Determinants of Childhood Growth and Development
Amy Kim, Kaity Lalonde & Nick Slater
April 25th, 2018
We are second year medical students, not quite doctors yet :)
Let's Talk Science - What is it?

Non-profit, national organization

UBC and UVic affiliated

Focused on providing education to communities in sciences, technology, engineering and mathematics
Outline

❖ Determinants of Growth
❖ Normal Development
➢ Infant
➢ Childhood
➢ Adolescents
❖ Learning Disabilities, Autism, ADHD
Determinants of Growth
Clinical basics of childhood growth

- Growth is a complex interplay of genetics and the environment.

- Anthropometric measurements are a cornerstone of the well-child check-up, including:
  - Height
  - Weight
  - Body-mass index
  - Head circumference

- Growth monitoring is important because it is easy, cost-effective and abnormal growth patterns, such as decreased growth velocity, may be suggestive of underlying medical or social problems.
  - In some conditions, abnormal growth patterns may be the first sign of disease.

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The impact of stature: a biosocial perspective

- Taller than average individuals are more likely to report better health, less illness as well as improved measures of well-being, such as enjoyment, happiness, sadness, physical pain, and social activity

- Adult height is inversely correlated with depression and suicide

- This is due to biomechanical, biological, genetic, and psychosocial advantages

- “Heightism” – bullying, exclusion, overprotection

- Taller individuals are however more likely to report stress, anger, and for women, worry.


50 – 80% of the variance in height is attributable to genetics – in a perfect world, this would be much greater

Height is a polygenetic trait, with over 400 gene loci associated with height and many more likely to be discovered

A child's height can be predicted based off of their parents height (± 10cm):

\[
\text{BOYS: } \frac{\text{Father's height} + \text{mother's height} + 13\text{cm}}{2}
\]

\[
\text{GIRLS: } \frac{\text{Father’s height} + \text{mother’s height} - 13\text{cm}}{2}
\]


LIONEL MESSI
The Smallest Boy with the Biggest Dreams
Hormones

- The pituitary gland

Hormones

Hormones: growth hormone

- **Effects of growth hormone (and IGF-1):**
  - Promotion of linear growth, stimulation of epiphyseal growth, and increased bone density
  - Increased protein synthesis and amino acid uptake
  - Decreased protein breakdown and increased lipolysis

- **Isolated growth hormone deficiency**
  - Congenital (genetic) or acquired (cancer, infection, trauma, radiation, etc.) defect in somatotropes
  - Can cause short stature, delayed bone age, delayed puberty, truncal obesity, cardiac disease and dysfunction, and decreased memory and cognitive function
  - Treated with synthetic growth hormone injections


Hormones

Growth Hormone

Thyroid Hormone

Hormones: thyroid hormone

- **Effects of thyroid hormone:**
  - Permissive effect on growth
  - Increased metabolism – increased oxygen consumption, heart production, energy production
  - Increased bone turnover and gut motility

- **Hypothyroidism**
  - Causes include congenital, autoimmune, cancer, drug-induced, radiation, and iodine deficiency
  - Symptoms include short stature, delayed puberty, obesity, low growth velocity, decreased bone age, dry skin, constipation, cold intolerance, and developmental delay
  - Treatment is exogenous thyroid hormone

Nutrition

**CALORIES IN**
- Food
- Beverages

**CALORIES OUT**
- Body functions
- Physical activity
Nutrition

- Nutrition is the single most important external factor limiting growth.
- The most important nutrient is protein, followed by minerals, vitamin A, and vitamin D.
- Milk consumption is correlated with adult height in the United States.
- Maternal supplementation with micronutrients (iodine, folate, and calcium) has been found to decrease small-for-gestational age births.
- Nutritional requirements vary depending on age and location.

