2–24.5	> 24.5
110	0–14.1	14.2–15.4	15.5–22.6	22.7–25.1	> 25.1
111	0–14.4	14.5–15.7	15.8–23.1	23.2–25.7	> 25.7
112	0–14.7	14.8–16.1	16.2–23.6	23.7–26.2	> 26.2
113	0–15.0	15.1–16.4	16.5–24.2	24.3–26.8	> 26.8
114	0–15.3	15.4–16.7	16.8–24.7	24.8–27.4	> 27.4
115	0–15.6	15.7–17.1	17.2–25.2	25.3–28.1	> 28.1
116	0–15.9	16.0–17.4	17.5–25.8	25.9–28.7	> 28.7
117	0–16.2	16.3–17.7	17.8–26.3	26.4–29.3	> 29.3
118	0–16.5	16.6–18.1	18.2–26.9	27.0–29.9	> 29.9
119	0–16.8	16.9–18.4	18.5–27.4	27.5–30.6	> 30.6
120	0–17.2	17.3–18.8	18.9–28.0	28.1–31.2	> 31.2

BOYS 24–59 months, weight-for-height

Height (cm)	SAM < -3	MAM ≥ -3 to < -2	Normal ≥ -2 to ≤ +2	Overweight > +2 to ≤ +3	Obesity > +3
	Weight (kg) →				
89	0–9.9	10.0–10.7	10.8–14.9	15.0–16.3	> 16.3
90	0–10.1	10.2–10.9	11.0–15.2	15.3–16.6	> 16.6
91	0–10.3	10.4–11.1	11.2–15.5	15.6–16.9	> 16.9
92	0–10.5	10.6–11.3	11.4–15.8	15.9–17.2	> 17.2
93	0–10.7	10.8–11.5	11.6–16.0	16.1–17.5	> 17.5
94	0–10.9	11.0–11.7	11.8–16.3	16.4–17.8	> 17.8
95	0–11.0	11.1–11.9	12.0–16.6	16.7–18.1	> 18.1
96	0–11.2	11.3–12.1	12.2–16.9	17.0–18.4	> 18.4
97	0–11.4	11.5–12.3	12.4–17.2	17.3–18.8	> 18.8
98	0–11.6	11.7–12.5	12.6–17.5	17.6–19.1	> 19.1
99	0–11.8	11.9–12.8	12.9–17.9	18.0–19.5	> 19.5
100	0–12.0	12.1–13.0	13.1–18.2	18.3–19.9	> 19.9
101	0–12.2	12.3–13.2	13.3–18.5	18.6–20.3	> 20.3
102	0–12.4	12.5–13.5	13.6–18.9	19.0–20.7	> 20.7
103	0–12.7	12.8–13.7	13.8–19.3	19.4–21.1	> 21.1
104	0–12.9	13.0–13.9	14.0–19.7	19.8–21.6	> 21.6
105	0–13.1	13.2–14.2	14.3–20.1	20.2–22.0	> 22.0
106	0–13.3	13.4–14.4	14.5–20.5	20.6–22.5	> 22.5
107	0–13.6	13.7–14.7	14.8–20.9	21.0–22.9	> 22.9
108	0–13.8	13.9–15.0	15.1–21.3	21.4–23.4	> 23.4
109	0–14.0	14.1–15.2	15.3–21.8	21.9–23.9	> 23.9
110	0–14.3	14.4–15.5	15.6–22.2	22.3–24.4	> 24.4
111	0–14.5	14.6–15.8	15.9–22.7	22.8–25.0	> 25.0
112	0–14.8	14.9–16.1	16.2–23.1	23.2–25.5	> 25.5
113	0–15.1	15.2–16.4	16.5–23.6	23.7–26.0	> 26.0
114	0–15.3	15.4–16.7	16.8–24.1	24.2–26.6	> 26.6
115	0–15.6	15.7–17.0	17.1–24.6	24.7–27.2	> 27.2
116	0–15.9	16.0–17.3	17.4–25.1	25.2–27.8	> 27.8
117	0–16.1	16.2–17.6	17.7–25.6	25.7–28.3	> 28.3
118	0–16.4	16.5–17.9	18.0–26.1	26.2–28.9	> 28.9
119	0–16.7	16.8–18.2	18.3–26.6	26.7–29.5	> 29.5
120	0–17.0	17.1–18.5	18.6–27.2	27.3–30.1	> 30.1

GIRLS 24–59 months, weight-for-height

Height (cm)	SAM < -3	MAM ≥ -3 to < -2	Normal ≥ -2 to ≤ +2	Overweight > +2 to ≤ +3	Obesity > +3
	Weight (kg) →				
89	0–9.5	9.6–10.3	10.4–14.9	15.0–16.4	> 16.4
90	0–9.7	9.8–10.5	10.6–15.2	15.3–16.8	> 16.8
91	0–9.9	10.0–10.8	10.9–15.5	15.6–17.1	> 17.1
92	0–10.1	10.2–11.0	11.1–15.8	15.9–17.4	> 17.4
93	0–10.3	10.4–11.2	11.3–16.1	16.2–17.8	> 17.8
94	0–10.5	10.6–11.4	11.5–16.4	16.5–18.1	> 18.1
95	0–10.7	10.8–11.6	11.7–16.7	16.8–18.5	> 18.5
96	0–10.8	10.9–11.8	11.9–17.0	17.1–18.8	> 18.8
97	0–11.0	11.1–12.0	12.1–17.4	17.5–19.2	> 19.2
98	0–11.2	11.3–12.2	12.3–17.7	17.8–19.5	> 19.5
99	0–11.4	11.5–12.4	12.5–18.0	18.1–19.9	> 19.9
100	0–11.6	11.7–12.7	12.8–18.4	18.5–20.3	> 20.3
101	0–11.9	12.0–12.9	13.0–18.7	18.8–20.7	> 20.7
102	0–12.1	12.2–13.2	13.3–19.1	19.2–21.1	> 21.1
103	0–12.3	12.4–13.4	13.5–19.5	19.6–21.6	> 21.6
104	0–12.5	12.6–13.7	13.8–19.9	20.0–22.0	> 22.0
105	0–12.8	12.9–13.9	14.0–20.3	20.4–22.5	> 22.5
106	0–13.0	13.1–14.2	14.3–20.8	20.9–23.0	> 23.0
107	0–13.3	13.4–14.5	14.6–21.2	21.3–23.5	> 23.5
108	0–13.6	13.7–14.8	14.9–21.7	21.8–24.0	> 24.0
109	0–13.8	13.9–15.1	15.2–22.1	22.2–24.5	> 24.5
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111	0–14.4	14.5–15.7	15.8–23.1	23.2–25.7	> 25.7
112	0–14.7	14.8–16.1	16.2–23.6	23.7–26.2	> 26.2
113	0–15.0	15.1–16.4	16.5–24.2	24.3–26.8	> 26.8
114	0–15.3	15.4–16.7	16.8–24.7	24.8–27.4	> 27.4
115	0–15.6	15.7–17.1	17.2–25.2	25.3–28.1	> 28.1
116	0–15.9	16.0–17.4	17.5–25.8	25.9–28.7	> 28.7
117	0–16.2	16.3–17.7	17.8–26.3	26.4–29.3	> 29.3
118	0–16.5	16.6–18.1	18.2–26.9	27.0–29.9	> 29.9
119	0–16.8	16.9–18.4	18.5–27.4	27.5–30.6	> 30.6
120	0–17.2	17.3–18.8	18.9–28.0	28.1–31.2	> 31.2

2. Anthropometrics measurement

Are a set of non-invasive, quantitative body measurements used to assess growth, and health parameters, help providers determine if a child is growing properly and can indicate when the child's health and well-being are at risk. Additionally, anthropometric measurements assist providers in selecting appropriate treatment options for children and adolescents. Anthropometric measurements, including:

1. Weight
2. Length or height (Stature)
3. Head, chest and abdominal circumference
4. Skin, arm and wrist fold thickness
5. Bone age
6. Body Mass Index (BMI)

A: Weight

- A full-term baby on an average **weighs 3.5 kg.**
- Weight loss in first few days: **5%-10%** of birth weight, Return to birthweight: **7–10 days** of age
- Baby gain at 25-30 gm/day for 1st **3 mths**
- Baby gain at 400 gm /month till end of **1st year**
- Roughly, **Double** birth weight**: 4–5 months**
- **Trebles** birth weight by **1 year,** approximately **10 kg at 1 yr**
- **Quadrupled** birth weight by **2 yrs**
- **6 times** of birth weight at **5 yrs,** approximately 20 kg at 5 yr

- **10 times** of birth weight at **10 yrs,** approximately 30 kg at 10 yr
- Child gains **2 kg/yr** between **3- 7 yrs**
- **Average annual weight gain:** 2.3 kg between 2 yr and puberty

Daily weight gain:

- 20–30 g for first 3–4 months
- 15–20 g for rest of the first year

Formulas for Approximate Average weight:

Weight	Kilograms
3 – 12 mo	Age (mo) + 9 ÷ 2
1 – 6 years	Age (yr) x 2 + 8
7 – 12 years	Age (yr) x 7 – 5 ÷2

A. Procedure for weighing infants:

1. Place the scale in an appropriate place
2. Drape (or) cover the scale with paper or plastic
3. Balance (or) adjust the scale to '0' error
4. Remove the infant's cloths and place him/her gently in the pan
5. For, safety, hold one hand over the body of the infant's without touching
6. Read an accurate reading of the weight and record it on the chart

B. Procedure for weighing older children

1. Place the scale in an appropriate place
2. Balance (or) adjust the scale to '0' error
3. Remove shoes and any heavy clothing of the child
4. Ask the child to step onto the scale and make sure the child is centered on the scale
5. Read an accurate reading of the weight and record it on the chart.

B: Length / Height:

1. The average length is **50 cm at birth,75 cm at 1 yr** and **87 cm at 2 yr**.
2. At age **4 yr**, the average child is **100 cm** tall
3. So, body ht. increases by about 50% at the end of 1st yr than it was at birth, and 100% at 4th yr.

- 50 cm at birth
- 60 cm at 3 mths
- 75 cm at 1 yr
- 100 cm at 4 yrs (**double birth length**)
- **Average annual height** increase: 5-7 cm between age 4 yr and puberty

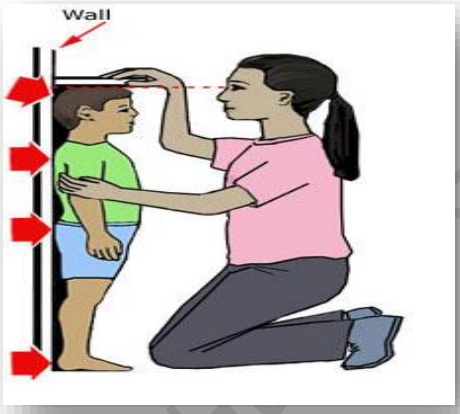
For infants, the measure of linear growth is length, taken by two examiners (one to position the child) with the child supine on a measuring board (**infantometer).**

Infant- length procedure:

1. The child should be placed on his back in the center of the length board so that the child is lying straight and his shoulders and buttocks are flat against the measuring surface.
2. Hold the head in midline. The child should look straight ahead
3. Grasp the knees together gently.
4. Both legs should be fully extended and the toes should be pointing upward with feet flat against the foot piece. The foot board is brought against the sole of the feet.
5. Reading is taken from the ruler placed at the junction of the inner side of the foot board.
6. The length should be recorded on the data form as soon as it is completed.

Measuring the child and adolescent stature

1. Use a calibrated vertical stadiometer with a right-angle headpiece.
2. Instruct to remove shoes and stand as straight as possible.
3. The child is measured standing with heels, buttocks, shoulders and head touching a flat upright surface
4. Place a three-dimensional object such as thick book on the top of the head firmly against the wall to form a right angle.
5. Measure length or stature to the nearest 1mm or 1/8 inch
6. Record the readings in the growth chart.



Age	Weight	Height
Infancy: Birth to 6 months	140 - 200 g Weekly Birth weight doubles by age 6 months	Monthly gain 1 (2.5 cm)

6 months to 12 months	Weight gain 85-140 g Birth weight triples by age 12 months	Monthly gain 1/2 (1.25 cm) Increase 50% over birth length by age 12 months
Toddler	Yearly gain 2 to3 kg Birth weight quadruples by age 2	Yearly gain 7.5- 10 cm
Preschool age	Yearly gain 2 -3 kg	Yearly gain 5-7 cm Birth length doubles by age 4 years
School age	Yearly gain 2-3 kg	Yearly gain 5 cm
Adolescence	**Males:** Highly gain 7 –to 30 kg. Growth spurt begins at age 13 **Females:** Highly gain 7- t0 25 kg Growth spurt begins at average age of 11	**Males:** Highly gain 10 to 30 cm **Females:** Highly gain 5- to 25 cm.

Steps of Measurement:

I. Height Measuring the child and adolescent stature

1. Use a calibrated vertical stadiometer with a right-angle headpiece.
2. Instruct to remove shoes and stand as straight as possible.
3. The child is measured standing with heels, buttocks, shoulders and head touching a flat upright surface

4. Place a three-dimensional object such as thick book on the top of the head firmly against the wall to form a right angle.
5. Measure length or stature to the nearest 1mm or 1/8 inch
6. Record the readings in the growth chart.

II. Infant- length procedure:

1. The child should be placed on his back in the center of the length board so that the child is lying straight and his shoulders and buttocks are flat against the measuring surface.
2. Hold the head in midline. The child should look straight ahead
3. Grasp the knees together gently.
4. Both legs should be fully extended and the toes should be pointing upward with feet flat against the foot piece. The foot board is brought against the sole of the feet.
5. Reading is taken from the ruler placed at the junction of the inner side of the foot board.
6. The length should be recorded on the data form as soon as it is completed.

C. Head Circumference:

The measurement of head circumference is an important screening procedure for detecting abnormalities of head growth. Although usually caused by non-nutritional factors, slow head growth can be a result of severe under nutrition. Children with poor head growth frequently have poor linear growth as well. Thus, knowledge of head size is very

important in assessing possible nutritional factors contributing to short length or stature. Head circumference should be measured routinely.

Average HC: 35 cm at birth (13.5 inches). By 1 yr it increases 12 cm to become 47 cm

OFC increase in the 1st year of life

Birth	**35 cm**
0-3 mo	**↑ 2cm/mo**
3-6 mo	**↑ 1cm/mo**
6-12 mo	**↑ ½ cm /mo**
1 yr	**47 cm**

OFC after the 1st year of life	
1 year	**47 cm**
2 years	**49 cm**
3 years	**50 cm**
6 years	**52 cm**
10 year	**53 cm**
Adult	**56 cm**

Head circumference:

To measure head circumference,

1. Position the child standing or in a sitting position in the lap of the caregiver.

2. Place the lower edge of the measuring tape just above the child's eyebrows, above the ears and around the occipital prominence at the back of the head.

3. Pull the tape snugly to compress the hair. The objective is to measure the maximal head circumference.

4. Repeat the measurement twice or until two measurements agree to 0.1 cm (1/8 in).

5. Record the numerical value immediately and plot on the growth chart.

6. If the measurement appears abnormal when plotted, check the accuracy of plotting and recheck the measurement.

Chest circumference

To measure chest circumference:

1. Make the child to sit or lie down comfortably
2. Place the tape around the chest at the level of the nipples, the measurement can also be taken at the level of the xiphisternum
3. The reading is recorded midway between inspiration and expiration
4. While recording the chest measurement, caution is to be observed that the tape is not pressed tightly on the chest wall which would compress the soft tissues underneath.

Abdominal Circumference

To measure abdominal circumference,

1. Place the children on a recumbent or dorsal position.
2. Measure abdominal circumference at the level of umbilicus with the tape measure at right angles to the vertebral column.
3. Record the measurement in centimeters.