Nutritional growth retardation

- An epidemic worldwide but underappreciated and under recognized in North America

- Often due to poverty or stimulant medication, which can cause anorexia and poor intake

- Difficult to differentiate from familial short stature, as individuals with nutritional growth retardation do not usually appear wasted and biomarkers of malnutrition are often normal

- Diagnosis often requires careful anthropometric growth monitoring

Malnutrition and disease are synergistic


Freedom from disease

- 5 infectious diseases cause > 50% of childhood deaths < 5 years old worldwide: pneumonia, diarrhea, malaria, measles, and AIDS

- Asthma, cystic fibrosis, inflammatory bowel disease, renal disease are associated with abnormalities in growth
  - Slowed growth velocity is often the first sign of inflammatory bowel disease (Crohn’s and Ulcerative colitis) in children

- Preventative strategies include supplementation, breast feeding, and vaccination

- The mechanism(s) by which disease limits growth is variable, including inflammation, malabsorption, poor appetite, immobility/neuromuscular limitations, or medical therapies


Let Them Eat Dirt

Saving Our Children from an Oversanitized World

B. Brett Finlay, Ph.D and Marie-Claire Arrieta, Ph.D
Physical activity

- Important for normal skeletal development
  - Physical exercise during growth may help to prevent osteoporosis-related fractures later in life

- Moderate physical exercise results in cardiovascular benefits and favourable changes in body composition, both of which promote growth
  - Exercise also increases endogenous growth hormone production

- Intensive physical exercise may however attenuate growth and delay puberty
  - Due to negative energy balance, psychological stress, and strict dietary regimes
  - Primarily observed in gymnasts


Sleep

- The cognitive and developmental benefits of sleep have been well studied; however, there may also be several relationship between sleep and infant growth:

1. **Sleep and obesity** – less than 12 hours/day in the first 2 years of life is associated with an increased BMI in childhood, due to increased caloric intake and insulin resistance from counter-regulatory hormones.

2. **Sleep and growth stunting** - sleep is temporally coupled with growth in early life, with increases in sleep preceding length growth.
   - Growth stunting may be associated with shorter sleep duration, increased night waking, and shorter nap duration but likely secondary to other factors.

3. **Sleep and growth hormone** – peak growth hormone production occurs just after the onset of sleep.


## Sleep requirements by age

<table>
<thead>
<tr>
<th>Age</th>
<th>Recommended</th>
<th>May be appropriate</th>
<th>Not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborns 0-3 months</td>
<td>14 to 17 hours</td>
<td>11 to 13 hours 18 to 19 hours</td>
<td>Less than 11 hours More than 19 hours</td>
</tr>
<tr>
<td>Infants 4-11 months</td>
<td>12 to 15 hours</td>
<td>10 to 11 hours 16 to 18 hours</td>
<td>Less than 10 hours More than 18 hours</td>
</tr>
<tr>
<td>Toddlers 1-2 years</td>
<td>11 to 14 hours</td>
<td>9 to 10 hours 15 to 16 hours</td>
<td>Less than 9 hours More than 16 hours</td>
</tr>
<tr>
<td>Preschoolers 3-5 years</td>
<td>10 to 13 hours</td>
<td>8 to 9 hours 14 hours</td>
<td>Less than 8 hours More than 14 hours</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>Recommended</th>
<th>May be appropriate</th>
<th>Not recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>School-aged Children 6-13 years</td>
<td>9 to 11 hours</td>
<td>7 to 8 hours 12 hours</td>
<td>Less than 7 hours More than 12 hours</td>
</tr>
<tr>
<td>Teenagers 14-17 years</td>
<td>8 to 10 hours</td>
<td>7 hours 11 hours</td>
<td>Less than 7 hours More than 11 hours</td>
</tr>
<tr>
<td>Young Adults 18-25 years</td>
<td>7 to 9 hours</td>
<td>6 hours 10 to 11 hours</td>
<td>Less than 6 hours More than 11 hours</td>
</tr>
</tbody>
</table>

### National Sleep Foundation recommendations

Table adapted from https://sleepfoundation.org/excessivesleepiness/content/how-much-sleep-do-babies-and-kids-need
Socioeconomics

- Poor living conditions, parental social class, and maternal education all independently associated with adult height
- Likely a result of lack of access to resources and increased exposure to risk factors, as well as family dynamics

'Feral' child barks and hisses after being raised as a pet

A "feral" five-year-old girl who hisses and barks after being forced by her family to live as one of their many pets has been rescued from a home in far eastern Russia.