Note:

- Indication only for children with gastrointestinal problem.
- For Newborn, measure abdominal circumference just above the level of umbilicus, because the umbilical cord is still attached.
- Measuring the abdominal circumference below the umbilical region is unsuitable because bladder status may affect the reading.

Mid arm circumference

- 13.5 cm – 16 cm: Normal
- 12.5 cm – 13.5 cm: Mild to moderate (Grade I & II) Malnutrition
- 12.5 cm or below: Severe (Grade IV) Malnutrition.

To measure Mid Arm Circumference,

1. Determine the midpoint on the arm between the acromial process and the olecranon process with the elbow flexed at an angle of 90o.
2. Measure child arm with non-stretch tape by passing it gently but firmly round the midpoint without compression of the soft tissues, with the child arm hanging relaxed at the side.
3. Record the measurement in centimeters.

D. Dentition (Tooth development)

Beginning at age 6, children slowly lose all 20 primary teeth in approximately the same order and time frame as they appeared in infancy.

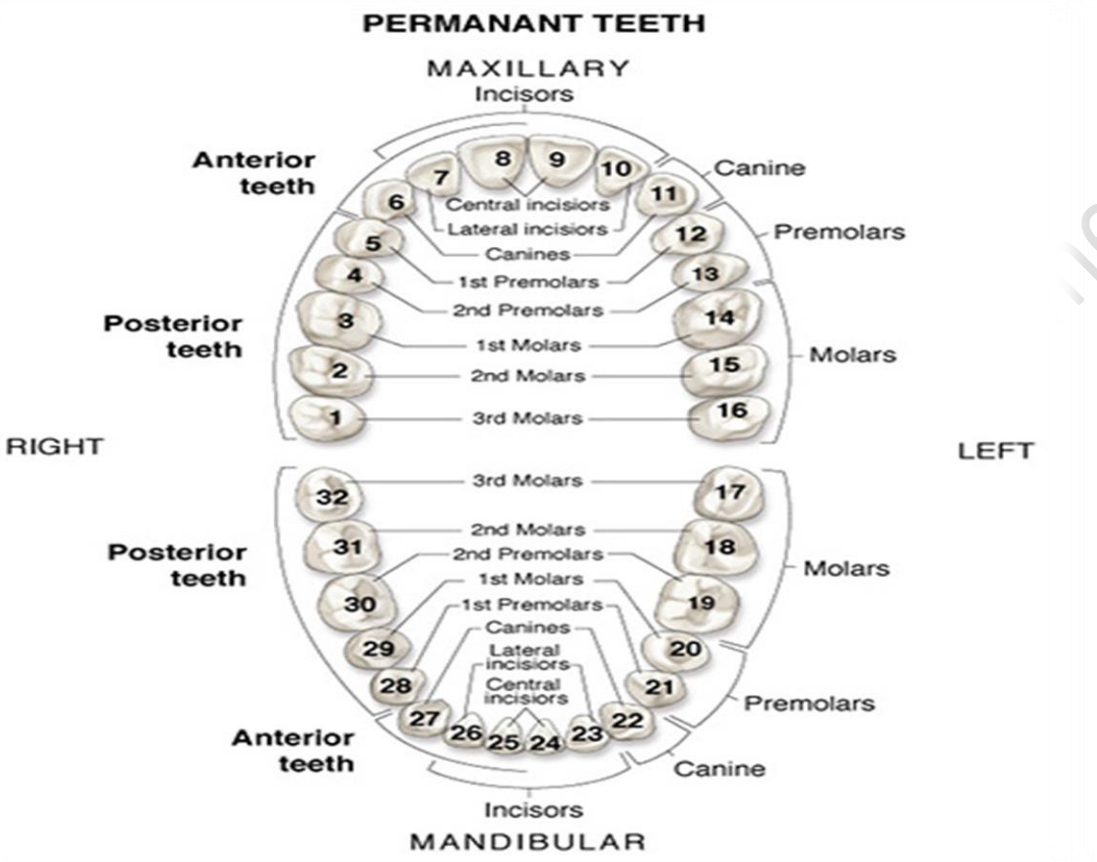
1. Primary Teeth

- Lower central incisors at 5-8 months
- Upper central incisors at a month later
- Lateral incisors – within next 3 months
- First Molars – 12-15 months
- Canine - 18-21 months
- Second Molars – 21 – 24 months

2. Permanent teeth

By the end of the school-age period, most children will have acquired 28 secondary teeth, including:

- Central incisors: two upper and two lower at 6 to 8 years.
- Lateral incisors: two upper and two lower at 7 to 9 years.
- Canines: two upper and two lower at 9 to 12 years.
- First premolar: two upper and two lower at 10 to 12 years.
- Second premolar: two upper and two lower at 10 to 12 years.
- First molar: two upper and two lower at 6 to 7 years.
- Second molar: two upper and two lower at 11 to 13 years.



E. Body proportions

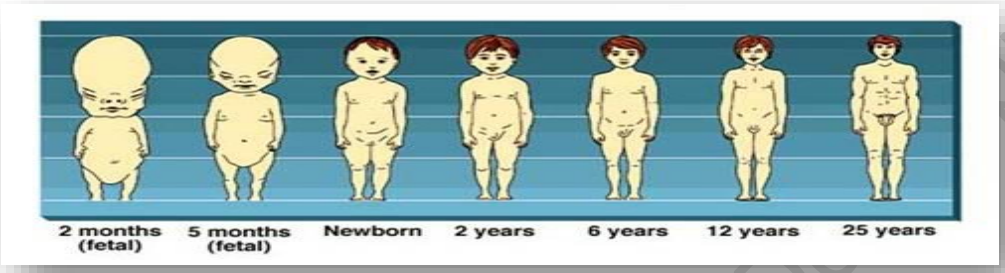
At birth the head is one fourth the total body length. In adults it is about one eighth of the total body length.

At birth, normal head circumstances are about 33-35 cm (13-14 inches). Chest circumference less than head circumferences 1-2 cm. Head &chest circumstances equalize during the first year after birth.

The arms legs are relatively short and chest and abdomen more barrel shaped. As growth proceeds, the midpoint of the total height moves

from umbilicus to pubic bone, the chest flattens and extremities grow longer.

During puberty, adult proportions are attained and the characteristic male and female contours develop**.**



F. Body Mass Index:

Body Mass Index (BMI) is used to assess body weight in relation to height and is commonly used starting from age 2 years for children and adolescents. Before age 2, growth charts that focus on weight-for-length are typically used.

In children and adolescents (ages 2 to 19), BMI is age- and sex-specific and is often referred to as BMI-for-age. The percentiles help classify weight status:

- Underweight: Less than the 5th percentile
- Healthy weight: 5th to 85th percentile
- Overweight: 85th to 95th percentile
- Obesity: 95th percentile and above

For children, adolescents (ages 2 to 19) and adults (age 20 and older), BMI is calculated the same way, but the interpretation is based on standard thresholds. The classification of body mass index includes the following:

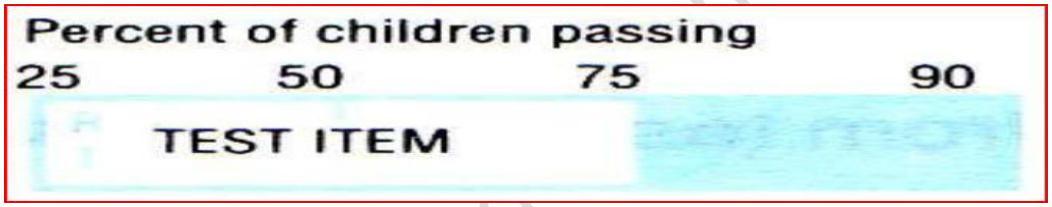
BMI	Weight status
➢ Below 18.5	Underweight
➢ 18.5-24.9	Normal
➢ 25.0-29.9	Overweight
➢ 30.0-34.9	Obese (Class I)
➢ 35.0-39.9	Obese (Class II)
➢ 40.0 and higher	Extreme obesity (Class III)

3. Denver Developmental Screening Test I and II (DDST)

1. Revision of DDST, by dr. William in Denver 1967.
2. The most widely used test for screening developmental problems in children.
3. Administered to children from birth to 6 years.

4. Designed to compare a given child's performance with the performance of other children the same age.
5. Asked if the child was born prematurely and corrected calculate the adjusted age.
6. Division from birth to 2 years: monthly, then every 3 months until 6 years.
7. Composed 4 categories; personal social, language, fine motor adaptive, and gross motor.
8. Contain 125 items or task

   Each item represents in bar each bar divided as the following:



9. DDST II includes four areas or sector:
    1. Personal –Social: 25 items
        - Getting along with people and caring for personal needs.
    2. Fine Motor-adaptive: 29 items
        - Eye hand coordination, manipulation of small objects, and problem solving
    3. Language: 39 items:
        - Hearing, understanding, and using language
    4. Gross Motor: 32 items:
        - Sitting, walking, jumping
10. Results: 25% (developmental status)- 50%- 75% (more common

children)- 90% (failure in testing) more than 90% developmental delay.

11. Score: pass, fail, refuse, non-opportunity\ in each item.

12. * Advance: pass completely (less than 25%).

* Ok: pass, fail, refuse (25% - 75%).

* Caution: fail, refuse, (75%- 90%).

* Delay: fail completely (more than 90%).

13. * Normal: no delay and one caution.

* Suspect: one or more delay and 2 caution

* Unstable: refuse one or more.

14. Note: can be retesting post 2 weeks.

Steps of measurement:

The Denver Developmental Screening Test (DDST) is a tool used to assess the developmental progress of children from birth to six years. Here are the steps involved in using the DDST:

1. Gather Materials

- Obtain the DDST booklet and scoring sheets. Familiarize yourself with the test items and age ranges.

2. Select the Child’s Age

- Determine the child's exact age in months. This is crucial for selecting the appropriate milestones to assess.

3. Conduct the Screening

- **Prepare the Environment**: Ensure a comfortable and quiet space for the child to engage.
- **Observe and Interact**: Use play and simple tasks to observe the child’s skills across four domains:
    - **Personal-Social**
    - **Fine Motor-Adaptive**
    - **Language**
    - **Gross Motor**

4. Use Age-Specific Items

- Administer tasks appropriate to the child’s age. If the child fails to complete a task, allow for a few prompts before moving on to the next item.

5. Score the Test

- Mark items as "passed," "failed," "refuse,” or "not attempted." Note any observations that may provide context.

6. Analyze Results

- Review the scoring to determine if the child is meeting developmental milestones. Identify areas where the child is ahead, on target, or delayed.

7. Provide Feedback

- Discuss results with parents or caregivers. Explain areas of strength and any concerns.

8. Plan Next Steps

- If there are significant delays, recommend further evaluation or intervention. For children on track, suggest ways to support continued development.

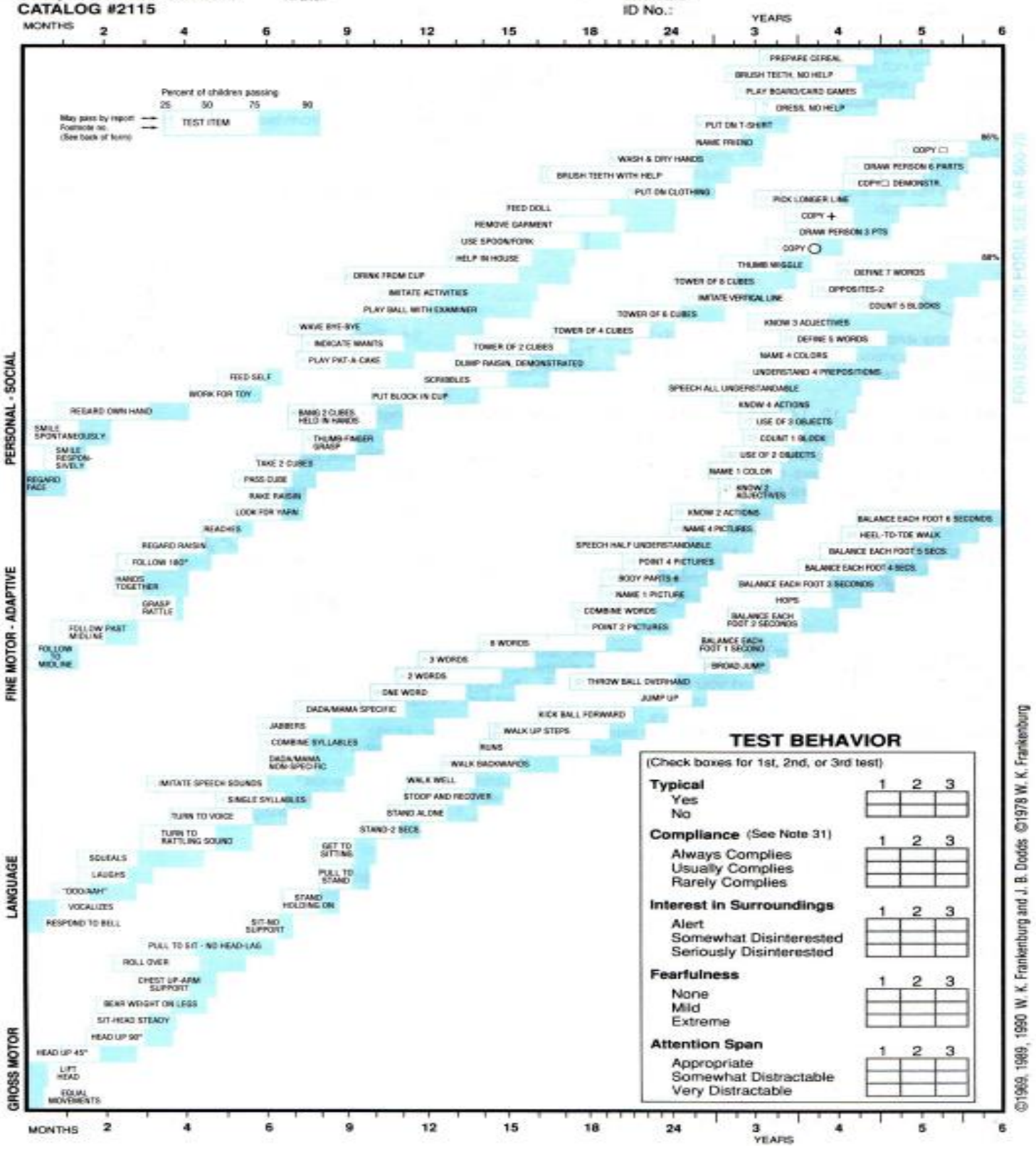
9. Document Findings

- Record the results and any recommendations in the child's health record for future reference.

10. Follow Up

- Schedule follow-up screenings as needed, typically annually or at significant developmental transitions.

Using the DDST effectively can help ensure children receive the support they need for healthy development.