By Adrian Blomfield in Moscow
12.57PM BST 27 May 2009
Psychological support

- Adverse early life experiences, such as abuse, neglect, and maltreatment, have been associated with short stature relative to growth trajectories.

- Chronic stress is associated with deficits in growth hormone and estrogen production.

- Psychosocial short stature – syndrome caused by deprivation, emotional stress, and neglect in children and infants.
  - Growth hormone secretion may be attenuated but treatment is not efficacious.
  - Children demonstrate catch-up growth when removed from environment.


The determinants of childhood growth

- Genetics (the instruction manual)
- Hormones (growth hormone, thyroid hormone, and sex hormones)
- Nutrition (adequate micro- and macronutrients)
- Environment (prenatal, sleep, freedom from disease, physical activity)
- Socioeconomics (parental income, social class)
- Psychological support (love)
The determinants of childhood growth

- Genetics
- Hormones
- Nutrition
- Environment
- Socioeconomics
- Psychological support
Childhood Development

The Infant (birth to 2 years)
I HAVE A SURPRISE FOR YOU

IT'S POOP

http://www.lovethispic.com/blog/4565/50-funny-baby-pictures%2C-memes-and-quotes
Domains of Development

- Gross motor
- Fine motor
- Speech/Language
- Cognitive/Problem Solving
- Social/Emotional

“Developmental milestones are things most children can do by a certain age”
# SNAPSHOT* DEVELOPMENTAL MILESTONES

<table>
<thead>
<tr>
<th>Mnemonic</th>
<th>G = Gotta</th>
<th>F = Find</th>
<th>S = Strong Coffee Soon</th>
<th>C = Coffee</th>
<th>S = Soon</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td><strong>Gross Motor</strong></td>
<td><strong>Fine Motor</strong></td>
<td><strong>Speech / Language</strong></td>
<td><strong>Cognitive / Problem Solving</strong></td>
<td><strong>Social / Emotional</strong></td>
</tr>
<tr>
<td>Newborn</td>
<td>Primitive reflexes – step, place, Moro, Babinski, ATNR, Flexor posture</td>
<td>Primitive reflexes – grasp</td>
<td>Primitive reflexes – root, suck</td>
<td>Visual focal length ~10°</td>
<td>Bonding (parent → child)</td>
</tr>
<tr>
<td>2 mos</td>
<td>Head steady when held</td>
<td>Head up 90° prone, arms out</td>
<td>Hands open half of time</td>
<td>Turns to voice</td>
<td>Prefers usual caregiver</td>
</tr>
<tr>
<td>4 mos</td>
<td>Sits with support</td>
<td>Rolls both ways</td>
<td>Palm grasp</td>
<td>Laugh, razz, ”ga”, squeal</td>
<td>Anticipates routines</td>
</tr>
<tr>
<td>6 mos</td>
<td>Postural reflexes</td>
<td>Sits tripod</td>
<td>Raking grasp</td>
<td>Babble (nonspecific)</td>
<td>Stranger anxiety</td>
</tr>
<tr>
<td>9 mos</td>
<td>Gets from all 4s → sitting</td>
<td>Pulls to stand on hands and knees</td>
<td>Inferior pincer grasp</td>
<td>”Mama”, ”dada” (specific)</td>
<td>Object permanence</td>
</tr>
<tr>
<td>12 mos</td>
<td>Walks a few steps</td>
<td>Fine pincer (fingertips)</td>
<td>1 word with meaning (besides mama, dada)</td>
<td>Cause &amp; effect</td>
<td>Explore from secure base</td>
</tr>
<tr>
<td>15 mos</td>
<td>Walks well</td>
<td>Uses spoon, open top cup</td>
<td>Points to 1 body part</td>
<td>Looks for moved hidden object</td>
<td>Points at wanted items</td>
</tr>
<tr>
<td>18 mos</td>
<td>Stoops and recovers</td>
<td>Carries toys while walking</td>
<td>Points to object, 3 body parts</td>
<td>Imitates housework</td>
<td>Shared attention: points at interesting items to show to parent</td>
</tr>
<tr>
<td>2 yr</td>
<td>Jumps on two feet</td>
<td>Handedness established</td>
<td>Follows 2-step command</td>
<td>New problem-solving strategies without rehearsal</td>
<td>Testing limits, tantrums</td>
</tr>
</tbody>
</table>