Denver II
DDM, INC. 1-800-419-4729
CATALOG #2115
Examiner:
Date:
Name:
Birthdate:
ID No.:
MONTHS
YEARS
PERSONAL - SOCIAL
FINE MOTOR - ADAPTIVE
LANGUAGE
GROSS MOTOR
Percent of children passing
25 50 75 90
May pass by report
Footnote no.
(See back of form)
TEST ITEM
TEST BEHAVIOR
(Check boxes for 1st, 2nd, or 3rd test)
Typical
Yes
No
Compliance (See Note 31)
Always Complies
Usually Complies
Rarely Complies
Interest in Surroundings
Alert
Somewhat Disinterested
Seriously Disinterested
Fearfulness
None
Mild
Extreme
Attention Span
Appropriate
Somewhat Distractable
Very Distractable
1 2 3
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4. Developmental Milestones:

A. Language Development:

- 1 month- Turns head towards sound
- 3-5 months- Vowel sounds, gurgles
- 6 month- Monosyllables
- 9 month- Bi syllables
- 10 month- Understands spoken speech
- 12 month- Speaks 2 words with meaning
- 18 month- 20 words
- 24 month- Joins 2-3 words in a short sentence
- 3 years- 250 words

B. Bowel & Bladder Control:

- Early months - gastrocolic reflex, defecates after each feed
- 7 month- no relation to feeds
- Toilet trainable by 18mths - 2 years

Feeding Developmental Milestones

NO	Developmental Milestones	
1.	Neonates	Good swallowing + sucking
2.	12 weeks	Can-swallows food placed on anterior tongue
3.	20 weeks	Can drink from held cup with biting movements
4.	28 weeks	Teeth begin to erupt. Feeds self-biscuits, chewing

5.	7 months	Shakes head to refuse foods
6.	9 months	Fingers feeding
7.	10 months	Drinks from cup
8.	12 months	Holds spoon unable to get food to mouth
9.	15 months	Control spoon + cups
10.	18 months	Plays with food

Considerations for Referral Treatment and / or Follow-Up

A. Infants and Children less than 2 years of age:

1. Abnormal Head Circumference
2. Short stature
3. Underweight
4. Inadequate weight gain
5. Overweight

B. Children greater than 2 years of age to Adolescents: Short Stature, Underweight, Overweight, Obese

Steps of measurement:

Measuring milestones in children's development involves observing various domains of growth. Here are key steps for tracking these milestones:

1. Identify Developmental Domains

- **Physical**: Gross and fine motor skills.
- **Cognitive**: Thinking, problem-solving, and learning abilities.

- **Language**: Communication skills, both expressive and receptive.
- **Social-Emotional**: Interactions with others and emotional regulation.

2. Establish Age Ranges

- Research and compile typical age ranges for each milestone, based on developmental guidelines (e.g., CDC, WHO).

3. Create a Milestone Checklist

- Develop a checklist for each domain, including key milestones (e.g., crawling, first words, sharing toys).

4. Regular Observations

- Observe children regularly in different settings (home, school, playdates) to see how they engage and respond.

5. Document Findings

- Keep records of observations, noting dates and specific behaviors that align with milestones.

6. Engage Parents and Caregivers

- Provide tools and resources for parents to monitor development at home and share observations.

7. Review and Assess Progress

- Periodically review documentation to assess if children are meeting milestones within expected timeframes.

8. Address Delays or Concerns

- If delays are identified, consult with professionals (e.g., pediatricians, child psychologists) for further evaluation and support.

9. Adjust Expectations and Goals

- Recognize that each child develops at their own pace; adjust expectations accordingly.

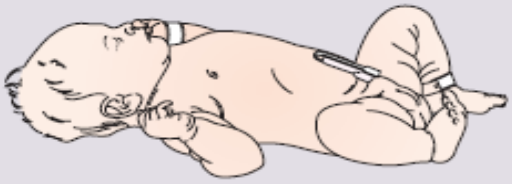
10. Celebrate Achievements

- Acknowledge and celebrate milestones as children reach them to encourage ongoing development.

Tracking these milestones helps ensure that children receive the support they need for healthy growth.

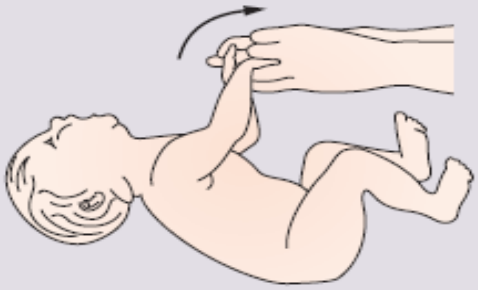
Gross motor development (median ages)

newborn



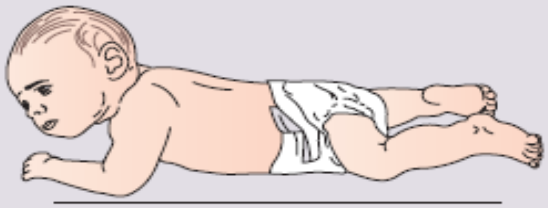
Limbs flexed, symmetrical posture

newborn



Marked head lag on pulling up

6–8 weeks

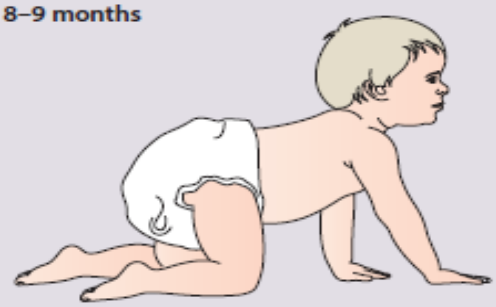


Raises head to 45° in prone

6–8 months

Sits without support
– at 6 months: with round back
– at 8 months: with straight back (shown)

8–9 months



Crawling

10 months

Cruises around furniture

12 months

Walks unsteadily,
broad gait, hands apart

15 months

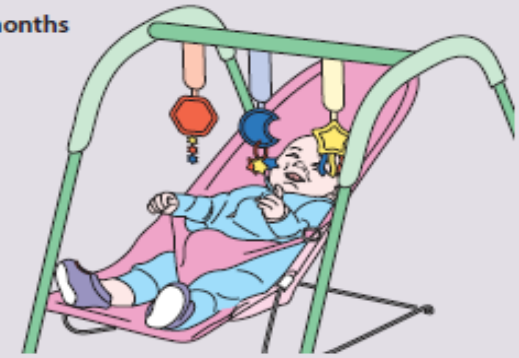
Walks steadily

Vision and fine motor (median ages)

6 weeks

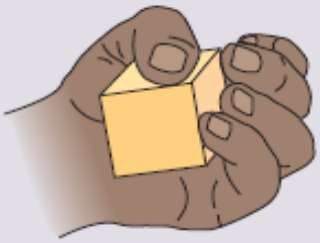
Follows moving object or face by turning the head (illustrated).

4 months



Reaches out for toys

4–6 months

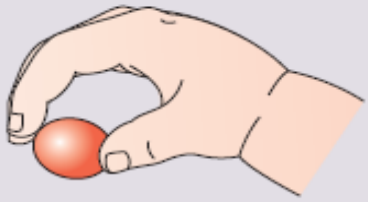


Palmar grasp

7 months

Transfers toys from one hand to another

10 months

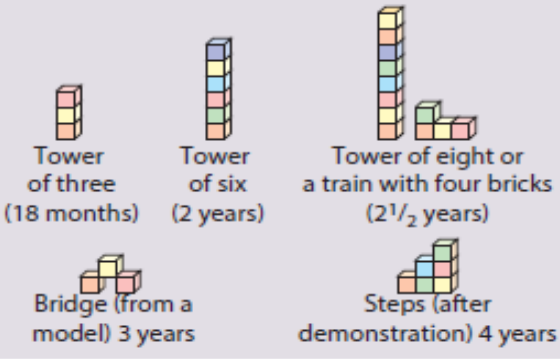


Mature pincer grip

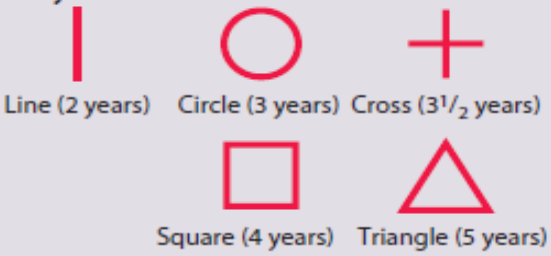
16–18 months

Makes marks with a crayon

14 months–4 years



2–5 years



Ability to draw without seeing how it is done. Can copy (draw after seeing it done) 6 months earlier.