*SNAPSHOTS* indicates the developmental milestones for children from newborn to 2 years old. Each milestone is categorized under different developmental domains such as Gross Motor, Fine Motor, Speech / Language, Cognitive / Problem Solving, and Social / Emotional.
## Newborn

**Developmental Stages**

- **Gross motor**
  - Primitive reflexes
    - Moro
    - Babinski
    - Asymmetric Tonic Neck Reflex

- **Fine motor**
  - Primitive reflexes
    - palmar grasp

- **Speech/Language**
  - Primitive reflexes
    - Root
    - Suck

- **Cognitive/Problem Solving**
  - Fix & follow slow horizontal arc

- **Social/Emotional**
  - Bonding (parent → child)

Black = milestone
Orange = milestone and red flag if not met
Red = red flag if not met

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Moro Reflex
Babinski Reflex
Asymmetric Tonic Neck Reflex
2 months

<table>
<thead>
<tr>
<th>Gross motor</th>
<th>Fine motor</th>
<th>Speech/Language</th>
<th>Cognitive/Problem Solving</th>
<th>Social/Emotional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head up 45° prone</td>
<td>Bats at objects</td>
<td>Turns to voice Cooing</td>
<td>Prefers usual caregiver Follows horizontal arc</td>
<td>Attachment Social smile</td>
</tr>
<tr>
<td>Roll back → front</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Black = milestone
Orange = milestone and red flag if not met
Red = red flag if not met
### 4 months

<table>
<thead>
<tr>
<th>Gross motor</th>
<th>Fine motor</th>
<th>Speech/Language</th>
<th>Cognitive/Problem Solving</th>
<th>Social/Emotional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rolls front → back</td>
<td>Palmar grasp</td>
<td>Laugh / Squeal</td>
<td>Anticipates routine</td>
<td>Turn-taking conversations</td>
</tr>
<tr>
<td>Sits with support</td>
<td>Brings objects to midline</td>
<td>coos</td>
<td></td>
<td>Explores parent’s face</td>
</tr>
<tr>
<td>Rolls back → front</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Black = milestone
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Red = red flag if not met*

http://thegingerbreadbaby.blogspot.ca/2015/05/pretend-its-april-4-months-and-4-year.html
Still Face Experiment
### 6 months

<table>
<thead>
<tr>
<th>Gross motor</th>
<th>Fine motor</th>
<th>Speech/Language</th>
<th>Cognitive/Problem Solving</th>
<th>Social/Emotional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sits tripod</td>
<td>Raking grasp</td>
<td>Babble</td>
<td>Looks for dropped or partially hidden object</td>
<td>Memory lasts ~24 hrs</td>
</tr>
<tr>
<td>Rolls both ways</td>
<td>Transfers hand to hand</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postural reflexes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primitive reflexes gone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Black = milestone</td>
<td></td>
<td>Orange = milestone and red flag if not met</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Orange = milestone and red flag if not met</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Red = red flag if not met</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

https://kidspot.co.nz/baby/six-nine-months-social-emotional-milestones/
## 9 months