Hearing, speech and language (median ages)

(a)

NEWBORN

Startles to loud noises

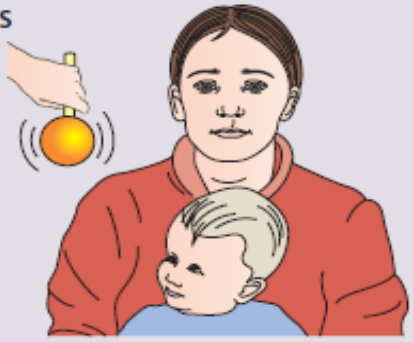
(b)

3–4 MONTHS

Vocalises alone or when spoken to, coos and laughs

(c)

7 MONTHS



Turns to soft sounds out of sight

(d)

7–10 MONTHS

At 7 months, sounds used indiscriminately. At 10 months, sounds used discriminately to parents

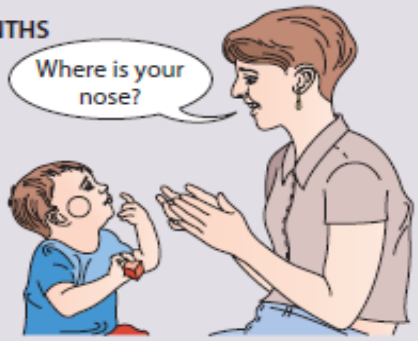
(e)

12 MONTHS

Two to three words other than 'dada' or 'mama'

(f)

18 MONTHS



6–10 words. Shows two parts of the body

(g)

20–24 MONTHS

Uses two or more words to make simple phrases

(h)

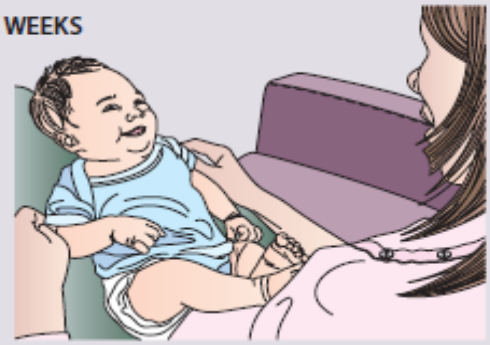
$2^1/_2$–3 YEARS

Talks constantly in 3–4 word sentences

Social, emotional and behavioural development (median ages)

(a)

6 WEEKS



Smiles responsively

(b)

6–8 MONTHS

Puts food in mouth

(c)

10–12 MONTHS

Waves bye-bye, plays peek-a-boo

(d)

12 MONTHS

Drinks from a cup with two hands

(e)

18 MONTHS

Holds spoon and gets food safely to mouth

(f)

18–24 MONTHS

Symbolic play

(g)

2 YEARS

Dry by day. Pulls off some clothing

(h)

2.5–3 YEARS

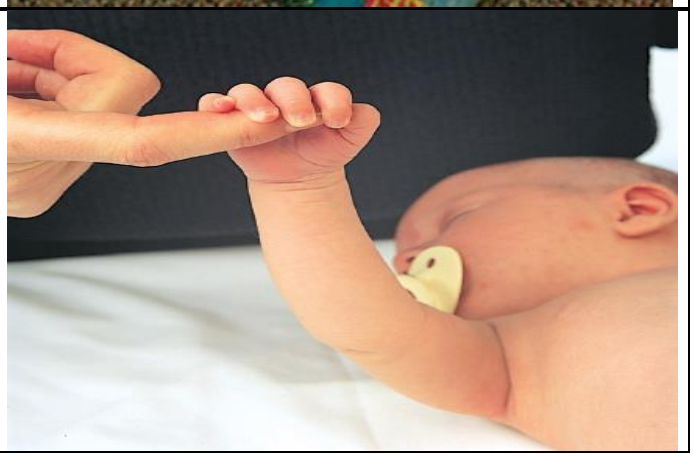
Parallel play. Interactive play evolving. Takes turn

Developmental Milestones

AGE	GROSS MOTOR	FINE MOTOR–ADAPTIVE	PERSONAL-SOCIAL	LANGUAGE
2 wk	Moves head side to side	—	Regards face	Alerts to bell
2 mo	Lifts shoulder while prone	Tracks past midline	Smiles responsively	Cooing Searches for sound with eyes
4 mo	Lifts up on hands Rolls front to back If pulled to sit from supine, no head lag	Reaches for object Raking grasp	Looks at hand Begins to work toward toy	Laughs and squeals
6 mo	Sits alone Rolls back to front	Transfers object hand to hand	Feeds self Holds bottle	Babbles
9 mo	Pulls to stand Gets into sitting position	Starting to pincer grasp Bangs two blocks together	Waves bye-bye Plays pat-a-cake	Says *Dada* and *Mama*, but nonspecific Two-syllable sounds
12 mo	Walks Stoops and stands	Puts block in cup	Drinks from a cup Imitates others	Says *Mama* and *Dada*, specific Says one to two other words
15 mo	Walks backward Stoops and recovers	Scribbles Stacks two blocks	Uses spoon and fork Helps in housework	Says three to six words Follows commands
18 mo	Runs	Stacks four blocks Kicks a ball	Removes garment "Feeds" doll	Says at least six words
2 yr	Walks up and down stairs Throws overhand	Stacks six blocks Copies line	Washes and dries hands Brushes teeth Puts on clothes	Puts two words together Points to pictures Knows body parts
3 yr	Walks steps alternating feet Broad jump	Stacks eight blocks Wiggles thumb	Uses spoon well, spilling little Puts on T-shirt	Names pictures Speech understandable to stranger 75% Says three-word sentences
4 yr	Balances well on each foot Hops on one foot	Copies *O*, maybe + Draws person with three parts	Brushes teeth without help Dresses without help	Names colors Understands adjectives
5 yr	Skips Heel-to-toe walks	Copies □	—	Counts Understands opposites
6 yr	Balances on each foot 6 sec	Copies Δ Draws person with six parts	—	Defines words

Automatic Reflexes of Newborns

Blink reflex: A blink reflex in a newborn to protect the eye from any object (eyelid closure).	
Root reflex: When touch near corner of mouth the child will turn the head in that direction. From Birth to 3 months	
Suck reflex: When newborn's lips are touched the baby makes a sucking motion. From Birth 2–5 months	
Swallowing reflex: Food that reaches the posterior portion of the tongue is automatically swallowed. Gag, cough, and sneeze reflex also are present to maintain a clear airway.	

Moro reflex: Hold newborns in a supine position and allow their heads to drop backward an inch or so they abduct and extend their arms and legs from Birth to 4 months	
Tonic neck reflex: When newborns lie on their backs, their heads usually turn to one side or the other. The arm and the leg on the side to which the head turns extend and the opposite arm and leg contract. From Birth to 4 months	
Palmar grasp reflex: Newborns will grasp an object placed in their palm by closing their fingers on it. From Birth to 4–6 months	

Plantar grasp reflex: When object touches the sole of a newborn's foot at the base of the toes, toes grasp in same manner as the fingers do. From Birth to 9 months	
Babinski reflex: When the side of the sole of the foot is stroked in an inverted "j" curve from the heel upward, the newborn fans the toes. From Birth to 12 months	
Step (walk) in place reflex With one foot on a flat surface, the infant puts the other foot down as if to “step.” From Birth to 4–8 weeks	

Immunization

Immunization—Inclusive term denoting the process of inducing or providing active or passive immunity artificially by administering an immunobiological