<table>
<thead>
<tr>
<th>Gross motor</th>
<th>Fine motor</th>
<th>Speech/Language</th>
<th>Cognitive/Problem Solving</th>
<th>Social/Emotional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulls to stand</td>
<td>Pokes at objects</td>
<td>“Mama” “Dada”</td>
<td>Object permanence - searches for hidden toy</td>
<td>Separation anxiety</td>
</tr>
<tr>
<td>Sits with hands free</td>
<td>Clumsy pincer grasps</td>
<td>Gestures “bye-bye” and “up”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postural reflexes</td>
<td>Raking grasp</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rolls both ways</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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http://www.momjunction.com/articles/toys-for-nine-month-old-babies_00369243/?ref=content/
## 12 months

<table>
<thead>
<tr>
<th>Gross motor</th>
<th>Fine motor</th>
<th>Speech/Language</th>
<th>Cognitive/Problem Solving</th>
<th>Social/Emotional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walks a few steps</td>
<td>Throws objects</td>
<td>Speaks one word</td>
<td>Cause &amp; effect</td>
<td>Points at wanted items</td>
</tr>
<tr>
<td>Wide-based gait</td>
<td>Fine pincer grasps</td>
<td>Follows one-word commands with gestures</td>
<td>Trial &amp; error</td>
<td>Narrative memory begins</td>
</tr>
<tr>
<td>Sits</td>
<td></td>
<td></td>
<td>Object permanence</td>
<td></td>
</tr>
<tr>
<td>Crawls</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulls to stand</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Black = milestone
Orange = milestone and red flag if not met
Red = red flag if not met
<table>
<thead>
<tr>
<th>15 months</th>
<th>Gross motor</th>
<th>Fine motor</th>
<th>Speech/Language</th>
<th>Cognitive/Problem Solving</th>
<th>Social/Emotional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>Orange</td>
<td>Red</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 months</td>
<td>Walks well</td>
<td>Uses spoon, open top cup</td>
<td>5 words</td>
<td>Experiments with toys</td>
<td>Points at interesting things to show parents</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tower of 2 blocks</td>
<td>1-step commands</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 18 months

<table>
<thead>
<tr>
<th>Gross motor</th>
<th>Fine motor</th>
<th>Speech/Language</th>
<th>Cognitive/Problem Solving</th>
<th>Social/Emotional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runs</td>
<td>Removes clothing</td>
<td>10-25 words</td>
<td>Imitates housework</td>
<td>Parallel play</td>
</tr>
<tr>
<td>Walks alone</td>
<td>Tower of 4 blocks</td>
<td>Labels familiar objects</td>
<td>Imaginative play with doll or bear</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scribbles</td>
<td>Follows one-step commands</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fisted pencil grasp</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Black = milestone  
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Red = red flag if not met

## 2 years

<table>
<thead>
<tr>
<th>Gross motor</th>
<th>Fine motor</th>
<th>Speech/ Language</th>
<th>Cognitive / Problem Solving</th>
<th>Social/ Emotional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jumps on 2 feet</td>
<td>Uses fork</td>
<td>Follows 2-step commands</td>
<td>New problem solving skills</td>
<td>Testing limits, tantrums</td>
</tr>
<tr>
<td>Runs</td>
<td>Tower of 6 blocks</td>
<td>50+ words</td>
<td></td>
<td>Negativism (“no”)</td>
</tr>
<tr>
<td></td>
<td>Handedness established</td>
<td>2-word phrases</td>
<td></td>
<td>Possessive (“mine”)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Speech 50% intelligible to strangers</td>
<td></td>
<td>Parallel play</td>
</tr>
</tbody>
</table>

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Red = red flag if not met

Childhood Development

School Years
A time of big change!

http://www.tomcorsonknowles.com/blog/healthy-breakfast-your-kids-will-surely-love/ (image)
## Gross Motor Abilities

<table>
<thead>
<tr>
<th>Age</th>
<th>Abilities</th>
</tr>
</thead>
</table>
| 3 Years of Age | - Can ride a tricycle  
                 | - Can run  
                 | - Able to go up stairs foot by foot                                    |
| 4 Years of Age | - Able to hop on one foot  
                 | - Can sometimes catch a ball                                           |
| 5 Years of Age | - Can do somersault  
                 | - Able to ride a two-wheel bike                                       |