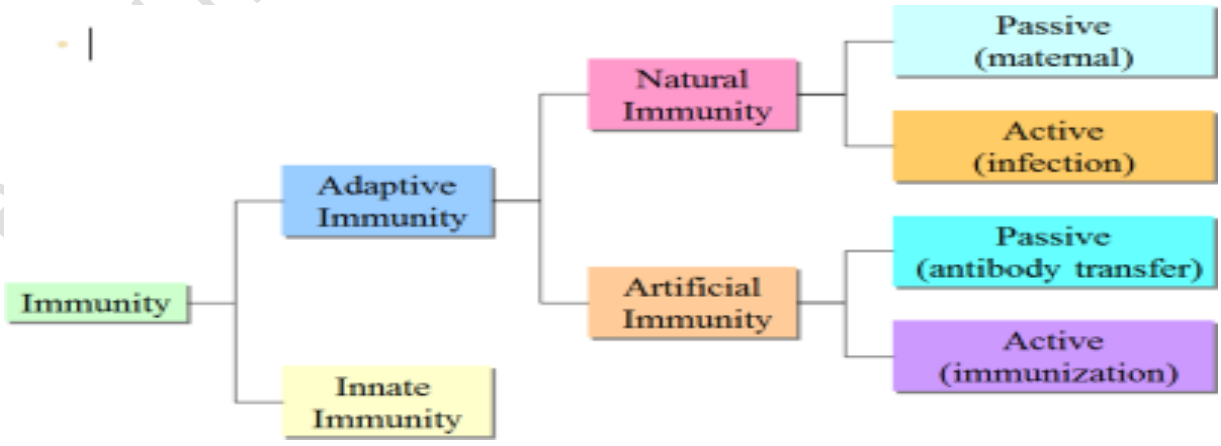
Immunity—An inherited or acquired state in which an individual is resistant to the occurrence or the effects of a specific disease, particularly an infectious agent

1. Natural immunity—Innate immunity or resistance to infection or toxicity

2. Acquired immunity—Immunity from exposure to the invading agent, either bacteria, virus, or toxin

A. Active immunity—A state where immune bodies are actively formed against specific antigens, either naturally by having had the disease clinically or sub-clinically or artificially by introducing the antigen into the individual

B. Passive immunity—Temporary immunity obtained by transfusing immunoglobulins or antitoxins either artificially from another human or an animal that has been actively immunized against an antigen or naturally from the mother to the fetus via the placenta



Antibody: A protein, found mostly in serum that is formed in response to exposure to a specific antigen.

Antigen: A variety of foreign substances including bacteria, viruses, toxins, and foreign proteins that stimulate the formation of antibodies.

Antitoxin: Antibody formed in response to a toxin (antigen).

Toxin: A poisonous substance, usually produced by invading microorganisms.

Vaccination: Originally referred to inoculation with vaccinia smallpox virus to
make a person immune to smallpox; currently denotes physical act of administering any vaccine or toxoid

How are vaccines made?

1. Dead (inactivated) pathogens
   - IPV (Inactivated Polio Vaccine)
   - Hepatitis A
   - pertussis of DPT
2. Live attenuated pathogens
   - MMR (Measles, Mumps, Rubella Viruses)
   - OVP (Oral Polio Vaccine)
   - BCG
3. Subunit / Peptide components
   - Hepatitis B
4. Conjugates
   - HiB (*Haemophilus influenzae* type B)

- PCV (Pneumococcal Conjugate Vaccine)

5. Toxoids

- DT (diphtheria, tetanus toxoids)

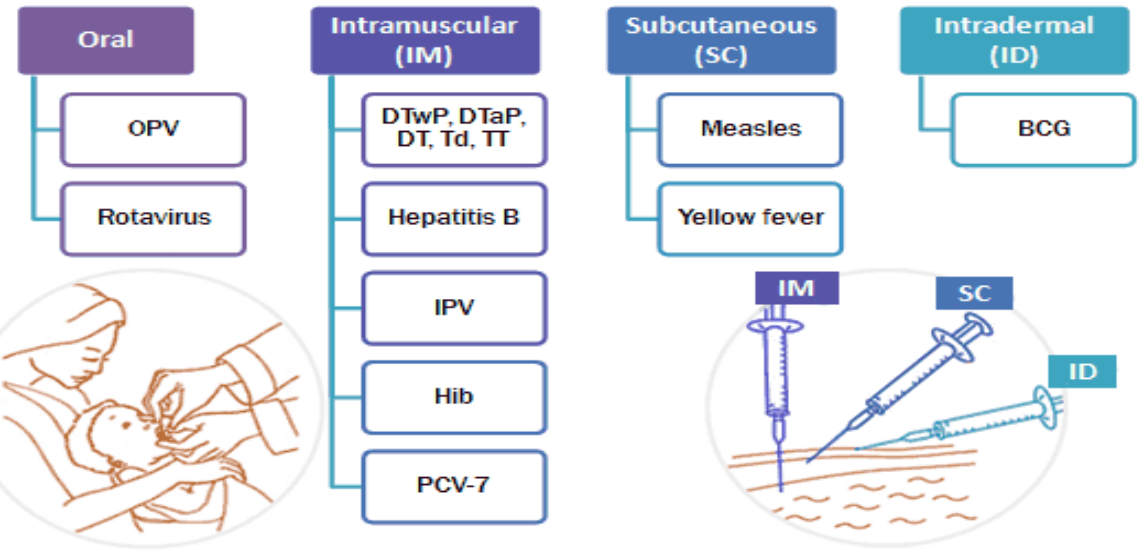
National Iraqi Vaccination Schedule

Age	Vaccines
First 12 hours 1 week to 1 month	BCG, OPV -0, Hep-B 1
2 m	OPV -1, PCV13- 1, RV-1, Penta -1
4 m	OPV -2, PCV13 -2, RV-2, Penta -2, IPV -1
6 m	OPV -3, PCV13 -3, RV-3, Penta -3, IPV -2
9 m	Measles, Vit A (100.000 UI)
15 m	MMR
18 m	OPV- 4, DPT-1, MMR Vit A (200.000 UI)
4 – 6 years	OPV-5, DPT-2 Vit A (200.000 UI)

Vaccination Dose

Vaccine	Dose
– BCG: Tuberculosis Vaccine: But if the child is over one year old (0.1 ml) single dose	0.05 ml
– OPV: Oral Poliovirus Vaccines	2 drops (0.1 ml)
– Hep-B: Hepatitis B	0.5 mL
– PCV13: Pneumococcal Conjugate Vaccine	0.5 ml
– RV: Rota Vaccine	5 drops (2.5 ml)
– Penta -3: Diphtheria, Pertussis, Tetanus, Hepatitis B, Hemophilus Influenzae	0.5 ml
– Measles	0.5 ml
– MMR: Measles, Mumps, and Rubella (MMR) Vaccination	0.5 ml
– DPT: Diphtheria, Tetanus, and Pertussis (DTaP) Vaccine	0.5 ml

Route of Administration



Avoid immunization if the child

1. Fever
2. Fits
3. Under treatment for cancer
4. HIV, AIDS
5. Organ transplant
6. Immunosuppression drugs

Side effects of the vaccine

1. Pain, redness, tenderness, swelling, or Itching at theinjection site
2. Fatigue
3. Headache
4. Fever
5. Mild rash

Child Play and Playing

- Child play: often refers to the activities children engage in for fun, learning, and development. It can include various forms of play, such as imaginative play, physical games, or structured activities.
- Child Playing: in this context, refers to the actual act of engaging in these activities. For example, a child might be playing with toys, running outside, or participating in a group game.

Play

It is educational – it enables children to learn about themselves and the world around them. It provides an opportunity to make choices and problem solve. It allows children to use their imagination. It is a way of making friends. It is essential to a young child's development

Views on Play

- **Freud and Erikson** saw play as a useful way of helping children master their anxieties and conflicts – tension is relived in play, which helps the child cope with problems
- **Piaget** believed play advances children's cognitive development – play provides an opportunity for cognitive structures to be exercised

Play and Language

- Play is essential when it comes to language learning, in that it helps enhance such skills

- During play, children learn to use language for different purposes in a variety of settings and with different people
- Play allows for purposeful verbal interaction in which children use language to seek out information and provide information to others, explore ideas, express ideas and explore language

Functions of play

1. Physical and motor development:
    - Physical and motor development is the immediate and continuing result of play.
    - Play increases muscle and teach motor coordinate. Active play promotes good health.
2. Social development:
    - Social development occurs as a result of play with other children.
    - At first child satisfied to be near others and begins to play with them.
    - The child learns to share, to take turns, to communicate, to enjoy the friendship of other, to compete to be good sport.
3. Emotional development \ expression:
    - One of the valuable functions of play.
    - Toddler can relieve anger.
    - Preschooler can act out feelings by imaginative play.
    - School child and adolescent may use competitive sports to vent hostility.
    - Play maintenance of mental health in children.
4. Intellectual education:

All bodily senses are involved in the process of learning through play. Child feel sees, tastes, hearing and smells the information (play).