*Least predictive ability for cognitive outcome later in life!*

[https://www.healthlinkbc.ca/health-topics/abo8756](https://www.healthlinkbc.ca/health-topics/abo8756)  
[http://letterformat.site/](http://letterformat.site/)
## Fine Motor Abilities

<table>
<thead>
<tr>
<th>Age</th>
<th>Abilities</th>
</tr>
</thead>
</table>
| 3 Years of Age | - Able to draw a circle  
                 - Have started to dress themselves  
                 - Have begun to use utensils       |
| 4 Years of Age | - Able to draw a square  
                 - Can use scissors                     |
| 5 Years of Age | - Able to draw a triangle  
                 - Can doodle a person                   |

[https://www.healthlinkbc.ca/health-topics/abo8756](https://www.healthlinkbc.ca/health-topics/abo8756)  
[http://futurities.info/](http://futurities.info/) (image)
### Social and Emotional Abilities

<table>
<thead>
<tr>
<th>Age</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Years of Age</td>
<td>- Separates easily from parents</td>
</tr>
<tr>
<td></td>
<td>- Shows a variety of emotions</td>
</tr>
<tr>
<td></td>
<td>- May notice the emotions of other people and respond appropriately</td>
</tr>
<tr>
<td>4 Years of Age</td>
<td>- Can take turns when playing with other children</td>
</tr>
<tr>
<td></td>
<td>- More able to roleplay</td>
</tr>
<tr>
<td>5 Years of Age</td>
<td>- Better understanding of what is real and what is not</td>
</tr>
<tr>
<td></td>
<td>- Becoming more independent</td>
</tr>
</tbody>
</table>

https://www.healthlinkbc.ca/health-topics/abo8756
* Speech is most predictive of cognitive development!

**Language Abilities**

| 3 Years of Age | - Can follow 3 step instructions  
|                | - Knows their name  
|                | - Strangers can generally understand the child is saying |
| 4 Years of Age | - Beginning to understand basic grammar |
| 5 Years of Age | - Can tell stories  
|                | - Has more meaningful conversations |

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https://www.healthlinkbc.ca/health-topics/abo8756  
https://www.istockphoto.com (image)
## Cognitive Abilities

<table>
<thead>
<tr>
<th>Age</th>
<th>Abilities</th>
</tr>
</thead>
</table>
| 3 Years of Age | - Builds towers of 6 or more blocks  
                 - Can play make-believe                                                   |
| 4 Years of Age | - Can name some numbers and may be able to count a few  
                 - Can tell when things are different or the same  
                 - Can play board or card games                                             |
| 5 Years of Age | - Understands the basic function of time  
                 - Knows everyday objects                                                  |

For more information, visit:  
https://www.healthlinkbc.ca/health-topics/abo8756  
http://therunawaymule.com/brain-coloring-page.html
As children get older...

- Gain more and more ability to be active and play sports
- Improve both their written and verbal language
- Improved ability to handwriting and draw
- They begin to lose teeth
  - lose about four baby teeth a year!
- Are able to read stories
- Enjoy being social and having friends

https://www.healthlinkbc.ca/health-topics/abo8756
http://slimbolala.blogspot.ca/2013/02/kitchen-door-frame.html (image)
Childhood Development

Adolescence
Welcome to being a parent of a teenager. Prepare for a large amount of eye rolling, emotional outbursts, and thoughts of running away. And that's just the parents.
Another time of big changes!

http://soberfish.co.uk/the-grown-up-awkward-teenager/ (image)
The biggest changes we see in youth are the physical changes and the social/emotional changes.

.... Who am I!?
Puberty!

→ The process of going from sexual immaturity to sexual maturity

**Girls:** 10.5 years of age (range 8-12)
**Boys:** 11.5 years of age (range 9-13)

**There is currently an observed trend towards puberty happening earlier**

- Growth spurts
- More injuries in sports
- Acne
- Hormonal fluctuations
- Menses
- Reproductive ability

https://www.uptodate.com/contents/normal-puberty
"At your age, Tommy, a boy’s body goes through changes that are not always easy to understand."
From early to late adolescence

- Earlier in adolescence is characterized by wanting independence and less interest in parents and family
  - but this does turn around as we get into early adulthood

- Often this is when youth become aware of body image

- Experimentation!
  - The brain is still developing until the mid-20s

- Emotional Lability!
  - The parts of the brain are developing at different paces and it can lead to some dyssynchrony

https://www.medicaldaily.com (image)
Learning Disabilities
“Learning Disabilities refer to a number of disorders which may affect the acquisition, organization, retention, understanding or use of verbal or nonverbal information. These disorders affect learning in individuals who otherwise demonstrate at least average abilities essential for thinking and/or reasoning. As such, learning disabilities are distinct from global intellectual deficiency”

https://www.ldac-acta.ca/official-definition-of-learning-disabilities/
What does this look like?

- It can affect:
  - language
  - memory
  - attention
  - processing speed
  - executive functions

- That may manifest as difficulties in:
  - mathematics
  - listening
  - speaking
  - reading
  - writing
  - overall school performance
  - and others!

https://www.ldac-acta.ca/official-definition-of-learning-disabilities/
http://wikiclipart.com/child-thinking-clipart_39090/ (image)
A bit more info

- Can range from mild to severe
- May affect more than one aspect of learning
- Are permanent
- Usually due to genetics or injury to the brain

- Important to be identified early!
- Need individualized interventions to help them learn best!

https://www.ldac-acta.ca/official-definition-of-learning-disabilities/
Autism Spectrum Disorder
Everyone with Autism presents a little differently than another person with Autism. 

That is because this is a **spectrum** disorder.
Three Core Characteristics

1) Disordered verbal and nonverbal communication

2) Impairments in social interaction

3) Repetitive behaviour and restrictive interests
Vaccines Do Not Cause Autism

Autism spectrum disorder (ASD) is a developmental disability that is caused by differences in how the brain functions. People with ASD may communicate, interact, behave, and learn in different ways. Recent estimates from CDC’s Autism and Developmental Disabilities Monitoring Network found that about 1 in 68 children have been identified with ASD in communities across the United States. CDC is committed to providing essential data on ASD, searching for causes of and factors that increase the risk for ASD, and developing resources that help identify children with ASD as early as possible.

There is no link between vaccines and autism.

Some people have had concerns that ASD might be linked to the vaccines children receive. But studies have shown that there is no link between receiving vaccines and developing ASD. In 2011, an Institute of Medicine (IOM) report on eight vaccines given to children and adults found that with rare exceptions, these vaccines are very safe.

A 2013 CDC study added to the research showing that vaccines do not cause ASD. The study looked at the number of antigens (substances in vaccines that cause the body’s immune system to produce disease-fighting antibodies) from vaccines during the first two years of life. The results showed that the total amount of antigen from vaccines received was the same between children with ASD and those that did not have ASD.

Vaccine ingredients do not cause autism.
Attention Deficit Hyperactivity Disorder
What is it?

Mental disorder that has been characterized by 3 main problems:
- 1) Regulating activity level
- 2) Attention
- 3) Impulsivity

Children with ADHD often are described as:
- Lazy
- Impatient
- Careless
- Struggles to follow instructions
- Disruptive

→ Most common mental disorder in childhood

http://caddac.ca/adhd/understanding-adhd/in-general/
Who is affected?

- Roughly 5% of children
- Disproportionately affects boys (3:1!)
- Often runs in families
- Co-occurs with other behavioural or mental disorders

- The cause is not completely known, but it is likely a combination of genes and environment
  - It is more commonly seen if there has been cigarette smoking in pregnancy

http://caddac.ca/adhd/understanding-adhd/in-general/
If you are concerned about a child in your life, please speak to your Doctor or School Counsellor for more information and testing :)
Be who you are and say what you feel because those who mind don't matter and those who matter don't mind.

- Dr. Seuss
References