5. Development of moral values:

   Good action helps other and bad action hurt others. Sense right and wrong. Through play adolescent learns about paying debts, honesty, loyalty to friends, and sexual relationship and responsibility thus moral values.

Stage of Play

Children will participate in many different types of play as they grow. This includes the six stages of play outlined by sociologist Mildred Parten:

1. Unoccupied play (0–3 months)
2. Solitary play (0–2 years)
3. Onlooker play (2 years)
4. Parallel play (2+ years)
5. Associative play (3–4 years)
6. Cooperative play (4+ years)

According to Parten's research, children progress through these six stages before they're 5 years old. Once they master them, they'll try out other types of play, including competitive play, dramatic play, and more.[3]

1. Unoccupied play

Newborns from 1 to 3 months old will participate in unoccupied play. Think of it as their first attempt to learn about the world. They'll observe their surroundings and make random body movements out of curiosity. Unoccupied play might not look like playing, but it sets the stage for future development.

Though newborns will engage in unoccupied play on their own, it doesn't hurt to encourage exploration. They can encourage unoccupied play by:

- Laying child baby on a playmat
- Showing child baby colorful pictures
- Playing with toys in front of them
- Talking to them often

Interaction with caregivers helps babies gain awareness about their new life.

2. Solitary play

From birth to around 2 years old, children don't pay much attention to playmates in social settings. They'd rather keep themselves entertained through independent play. By engaging in solo play, kids learn about their surroundings, build confidence and independence, practice creativity, experience cause and effect, and fine-tune their motor skills. They can encourage independent play by:

- Giving child toddler a wide range of toys, from push toys to stuffed animals
- Rotating toys in their play spaces frequently

- Putting many different types of colorful books in their play spaces
- Allowing them the freedom to play with toys how they wish (in a safe manner, of course)

3. Onlooker play

Around 2 years old, toddlers engage in onlooker play. This involves watching others playing but not participating themselves. Parents might be quick to discount the benefits of onlooker play, but experts say it helps kids gain the confidence needed to join the fun. They'll learn how to play and interact with others.

They can encourage onlooker play by:

- Letting child toddler watch they complete interesting tasks like solving a puzzle or playing piano
- Encouraging older siblings to allow younger children to watch them build a maze or play kickball
-

4. Parallel play

Have they ever noticed a group of toddlers playing side-by-side but not together? They're engaging in parallel play. Kids might use the same toys and mimic each other but won't directly interact with their peers. Parallel play is common in kids from ages 2 to 3. It indicates a child is almost ready for social interaction.

They can encourage parallel play by:

- Providing enough toys and activities (like stuffed animals, blocks, sticker books, sandboxes, playdough) for two or more children to be entertained at once
- Offering multiple of the same popular toys to minimize conflict
- Not forcing children to interact (they'll still learn valuable lessons about cooperation and socialization)

5. Associative play

Around ages 3 or 4, children become more interested in the actions of others. They'll begin engaging with their peers while playing, but they'll still do things mainly on their own.

For example, kids might draw on the same paper without commenting on each other's designs, or they might exchange clothes while playing dress-up. Because kids won't be working toward a shared goal, there's little organization involved with associative play. This type of play helps with social skills, cooperation, language, problem-solving, and conflict resolution.[6]

They can encourage associative play by:

- Putting child in a social setting with peers regularly (like daycare, preschool, playdates)
- Continuing to offer plenty of toys and activities that interest a wide range of young children

6. Cooperative play

The stage of cooperative play is when children truly start playing with others. Kids first participate in cooperative play around 4 or 5 years old. It lets them practice skills they've gained through other stages of play, such as verbal communication, teamwork, and sharing. They'll also learn new skills like kindness, empathy, and compromise.

Through cooperative play, kids work toward a common goal, whether it's building a block tower together or playing duck-duck-goose. It's essential for social and emotional development.[7]

They can encourage cooperative play by:

- Modeling cooperative play (like taking turns and sharing) in family games or activities
- Encouraging activities that require cooperation, such as raking leaves, building a fort, or organizing toys

Play according to child age

0-1 Month: Enjoys watching face of primary caregiver, listening to soothing sounds.

2 Months: Enjoys bright – colored mobiles.

3 Months: Spends time looking at hands or uses them as toy during the month (hand regard).

4 Months: Need space to turn.

5. Months: Handles rattles well.

6 Months: Enjoys bath tub toys, rubber ring for teething.

7 Months: Likes objects that good size for transferring.

8 Months: Enjoys manipulation, rattles and toys of different textures.

9 Months: Need space for creeping.

10 Months: Plays games like patty-cake and peek-a-boo.

11 Months: Cruises.

12 Months: Likes toys that fit inside each other (pots and pans); nursery rhymes; will like pull-toy as soon as walking.

15 Months: Can stacks 2 blocks; enjoys being read to; drops toys for adult to recover (exploring sense of permanence).

18 Months: Imitates household chores, dusting, etc.; begins parallel play (playing beside not with another child).

24 Months: parallel play evident.

30 Months: spends time playing house, imitating parents' actions.

3 Years: Able to take turns; imaginative.

4 Years: Pretending is major activity.

5 Years: Likes games with numbers or letters.

6 Years: Discover reading as an enjoyable activity. Begin to spend quiet time with books.

7 Years: child needs a badge and gun (police officer). Imaginative play, video games. Girls begin to prefer teenager dolls.

8 Years: Collecting items as baseball cards, dolls etc. boy and girls are enjoy helping in the kitchen with jobs.

9 Years: Can read quickly, play hard.

10 Years: Children are interested in rules and fairness. club activities

11-12 years: Enjoy dancing to popular music and play in table games time with friends are often spent just talking.

Adolescent: Need exercise to relief tension. Spent time with activities need. skill in body and mind. Watch sport with friends. Athletic activities.

University of Mosul

Collage of Nursing

Guide Report for Children in the Nursery School

Student Identification

- Student Name: -
- Study:
- Group:

Child Identification

- Child Name:
- Age:
- Growth and Developmental Stage:
- Gender: - boy - Girl
- Weight:
- Height/length:
- Body Mass Index: -Explanation:

_ Number of Children in the Family:

− Ordinal Position in the Family:

− Job of Father:

− Job of Mother:

Child Eating

- Breast feeding:
- Bottle feeding:
- Cup/spoon feeding:
- Feed self:
- Need for help: health food for kids
- Kinds of food the child:

Should be Eating	Like to Eating	Dislike to Eating

Elimination:

- Has the child toilet training at nursery?
- For Defecation: - Frequent:
- Normal age for defecation control:
- For Urination: - Frequent:
- Normal age for urination control:
- Does the child need help for defecation and urination:
- What kinds of help the child needs?

Sleeping:

- Does the child take a nap in nursery?
- Usual from time to time
- During napping time, does the child use?

Toy: Blanket:

Others:

Playing:

- How does the child play?
- Type of play according to his age group:
- Kinds of toy the child uses?
- How many hours does the child play during the day?

Immunization:

Vaccine Actually taken by the child	Vaccine Most Be Taken by the child

Characteristics of Growth and Developments

Physical	
Actually, Found on the Child	**According to Standard of Age Group**

Motors	
Actually, Found on the Child	**According to Standard of Age Group**

Cognitive	
Actually, Found on the Child	**According to Standard of Age Group**

Psychological	
Actually, Found on the Child	**According to Standard of Age Group**

Social and Behavioral Adaptation	
Actually, Found on the Child	**According to Standard of Age Group**

Developmental Needs during this stage group:

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-
-
-
-
-
-

Developmental Problems

Displayed by the Child	According to Standard of Age Group

Explanation of Growth Chart after Using:

(ارفق صور التطبيق مع المستند)

Child Dentation:

Abnormalities: