Human growth and development is a lifelong process.

In all sorts of ways, you're not the person you used to be! A lot has happened to you since your birth. Your body, for example, has been transformed through continuous physical growth; you're a totally different size and shape compared to when you were a baby. Most of the time, you don't notice how much you are changing and developing as a person. The surprised reactions of relatives, family friends and people who haven't seen you for a long time provide an indication of the speed and extent of your growth and development during infancy, childhood and adolescence.

Your assessment criteria:

P1 Describe physical, intellect emotional and social development for each of t life stages of an individual

P1 What is human growth?

Human beings experience **growth** when they increase in physical size or **mass**. Gain in height is a gradual process that occurs from birth until a point in early adulthood when we reach our maximum height. As you are no doubt aware, some people don't stop getting bigger just because they've stopped getting taller! The physical process of human growth involves both height and weight gain. However, once we reach our maximum height, other aspects of our physique are also usually fully developed and we have reached a point of physical **maturity**. Eating and drinking too much, together with being inactive, can result in further weight increases once our body has reached this point of physical maturity. However, increases in size for these reasons are not part of the normal or expected pattern of human growth.

Key terms

Growth: *an increase in a per physical size or 'mass'*

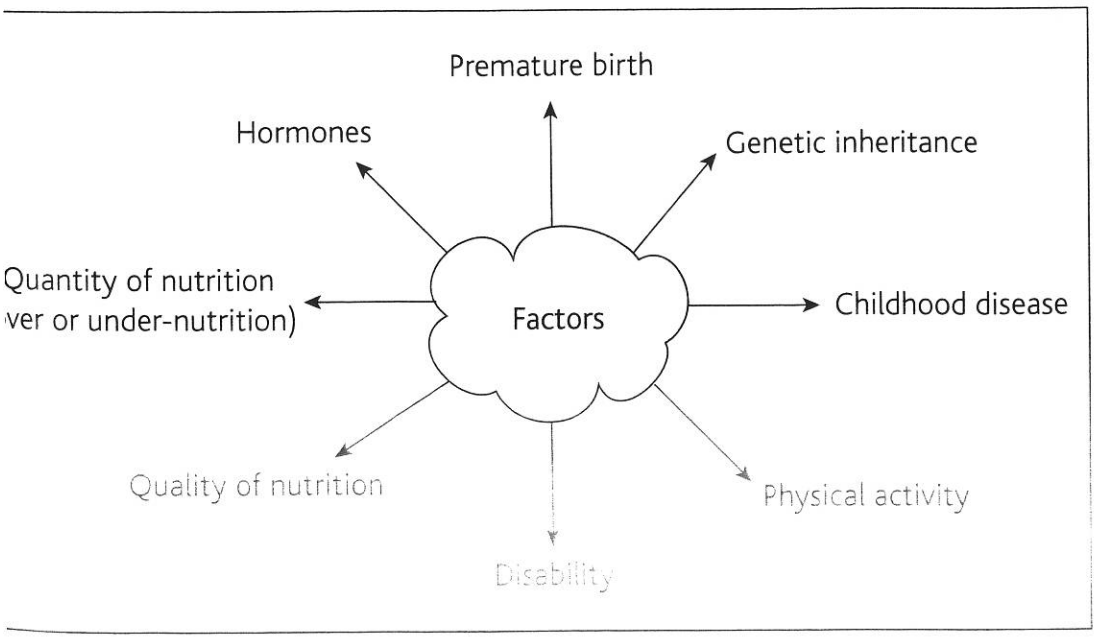
Mass: *the quantity of somet*

Maturity: *the state or point fully developed as a human*

Reflect

ık about a friend or relative who you have known since childhood (ideally since you were both infants). How have they changed e this point in their life? Complete a table like the one below with your ideas.

	What was the person like when you first knew them?	What are they like now?
hysically		
ıtellectually		
motionally		
ocially		



re 4.1 Factors affecting human growth.

P1 What is human development?

Human development refers to changes in the complexity, sophistication and use of a person's capabilities and skills. As a result, human development includes changes that go beyond improvements in our *physical* capabilities and skills. From the moment of birth, human beings experience a continuous process of physical, intellectual, social and emotional development, so that development is never complete.

Developmental norms

In most cases, the processes of human growth and development follow a fairly predictable pattern. For example, observation, experience and research tell us that specific growth and development changes tend to occur within particular time periods (see Figure 4.2). We also know that human growth and development usually follow a predictable sequence. We know, for example, that after babies sit up without support, they will next develop the ability to crawl, followed by the ability to stand up and then the ability to walk. Linking this sequence of expected growth and development events to an expected timeframe enables us to talk about **developmental norms** or **milestones**.

Figure 4.2 Examples of developmental norms.

Milestone	Age
Baby can sit unaided	6–9 months
Baby can crawl	8–10 months
Baby can walk unaided	12–13 months
Infant can say a few words	9–12 months
Puberty begins	10 (girls) 12 (boys)
Menopause occurs in females	45–55 years

Knowledge of developmental norms provides a useful way of assessing a child's growth and development. However, you should also know there is variation in the times when infants and children achieve their developmental norms or milestones. Furthermore, it is incorrect to say a child is 'abnormal' if they reach growth and development norms later than expected. There may be a variety of reasons why a child's general pattern of growth and development is more advanced or delayed than the typical pattern.

Your assessment criteria:

P1 Describe physical, intellectual, emotional and social development for each of the life stages of an individual

Key terms

Developmental norm: *the point at which, on average, an infant or child is expected to achieve a particular skill or developmental change*

Milestone: *a significant event or point in the development of an infant or young child*

Reflect

Find out whether you reached any of these infant milestones at the expected point.

evelopmental problems

infant or child under the age of five may be described by health and ial care professionals (health visitors, GPs, social workers) as having **layed development** if their pattern of physical, intellectual, emotional social development is significantly and persistently slower than pected for a child of their age. A child with delayed development may ceive specialist care or support to promote a particular pect of their development. **Arrested development** an old-fashioned term; since it is now considered appropriate, it is rarely used by health and social care orkers. It was used in the past to describe people with mplex disabilities, especially learning disabilities and brain amage, whose development seemed to have stopped. It is w recognised that even people with the most complex isabilities and damaged brains are always changing and eveloping, just at a significantly slower pace.

Key terms

Arrested development: *the absence of development, an out-of-date term*

Delayed development: *a pattern of development that is significantly slower than expected*

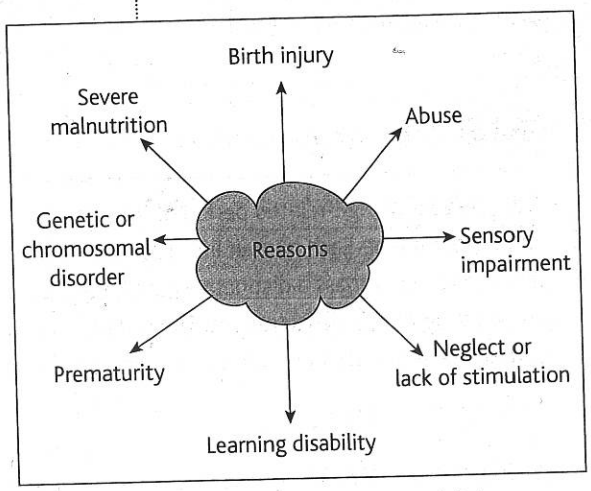
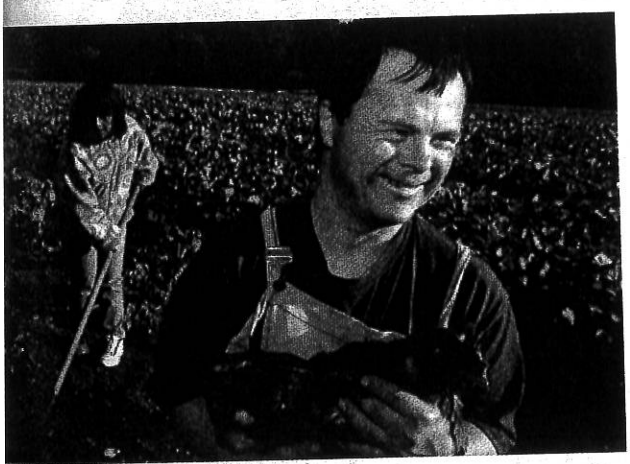


Figure 4.3 Reasons for developmental delay.



A person with a learning disability usually has some form of arrested development.

Continuity as well as change

When considering human growth and development we tend to think about change. This is understandable as both processes cause a bewildering variety of changes throughout life. However, it is important to appreciate that human growth and development depend on a number of *continuities*. For example, the genes that we inherit from our parents, the values that we learn as children and the patterns of behaviour that we use when we're faced by new situations are all examples of continuing influences on our growth and personal development. In addition, the development of new skills and abilities often depends on the maintenance and continuing use of capabilities and skills that we developed earlier in life.

Understanding life terms

Life is a frequently used word in any book on human growth and development. Typically, it is associated with a variety of other words. Examples of these 'life terms' are life stage, lifestyle (see page 180), life course, life expectancy and life span. The various life terms have different and specific meanings when applied to human growth and development.

Your assessment criteria:

P1 Describe physical, intellectual, emotional and social development of each of the life stages of an individual

P1 Life stages

A life stage is an age-related period of growth and development. Each human life stage is thought to encompass a distinctive pattern of human growth and development. The classic human life stages that are referred to here are:

- infancy (0–3 years)
- childhood (4–9 years)
- adolescence (10–18 years)
- adulthood (19–65)
- older adulthood (65+).

Dividing human growth and development into stages, like those shown in Figure 4.4, is a common way of identifying the main developmental patterns and points of transition that most people experience.

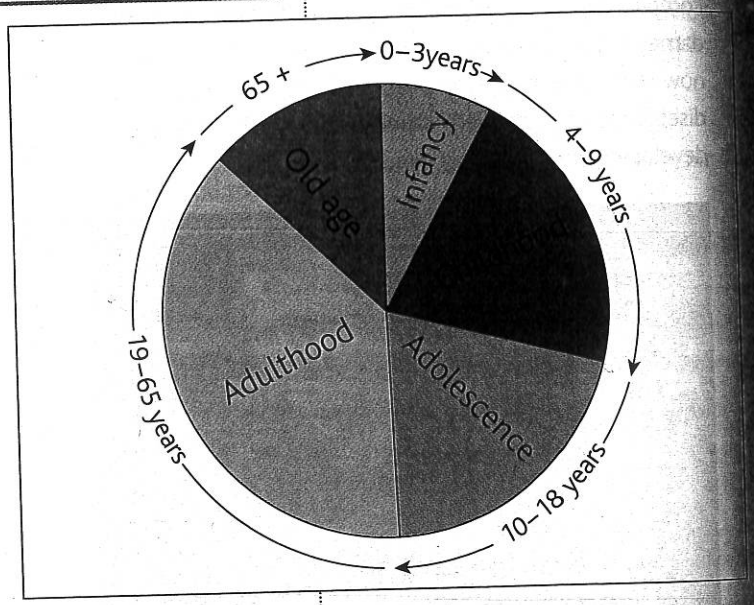


Figure 4.4 Life stages.

The life course

The concept of the human **life course** refers to the ***unique*** pattern of events, experiences and influences that affect an individual during their existence. The idea of a life course encourages us to think about how one person's development is shaped by a unique combination of factors, influences and events. It is the way in which we experience events and influences during our life course that causes us to become the individual we are. This partly explains why brothers, sisters and people from very similar backgrounds may develop in very different ways.

Reflect

Create a life stage table or diagram and identify family members, friends and neighbours who fall into each life stage category. Would it be obvious to people meeting your family, friends and neighbours for the first time which of them belongs in which life stage? Reflect on this and consider why some individuals may be harder to place than others.

Key terms

Life course: *the unique pattern of events and experiences that a person goes through during their existence*

Life span and life expectancy

Life span is the length of time between a person's birth and their death. According to valid and credible records the maximum human life span ever achieved is 122 years. It is very unusual for human beings to survive to such an advanced age. A more typical human life span is, in fact, revealed by another concept – **life expectancy**. This refers to the number of years that a man or woman living in a specified country can expect to live at any given point in time. The life expectancy at birth for men born in the United Kingdom in 2006 was 77. It is slightly longer, at 82 years, for women born in the United Kingdom in 2006.

Key terms

Life expectancy: the number of further years a person can expect to live from a given age point

Life expectancy at birth has increased significantly for both men and women over the last century (see Figure 4.5) and is continuing to increase slowly. Despite the fact that more of us will live to be older, the length of the maximum human life span has not changed much over time; it is still not possible to live forever or to hang on to eternal youth! Human beings inevitably age and eventually die.

Figure 4.5 Life expectancy has increased over the last century.

Year of birth	Males at birth	Females at birth
1911	50.4	53.9
1931	58.0	62.0
1951	66.1	70.9
1971	68.8	75.0
1991	73.2	78.8
1997	74.6	79.6
2011	77.4	81.6
2021	78.6	82.7

What do you know?

1. Can you identify the two things that change as a result of physical growth?
2. If a Health Visitor wanted to check a newborn baby's physical *development*, should she weigh the baby or assess the baby's physical reflexes? Explain why.
3. Can you name five different life stages in which human growth and development occur?
4. Do you know the difference between the human life span and the human life course?
5. In what sense is human growth and development about continuity as much as change?
6. Can you describe what has happened to human life expectancy over the last 300 years?

Conception

Rapid physical growth and development occurs from the moment of conception.

Your assessment criteria:

P1 Describe physical, intellectual, emotional and social development for each of the life stages of an individual

Key terms

Conception: *fertilisation of the female ovum (egg) by the male sperm*

Ovulation: *the release of an ovum from the ovary*

P1 The start of human life

In biological terms, human life begins with the process of **conception**. Both the male and female reproductive systems need to be functioning effectively for conception to take place naturally.

The female sex hormones oestrogen and progesterone are produced by the ovaries and control the female menstrual cycle. An average menstrual cycle lasts 28 days. During the first part of the cycle, the lining of the uterus (womb) thickens. Around day 14 of the cycle, a female ovum (egg) is released from the ovary into the fallopian tube, a process called **ovulation**. If the ovum is not fertilised by a male sperm, it will be expelled with the lining of the uterus as a menstrual bleed.

The testes produce the male sex hormone testosterone, which stimulates sperm production. Sperm are made in the testes and stored in the epididymis.

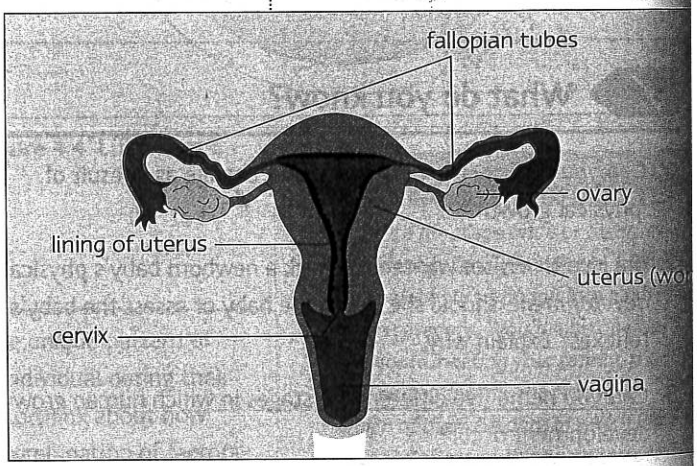


Figure 4.6 The female reproductive system.

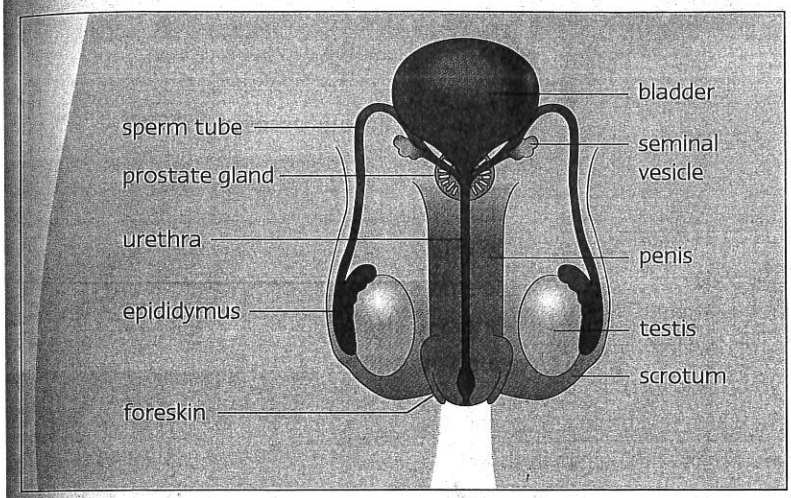


Figure 4.7 The male reproductive system.

When a man becomes sexually aroused, his penis becomes erect and sperm are released from the testes. The sperm mix with semen from the seminal vesicle and are ejected from the penis in an ejaculation. During sexual intercourse, sperm are deposited in the vagina and swim up through the female reproductive system to reach the fallopian tubes.

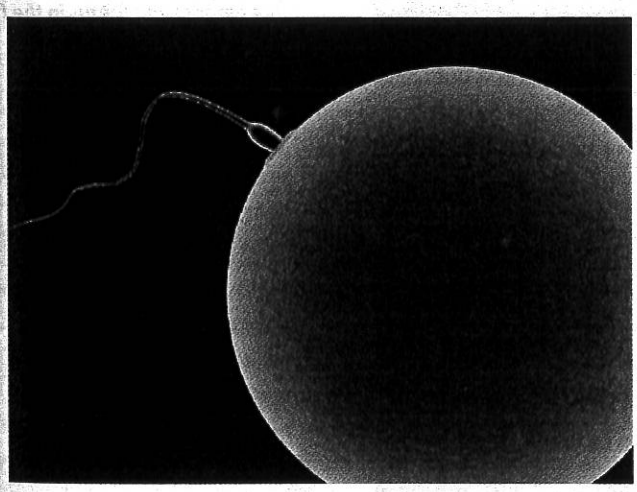


Figure 4.8 Fertilisation and implantation.

After ovulation, the ripe ovum travels along the fallopian tube to the uterus. This journey usually takes 5 to 7 days. If sexual intercourse takes place during this time, the egg may become fertilised by a male sperm in the fallopian tube. The fertilised ovum will then attach itself to the wall of the uterus. This is called implantation. The fertilised egg starts to develop into an embryo and begins to grow rapidly. The growth and development of the baby in the uterus is one of the most eventful periods of human growth and development. It usually takes place over 37 to 42 weeks (full-term pregnancy) and can be divided into three different phases known as **trimesters**.

Discuss

Why are some men infertile? In a small group, identify as many reasons for male infertility as you can. Add to your ideas by researching this issue in textbooks and using online sources so that you understand the causes of male infertility.

Key terms

***Embryo:** a fertilised ovum from conception to the eighth week of pregnancy*

***Trimester:** a period in pregnancy, roughly equivalent to 12 weeks*

Investigate

Using online and library resources, find out how uniovular and binovular twins are conceived. Describe what happens during conception and what the differences are between these two types of twins.

P1 The first trimester

The first 12 weeks of pregnancy are referred to as the first trimester. The starting point of the first trimester is the date of the mother's last menstrual period. Once the fertilised ovum has implanted in the wall of the uterus, the embryo begins to grow and develop. This is a critical time in the pregnancy. The growing embryo is nourished directly from the mother's blood through the placenta, to which it is attached by the umbilical cord. The embryo receives both nutrients and oxygen in this way, so does not breathe normally or need to digest food. It is protected in the uterus within the amniotic sac, surrounded by amniotic fluid. This protective environment keeps the embryo at a constant temperature and helps to prevent some infections.

From the eighth week of pregnancy, the embryo is referred to as a **foetus**. Most of the major body organs are formed during the first trimester, although they will take more time to reach full maturity. By 12 weeks, an average foetus measures 6 cm and weighs 9–14 g.

Figure 4.9 A foetus at 12 weeks.

The second trimester

The second trimester of pregnancy occurs between weeks 12 and 25. It is a period of rapid foetal growth and from about week 20 a pregnant woman can usually feel the foetus kicking. By 24 weeks, the foetus is considered to be viable, or able to survive on its own outside of the uterus. At this stage, an average foetus measures 21 cm and weighs 700 g. Most women will appear noticeably pregnant during this trimester as the uterus increases in size and the breasts also enlarge.

Your assessment criteria:

P1 Describe physical, intellectual, emotional and social development for each of the life stages of an individual

Key terms

Foetus: *the developing baby from the eighth week of pregnancy until birth*

Investigate

Use the internet, library or other resources to investigate some of the factors that can adversely affect the growth and development of the embryo and foetus in the first trimester of pregnancy. Make a chart that highlights:

- *the factor*
- *the possible effects on the embryo or foetus*
- *how these effects could be prevented.*

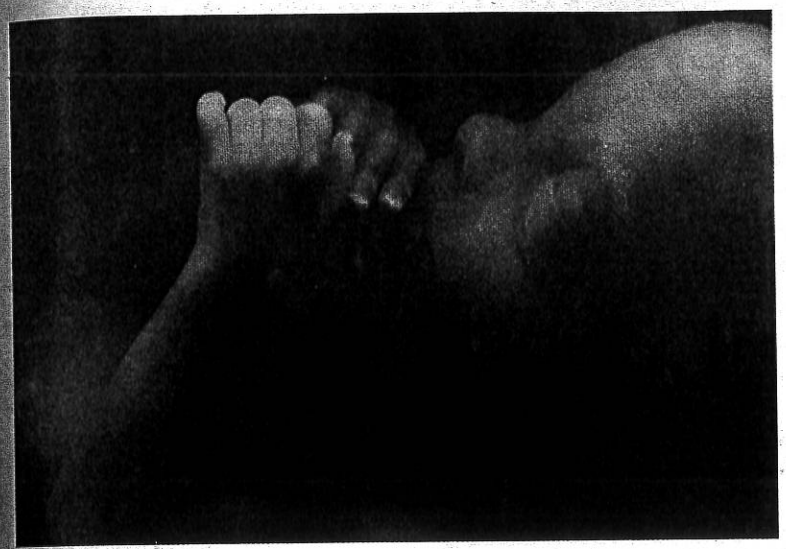


Figure 4.10 A developing foetus.

The third trimester

This is the period from week 25 until full term (between 37 and 42 weeks). The foetus grows very rapidly during this time, in preparation for birth and life outside of the uterus. Towards the end of the third trimester, the baby will settle low in the uterus with the head facing downwards (it is said to be engaged). Occasionally, the baby will settle with its bottom or legs and feet facing downwards (breech position), but in most cases it will turn around before birth. At full-term, an average baby measures 55 cm and weighs 3.5 kg or 7lb 7oz. Many women experience tiredness and backache at this stage in the pregnancy as the foetus is quite heavy.

Investigate

Find out about the major milestones of growth and development in each trimester and create a 'Pregnancy Timeline' from conception to full-term. Present this as a table, poster or diagram.

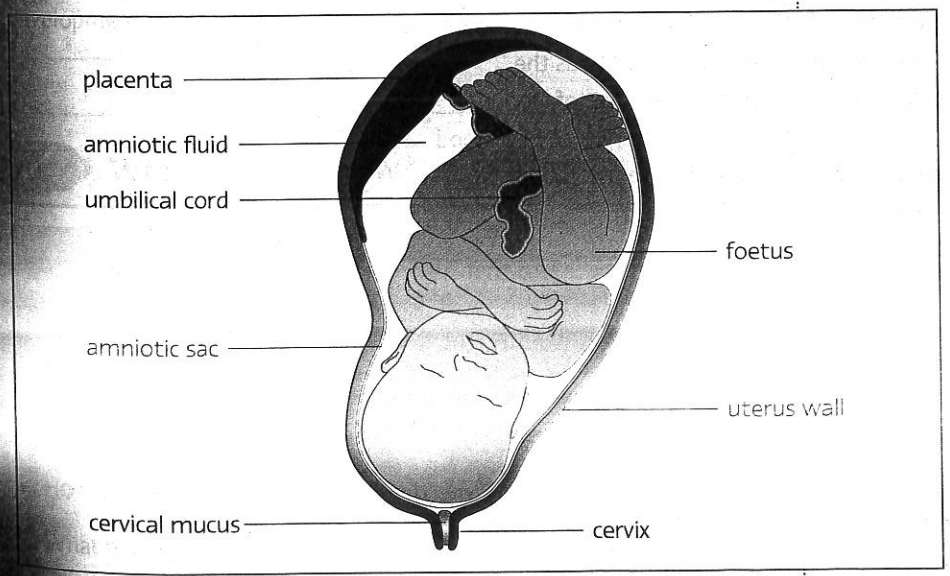
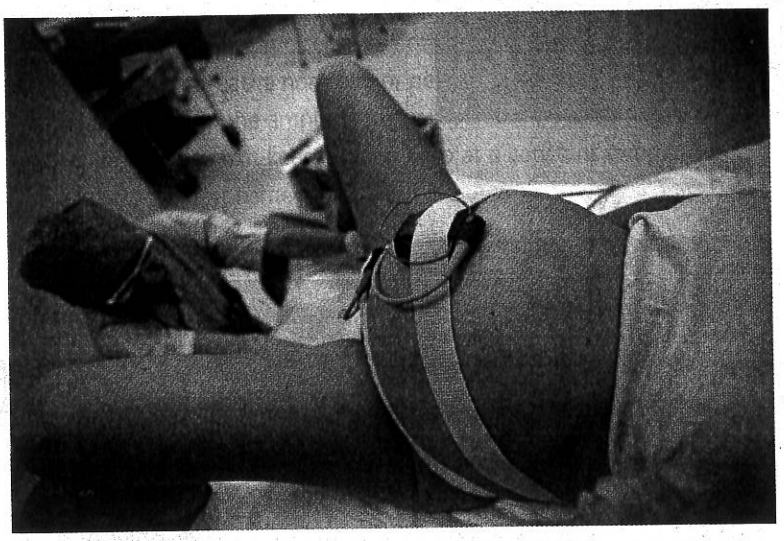


Figure 4.11 Full-term foetus.

P1 The process of labour

The process of birth is called labour and is well named; the woman's body works hard to push the baby out of the uterus. Birth is the first big event in every human being's life. Approximately 9 months of rapid foetal development culminates in the moment when a new human being enters the world! Labour usually lasts for several hours and can be an anxious time.



The length of labour varies from woman to woman and can't be predicted.

Labour usually begins with contractions (the muscles of the uterus tighten up and get ready to push the baby out). The amniotic sac may also burst, releasing amniotic fluid. This is often referred to as the 'breaking of the waters' and is a common sign of the onset of labour. The woman may also experience a 'show', which is the release of a blood and mucous discharge from the cervix (neck of the uterus). Labour is generally divided into three stages:

- **Stage one** is characterised by steady contractions of the uterus that open the cervix wide enough for the baby to pass through (usually about 10 cm). This stage can take several hours, with the contractions becoming more intense.
- **Stage two** begins when the cervix has fully opened (fully dilated) and involves the strong and frequent contractions that push the baby out. This is a very active stage of labour as the woman pushes with each contraction. She is usually encouraged to use special breathing techniques. A special moment comes when the baby's head finally

Your assessment criteria:

P1 Describe physical, intellectual, emotional and social development for each of the life stages of an individual

Key terms

Stage one, stage two, stage three: *the three stages of labour*

becomes visible. This is called crowning and is usually a sign that the baby will soon be born.

- **Stage three** consists of expelling the placenta (afterbirth) from the uterus. It is usually a straightforward process guided by the midwife and requires very little effort from the mother. Labour is then complete.

After the birth, mucous is cleared from the baby's nose and mouth to allow him or her to take a first breath. The umbilical cord will then be clamped and cut, permanently separating the baby from the mother. Birth is generally seen as a positive and happy event, even though it may involve some pain, risk and difficulty for both the mother and baby.

Although many births are straightforward and uncomplicated, it can be a difficult and traumatic experience for a baby if:

- labour is very long
- there are complications with the baby's supply of oxygen
- he or she is lying in a position that makes delivery problematic.

All newborn babies are given some immediate physical tests to check that they can breathe and function normally. Birth injuries, inherited disorders and problems due to premature arrival can often be identified shortly after birth. These may affect the baby's subsequent growth and development. However, most babies are born in robust health and will, despite looking quite vulnerable and helpless, experience rapid growth and development over the first few years of life.

Shortly after birth physical checks are carried out to assess the health of the newborn baby.

What do you know?

1. What is an ovum?
2. Using biological terms, can you describe what happens during conception?
3. Can you explain how an embryo grows into a foetus during the early stages of pregnancy?
4. How does a woman know that she is about to go into labour?
5. What happens when a woman goes into labour?
6. Can you explain why a baby may experience a difficult birth process?

Physical growth and development in the early years

Early infancy is a period of rapid physical growth and change.

Your assessment criteria:

P1 Describe physical, intellectual, emotional and social development for each of the life stages of an individual

Physical growth and development can be observed over relatively short periods of time, particularly in the early years and during adolescence when physical changes are noticeable and occur rapidly. Physical change during adulthood and old age involves less ***growth*** but should not be thought of simply as a period of physical decline.

P1 Infancy (0–3 years)

Infancy is probably the most dynamic phase of growth and development in the human life course. The rapid pace of physical growth and development that began at conception and which continued through 9 months of foetal development shows little sign of slowing when a baby is born. Physical change during the first 3 years of life transforms an infant's appearance. Infants grow taller and generally gain weight very quickly. During the first 18 months of life, an average infant's body weight triples.

An infant's physical growth and development follows a predictable pattern. Physical change occurs from the head downwards (cephalocaudal) and from the middle of the body outwards (proximodistal). An infant first develops gross **motor skills**. These are the basic, unsophisticated movements of limbs, trunk and head that enable children to hold their heads up without support, to hold on to people and large objects, and subsequently to crawl.

In the later stages of infancy, children begin to develop fine motor skills. These are more sophisticated and finely controlled forms of movement. They enable children to eat with cutlery, do up zips and buttons, and tie their shoe laces, for example.

Key terms

Motor skills: *skills related to physical movement*

Figure 4.12 Types of motor development.

Skill Type	Example
Locomotor skills	Pulling, crawling, walking, holding on
Non-locomotor skills	Holding head up, pushing, bending body
Manipulative skills	Reaching, grasping, stacking blocks

Key terms

Centile charts: graphs showing the normal range of measurements at different ages

The physical foundations of infant development

The physical growth and changes that occur in early infancy provide an essential foundation for various forms of growth and development that occur later in the human life course. These changes include:

- ossification (hardening) of the baby's soft bones, allowing independent movement and making the infant physically robust
- brain growth, enabling the infant to develop language and thinking skills, later giving the child the ability to build relationships and to use social skills.

Research data on average growth patterns has been used to produce **centile charts** of height and weight for both male and female infants (see Figure 4.13). Health and social care professionals use these to work out whether a child is developing within normal limits for their age.

The red line in Figure 4.13 shows the average trend in weight gain expected in boys in the first 12 months of life. If a 4-month-old boy weights 7 kg, on average 50% of boys of the same age will weigh less than him and 50% will weigh more.

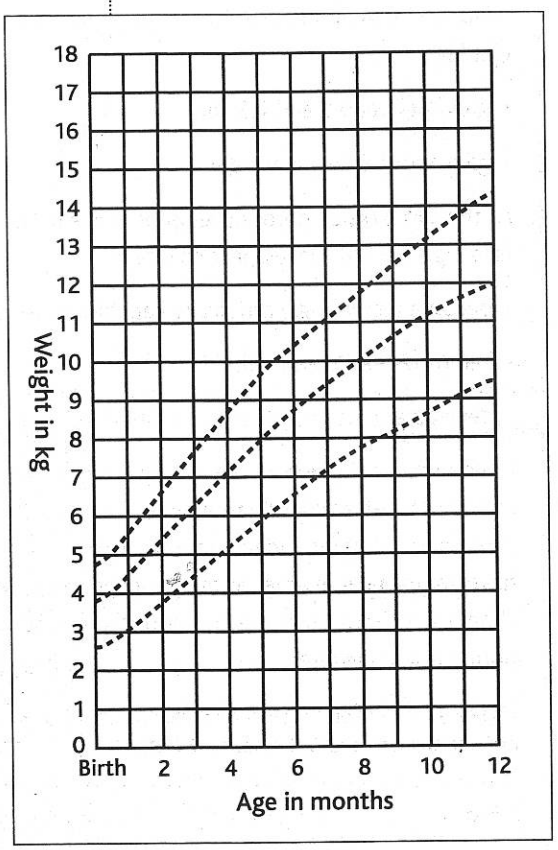


Figure 4.13 Centile chart.

Key:
- 97 percentile
- 50 percentile
- 3 percentile

Case study

Jo Michael, Health Visitor, is weighing infants at a baby clinic. Karl, a 9-month-old boy, weighs 12.0 kg. Jo's records tell her that Karl has put on 2.0 kg over the last 3 months..

1. Use the weight centile chart (Figure 4.13) to explain Karl's pattern of growth.
2. Would you be concerned by these figures? Give reasons.
3. What factors might account for Karl's weight at this point in his life?

Physical growth and development in childhood

Your assessment criteria:

P1 Describe physical, intellectual, emotional and social development for each of the life stages of an individual

P1 Childhood (4–9 years)

During childhood, individuals gradually become less physically dependent and immobile, and more physically capable and competent. The pace of physical change experienced by the human body is slower during childhood than in infancy. On average, during each year of childhood a child will:

- grow between 5 and 7.5 cm
- gain about 2.7 kg in weight.

At the same time, motor development is extended and consolidated (see Figure 4.14). Developing children:

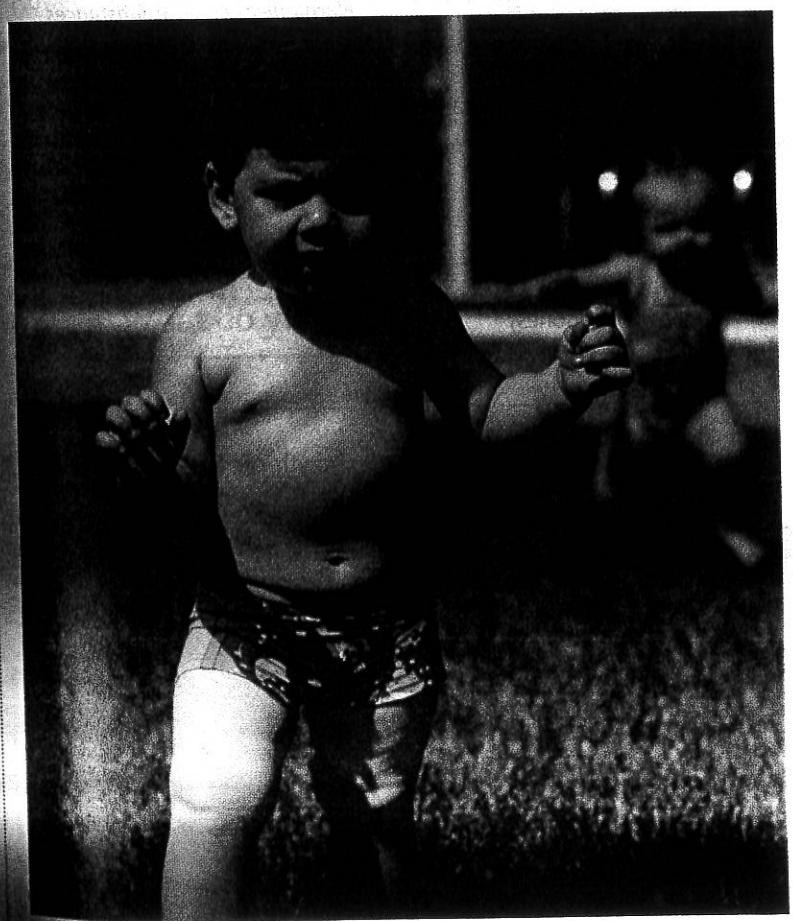
- become increasingly physically capable, skilled and robust
- can move easily and skilfully
- develop and use hand–eye coordination.

Improvements in motor skills during later childhood allow children to move with better coordination and complete tasks faster. Girls tend to have more body fat and less muscle tissue than boys at this age, but have very similar abilities in terms of speed and strength. Hormonal changes begin towards the end of this stage, but the effects are not seen until a few years later.

Figure 4.14 Motor development during childhood. Adapted from Bee, Helen *Human Growth and Development* (1994).

Age	Motor skill development
18–24 months old	• able to run at 20 months • walk well at 24 months • push and pull boxes or toys on wheels • stack blocks • pick objects up without overbalancing
2–3 years old	• can now run quite easily • climb onto and get off furniture unaided • move large toys around obstacles • pick up small items • throw a ball forward

Age	Motor skill development
3–4 years old	• can walk up stairs using one foot per step • walk on tip toe • pedal and steer toys with wheels • catch a large ball with both hands • hold a pencil between thumb and forefinger
4–5 years old	• can walk up and down stairs using one foot per step • use a bat and ball • kick a ball • hold a pencil with ease
5–6 years old	• now able to play ball games well • skip using alternate feet • sufficient fine motor control to thread a needle and sew stitches



What does this child's motor skill development tell you about his age?

Reflect

How might this kind of knowledge be helpful to health and social care practitioners working with young children?

Physical growth and development in adolescence

P1 Adolescence (10–18 years)

Adolescence is a period of rapid, major physical growth and development. This is in contrast to the slower pace of physical change in late childhood. *Puberty* is the term used to describe the period in adolescence when physical changes to the human reproductive system lead to sexual maturity. As a result of puberty, boys can produce sperm and girls can produce eggs that, when fertilised by sperm, can result in a pregnancy and birth of a baby. Girls tend to begin puberty about 2 years earlier than boys.

Your assessment criteria:

P1 Describe physical, intellectual, emotional and social development for each of the life stages of an individual

The influence of hormones

The physical changes that occur during puberty are mainly the result of **hormone** activity. Hormones are the secretions of the endocrine glands. The body produces a number of hormones from several different endocrine glands (see Figure 4.15).

As a result of increased hormone production, primary and secondary sexual characteristics develop in both males and females during adolescence (see Figure 4.16, opposite).

Key terms

Hormones: *chemical substances secreted into the blood by certain glands that stimulate activity in other organs*

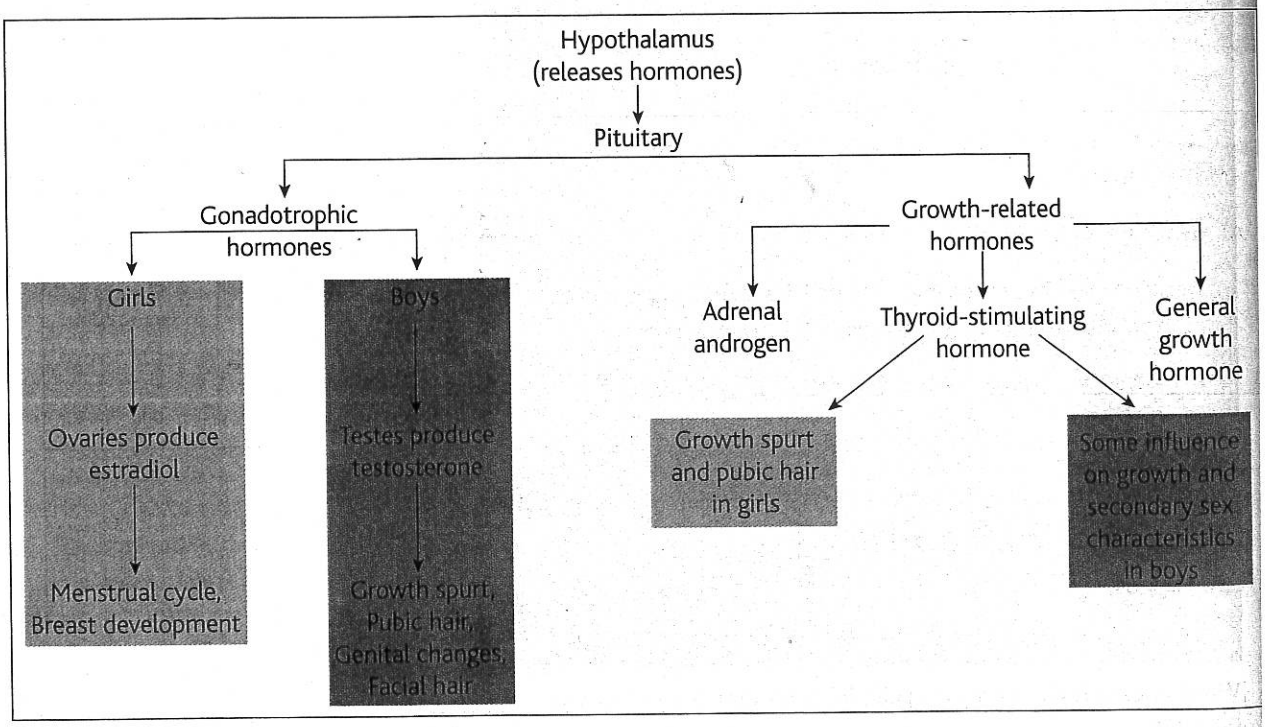


Figure 4.15 Action of the hormones at puberty.

Figure 4.16 Primary and secondary sexual characteristics in males and females.

Sex	Primary	Secondary
Male	Penis Scrotum	Lower voice Facial hair Sperm production Pubic hair Muscle development
Female	Ovaries Uterus Vagina Clitoris Labia	Breasts Wider hips Ovulation and menstruation Pubic hair

Normally, males and females secrete *both* oestrogen and testosterone. However, males generally secrete more testosterone than females and females generally secrete more oestrogen than males. These differences in hormone levels account for differences in physical growth and development during this life stage. At the end of puberty, hormonal activity slows down and the rate of physical change reduces dramatically.

What do you know?

1. Identify three examples of physical development that occur in childhood.
2. What are motor skills?
3. Describe one physical change that only happens to girls and one physical change that only happens to boys during puberty.
4. Explain how hormones effect physical change during puberty.
5. Name two growth-related hormones that stimulate physical change.
6. Describe how a girl's primary and secondary sexual characteristics change and develop during puberty.

Reflect

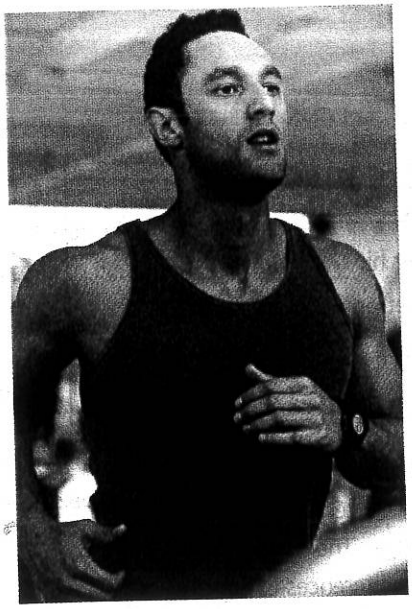
A group of primary school children, aged about 10, are to be given simple leaflets to help them understand puberty.

1. *Using a maximum of two sides of A4 and in language that 10-year-olds can understand, create a leaflet giving basic information about puberty for both girls and boys.*
2. *Use charts, drawings and cartoons as appropriate. Try not to be too technical, mind boggling or frightening in the way you explain what happens during this life stage!*

Physical growth and development in adulthood

P1 Physical change in adulthood (19–65)

Physical maturity is reached in adulthood. This is the phase of the life course where most people are at their physical peak. As a young adult, a person is likely to have more muscle tissue, stronger bones, better eyesight, hearing and sense of smell, greater oxygen capacity and a more efficient immune system than at any other point in their life.



People are usually at their fittest during early adulthood.

In the years leading up to adulthood, physical growth and development has occurred largely as a result of **maturation** (see page 171). From early adulthood onwards, the ageing process takes over from maturation, affecting the way we change physically, as well as our cognitive (intellectual) and psychological functioning.The effects of the human ageing process are much more noticeable in middle adulthood, typically between the ages of 40 and 65. People who are aged 40 are at about the midpoint of their life

Your assessment criteria:

P1 Describe physical, intellectual, emotional and social development for each of the life stages of an individual

Key terms

Maturation: *the gradual process of becoming physically mature or fully developed*

Figure 4.17 Physical changes experienced in adulthood.

Physical function	Age of change	Nature of change
Vision	40–45	Thickening of the lens of the eye leads to poorer vision and more sensitivity to glare.
Hearing	Approximately 50	Loss of the ability to hear very high and very low sounds.
Muscles	Approximately 50	Loss of muscle tissue, especially fibres used for bursts of strength and speed.
Bones	After menopause in women, later in men	Loss of calcium in bones, and wear and tear on the joints.
Heart and lungs	35–40	Decline in most aspects of function when measured during or after exercise, but not at rest.
Reproductive system	Mid-30s for women	Increased risk of reproductive problems and lowered fertility.
Skin elasticity	Approximately 40	Increase in wrinkles due to loss of elasticity.

expectancy and will be aware of some loss of physical ability. For example, they may be aware that they run and walk more slowly and may feel that they have less strength and stamina.

One of the major physical changes experienced by women during adulthood is the onset of the menopause. This occurs when the menstrual cycle ceases because the ovaries no longer produce the hormones that are necessary for ovulation and menstruation. Most women experience the menopause around the age of 50, though there is some variation. From the middle of adulthood onwards, human vision and hearing tend to become less acute, bones become more brittle and less porous, and people become more susceptible to chronic health problems and disability.

Investigate

Do you know anybody who has experienced the menopause? Ask the person what kinds of physical changes they experienced and how this important change affected them emotionally and psychologically.

The final stages of life

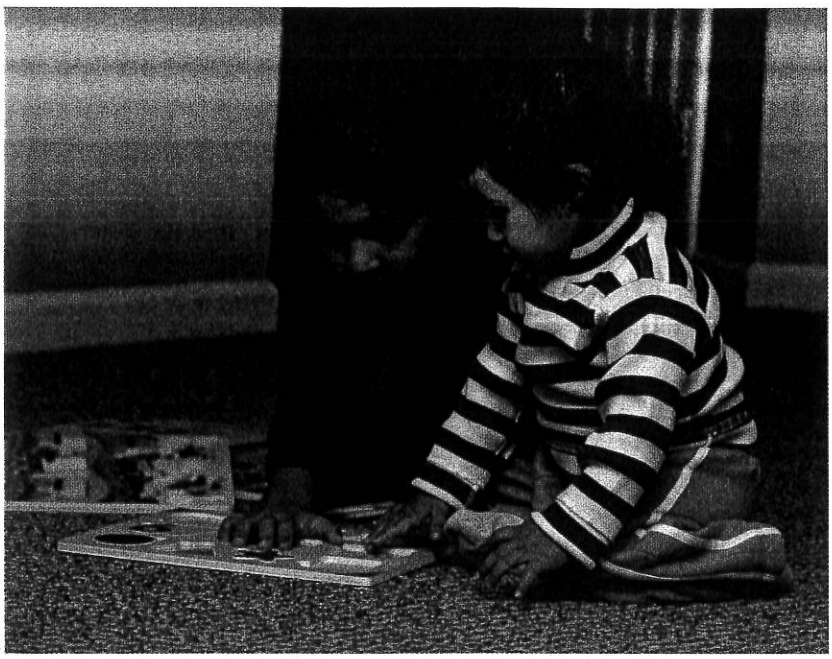
The final stages of life are characterised by the gradual loss of function and by physical decline. Biologists and medical researchers have put forward a number of theories to explain why there appears to be a limit to the human life span. These include claims that:

- human body cells can only renew themselves a certain number of times, so that body processes decline and tissue wastage occurs
- the DNA in cells deteriorates over time and, by old age, can no longer be replicated, resulting in cell death
- a gradual decline in hormone production results in the decline of body systems
- body cells become damaged over time, resulting in mutations and the development of degenerative conditions
- toxic substances build up in body cells, gradually damaging them and disrupting the way they work.

What do you know?

1. Identify two ways in which an adult is physically mature.
2. Describe how the human body changes during middle age (40–65).
3. How do menopausal changes affect a woman's body during middle adulthood?
4. Describe and explain how the human body changes during the final stages of life.

Intellectual and language development in infants and children



Intellectual development helps people to solve problems and communicate more effectively.

Your assessment criteria:

P1 Describe physical, intellectual, emotional and social development for each of the life stages of an individual

Key terms

Cognitive: *relating to mental processes such as thinking, memory and judgement*

Intellectual development: *the emergence and improvement of thinking and language skills*

P1 Intellectual potential

Intellectual development affects the ability of the human brain to think, use language and remember; human intellectual development affects both the quantity and the quality of what an individual can do with their brain. People used to believe that a child was born with a mind like an empty book that gradually filled up with knowledge as the child experienced the world. However, scientific research has shown that babies start learning in the womb, having some basic abilities and lots of potential at the moment of their birth. Jean Piaget (1896–1980), a Swiss psychologist, first put forward the theory that we are born with basic intellectual abilities which improve as we experience different stages of intellectual development during infancy, childhood and adolescence.

Infant intellectual development

Thinking is an intellectual, or **cognitive**, activity. An infant's ability to think is quite limited. During early infancy babies respond mainly to physical stimuli; they cry when they are wet, cold and hungry, for example. This is a relatively primitive level of intellectual response.

Jean Piaget, who studied and wrote about cognitive development, called infancy the sensorimotor stage of intellectual development. He claimed that infants learn about the world by using their senses (touch, hearing, sight, smell and taste – hence 'sensori') and through physical activity (hence 'motor'). There is very limited cognitive or intellectual activity involved in this type of learning. Infants don't use their memories and experiences of events in a conscious way to plan their actions.

Thinking skills gradually improve as an infant grows older and intellectual development occurs. For example, by the end of infancy, a child will learn that people and objects continue to exist in the world even when they can't be seen (object permanence). In contrast, a baby who is less than 8 months old won't usually search for a toy that is hidden from view as they watch. This is because they haven't developed the thinking ability to know that the hidden toy still exists. An older infant or young child will look for a hidden toy because their intellectual development enables them to work out that objects still exist even when they're out of sight.

Investigate

Investigate the concept of object permanence using the internet, psychology or child development books. Try to find out how Piaget and other psychologists tested this concept and summarise their evidence.

gure 4.18 Intellectual development during infancy.

Age	Developmental change
Birth	Explores, using senses to learn.
1 month	Able to recognise parents or main carers by sight and smell.
3 months	Learns by playing with hands, holding and grasping objects.
6 months	Aware of parents' or carers' voices and can take part in simple play activities.
9 months	Recognises familiar toys and pictures, joins in games with familiar people and is able to respond to simple instructions.
12 months	Copies other people's behaviour and is able to use objects appropriately (for example, a brush or spoon).
15 months	Remembers people, recognises and sorts shapes and knows some parts of the body, responding to questions such as 'where's your nose?'
18 months	Recognises self in a picture or reflection, responds to simple instructions and is able to remember and recall simple information.
2 years	Completes simple jigsaws and develops a basic understanding of the consequences of own actions.
2 years 6 months	Usually very inquisitive, asks lots of questions, knows their own name and can find details in pictures.
3 years	Can usually understand time, is able to recognise different colours, can compare the size of different objects (bigger, smaller) and is able to remember the words to their favourite songs and rhymes.

P1 Developing language skills

Learning the basics of a spoken language is an important part of intellectual development during infancy. Babies begin developing communication skills almost straight from birth. Smiles, movements and noises are early ways of communicating with care-givers. However, words don't usually become a feature of communication before an infant is 1 year old and first words are preceded by lots of babbling. Once an older infant begins using words, their vocabulary improves quickly and they can put words into short sentences.

Researchers such as Noam Chomsky (1959) and Steven Pinker (1994) claim that human beings are born with the capacity to develop a verbal language. They argue that human beings, unlike other animals, are biologically programmed or 'hard wired' to acquire and use language. Evidence to support this theory includes the fact that all children, regardless of the language they're learning, progress through the same step-by-step stages: babbling, saying their first word around the age of 1 year, using two-word combinations by 3 years, and generally accomplishing grammatical rules by 4 or 5 years. A child's early language development is promoted by seeing and hearing other people use language and by being encouraged to make sounds and use words.

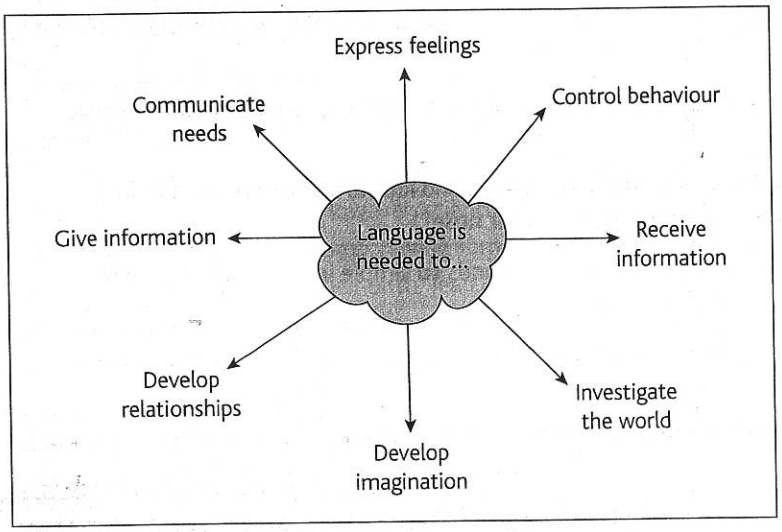


Figure 4.19 The functions of language.

Your assessment criteria:

P1 Describe physical, intellectual, emotional and social development for each of the life stages of an individual

Investigate

How old were you when you first started speaking? Do you know what your first word(s) were? Try to find out from your parents or carers and ask them what they remember about your early language development.

Figure 4.20 Language development during early childhood.

Age	Developmental change
Birth	Communicates through physical movement (moving arms and legs), by crying and through eye contact.
1 month	Makes gurgling sounds, looks at people to get their attention and interacts by making cooing sounds.
3 months	Smiles and makes noises to communicate with familiar people and cries loudly to express discomfort or hunger.
6 months	Makes a number of speech-like sounds ('goo', 'der', 'dhah' and 'ka'), talks by babbling and looks for the source of sounds.
9 months	Uses basic sounds to say simple words, such as 'da da' and 'ma ma'.
12 months	Follows simple instructions and can use simple words such as 'bye bye'.
15 months	Has enough language to join in with nursery rhymes and songs and enjoys having stories read to them.
18 months	Babbles simple sentences, responds to simple questions and more complex requests, and follows instructions.
2 years	Makes two-word sentences ('dog gone'), understands lots of words, can name familiar and everyday objects.
2 years 6 months	Thinks of and asks questions and is able to recall and repeat familiar rhymes and songs.
3 years	Makes longer sentences to describe what they see and to express their feelings, can hold a simple conversation, is able to use about 200 different words and can learn more than one language if they live in a bilingual family.

Childhood intellectual development

Jean Piaget argued that, in early childhood, human beings first develop the ability to use 'symbols' in the form of images and words. As children's intellectual abilities develop, they become better at using these symbols. This pattern of progressive intellectual development can be seen in the way that children's play becomes more sophisticated throughout childhood.

A significant intellectual change occurs during later childhood when children discover that there are some general rules for understanding the world around them. Jean Piaget referred to these rules as 'concrete operations'. An operation is an abstract way of thinking (a scheme), such as reversibility, addition, subtraction and serial ordering, that can be used to understand objects and their relationships. For example, when children develop concrete operational thinking they understand that *adding* to something makes it *bigger* and *subtracting* from something makes it *smaller*.

Key terms

Bilingual: *the ability to speak two languages fluently*

Reflect

If you were a teacher of 7-year-olds in a primary school, how could you test out Piaget's claims about 'concrete operational thinking' with the children in your class?

Intellectual development in adolescence, adulthood and old age

Your assessment criteria:

P1 Describe physical, intellectual, emotional and social development for each of the life stages of an individual

P1 Adolescent intellectual development

During adolescence, a person's ability to think in concrete ways is extended. The level or complexity of an adolescent's thinking, their use of language and their memory ability is significantly greater than it was during their childhood.

Greater intellectual capacity enables people in this life stage to think about objects and situations that they have not directly experienced themselves or which are hypothetical. Abstract thinking, for example, improves an adolescent's ability to:

- contemplate the future
- understand the nature of human relationships
- use foresight to predict possible consequences
- empathise.

Intellectual development in adulthood

Patterns of intellectual development are similar to patterns of physical development during adulthood. For example, intellectual and cognitive processes are at their peak from early to middle adulthood. They begin to decline in various ways, such as in loss of memory capacity, as the individual enters old age.

Nancy Denny (1982) developed a model of change that shows how human cognitive performance rises then falls over the life course (see Figure 4.21).

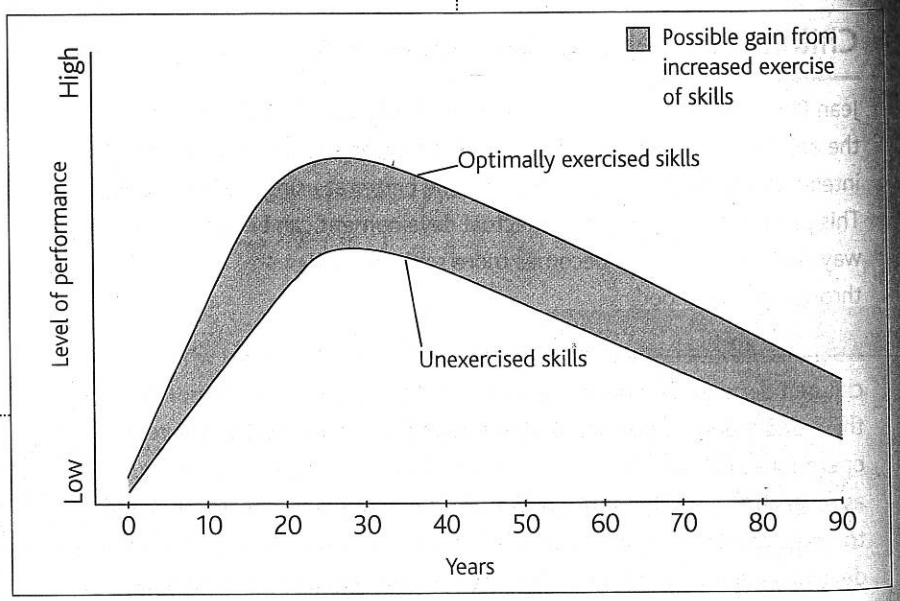


Figure 4.21 Nancy Denny's model of change in human cognitive performance.

Denny's research also showed that, in the middle years of adulthood, a person's cognitive ability can continue to develop if intellectual tasks are based on highly practised skills or specific learning. When people don't use (or under-use) their cognitive skill, the decline in their intellectual abilities is likely to be more noticeable from the middle of adulthood onwards. However, many middle-aged and older adults retain their ability to do high level, productive work and engage in intellectual problem-solving.

Intellectual change in old age

Up to the age of 75, changes in intellectual function are relatively small and hard to detect. From 75 years of age onwards, reduced intellectual functioning tends to be quite noticeable. However, in the majority of older people, this is *not* the result of **dementia**-related disease; it is simply a general feature of human ageing. Although there is little change in the quality of an older person's short-term memory, the general pattern is for older people to experience some slowness when recalling information from their long-term memory and for them to be less effective at problem-solving.

Key terms

Dementia: *a degenerative brain disease that causes confusion, gradual memory loss and loss of physical functions*

Reflect

How might an older person benefit from life experience and the wisdom they've acquired when their memory and thinking ability starts to decline?

What do you know?

1. How do infants learn during the sensorimotor stage of intellectual development?
2. Can you describe three examples of intellectual development during the first 3 years of a child's life?
3. What evidence suggests that human language abilities have a genetic basis?
4. Can you explain what 'concrete operational thinking' involves during childhood?
5. What type of thinking ability is usually developed during adolescence?
6. How is cognitive performance and intellectual ability affected by the ageing process?

Social and emotional development in infancy

Your assessment criteria:

P1 Describe physical, intellectual, emotional and social development for each of the life stages of an individual

Key terms

Emotional development: *the emergence of feelings about self and others*

Social development: *the emergence and improvement of communication skills and relationships with other people*

P1 Society, culture and social relationships

Social development is concerned with the ability to form relationships using communication skills. The ways in which individuals develop socially are strongly influenced by the society and culture in which they grow up. **Emotional development** is concerned with a person's feelings and their sense of self or identity. Emotional development and social development are closely linked. A person's social relationships and their ability to communicate effectively with others have a significant impact on how they feel about themselves and on how they are able to express and deal with their feelings.

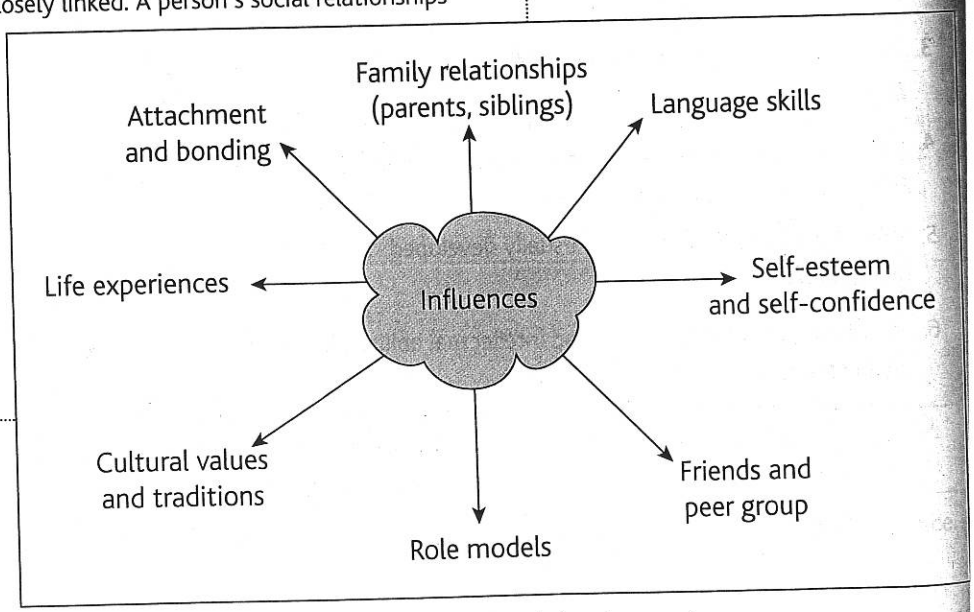


Figure 4.22 Influences on social and emotional development.

Early emotional development

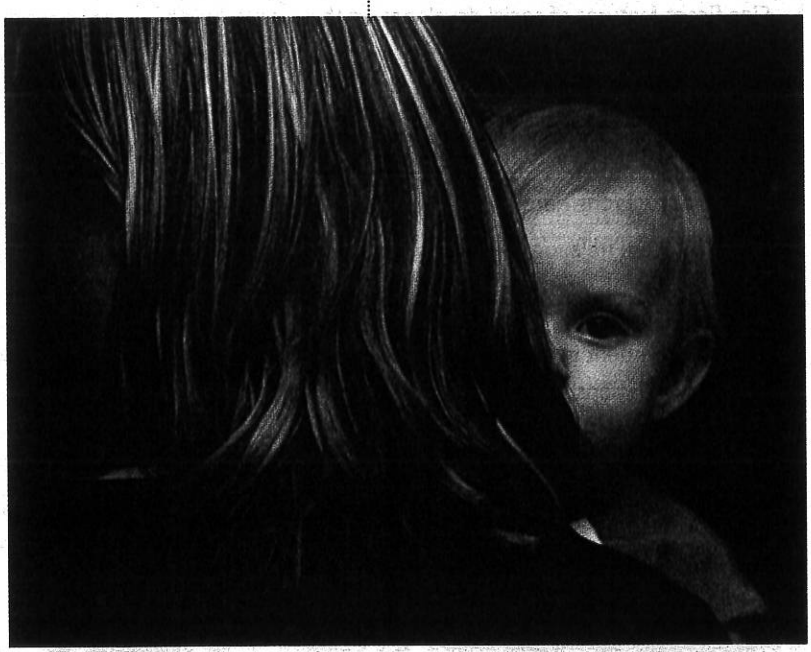
An infant's early emotional development plays an important part in their future relationships with others. Ideally, an infant should have opportunities to develop feelings of trust and security during the early years of life. The process of developing a strong emotional link with parents or main care-givers is known as **attachment**. The parent or carer response to this emotional linking is known as **bonding**. It is through attachment and bonding that an infant's first emotional relationship is formed.

Key terms

Attachment and bonding: *processes through which an emotional link is established between a baby and a parent or carer*

An infant's response to other people changes as they develop socially and emotionally:

- Up to 6 months, the baby is content to be held by anyone. He or she may protest when put down. This is known as *indiscriminate* attachment.
- Between 7 and 12 months, the baby is usually bonded to her parents and shows fear of strangers. This can be intense for 3 or 4 months. This is known as *specific* attachment.
- From 12 months onwards, the baby's attachments broaden to include other close relatives and familiar people. This is known as *multiple* attachment.



Between 7 and 12 months, the baby is usually bonded to her parents and shows fear of strangers.

It is thought that our first experience of attachment and bonding provides a blueprint for subsequent relationships. Poor or faulty attachment, or problems with parental bonding, may lead to feelings of insecurity and difficulties in forming and maintaining relationships later in life.

As their social and intellectual abilities develop and their life experience increases, infants are increasingly able to communicate and interact with other people. However, making friends and playing co-operatively also require some practice. Opportunities to mix and play with other children have a positive effect on the development of an infant's relationship-building skills.

Discuss

In a small group, share ideas about ways in which the parents of a newborn baby can promote attachment and bonding with their child. Do you have any experience of friends or relatives who have done this? Discuss strategies that you think are effective in promoting a baby's emotional development.

Social and emotional development in childhood and adolescence

P1 Childhood

Emotional and social development during childhood builds on the foundations established during infancy. During childhood, children form new relationships with new people in new situations – such as with teachers at school and with their friends.

Significant features of social development that occur during childhood include:

- the development of further communication and relationship-building skills
- an increase in the number and variety of relationships with people outside the family
- a greater degree of independence from parents
- an improvement in the ability to use social and language skills to manage personal relationships.

Children gradually develop greater awareness of who they are and how they are similar to and different from others. A child can usually identify their own sex (boy or girl) by 2 years of age. However, it is not until they reach 5 or 6 years that most children realise this feature of their identity is fixed! This concept, known as **gender constancy**, forms an important part of a child's developing sense of self.

Your assessment criteria:

P1 Describe physical, intellectual, emotional and social development for each of the life stages of an individual

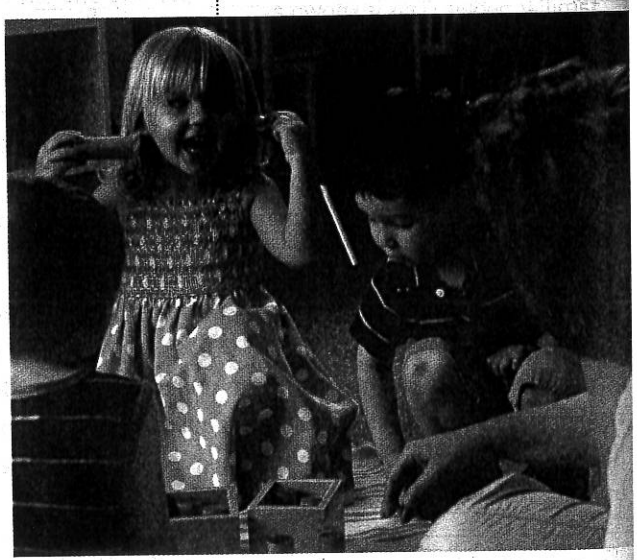
Key terms

Gender constancy: *the notion that a person's sex (male or female) is fixed and will not change*

Self-concept: *the combination of self-image and self-esteem that produces a sense of personal identity*

Children's ideas about self

A child's sense of self – who they are – is relatively simple. In early childhood, children don't tend to reflect on their self-worth. Instead, they tend to think about who they are in terms of their visible characteristics and can say how good they think they are at familiar physical, intellectual and social tasks. For example, a child might say, 'I'm no good at counting, but I am good at running.' Children develop a clearer **self-concept** as they progress through childhood. By the end of this life stage, children usually have an awareness of their own internal qualities, beliefs and personality traits. They will now be able to make judgements about their self-worth and self-esteem.



Ideas about self-concept gradually become more sophisticated during childhood.

Relationships with friends become increasingly important during childhood. In fact, by the middle of childhood many children prefer to spend time with their peers rather than with their parents and can become quite embarrassed by parental attention when their friends are around! Childhood friendships tend to be sex-segregated with boys preferring to make friends with other boys and girls establishing friendships with other girls.

Reflect

Can you remember who your first or best friend was during childhood? How did you meet this person? Think about how and why they were important to you.

Adolescence

Adolescence is often seen as an emotionally difficult and stormy life stage. Teenagers' turbulent hormones are often blamed for their moodiness and emotional sensitivity.

Two of the key emotional concerns of adolescence are:

- coping with the physical effects of puberty
- forging a sense of personal identity.

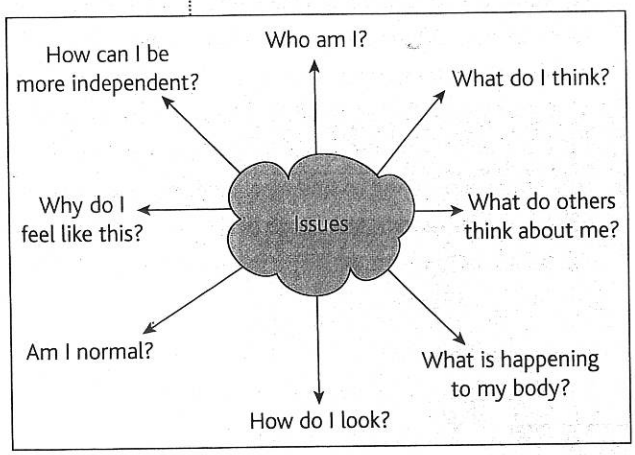


Figure 4.23 Issues for adolescents.

The significant physical changes that adolescents experience often trigger concerns about what is normal development and about self-image. Adolescents tend to need reassurance about their growth patterns. They may seek this from friends, parents, teachers, magazines and other media. Social and emotional development and physical maturation during adolescence are intertwined. For example, early maturation can result in increased attention and extra responsibility, especially for boys. For girls, it can result in unwanted sexual attention, pressure and awkwardness. Alternatively, late maturation can damage self-confidence and self-esteem in some adolescents who may be teased or bullied.

Leaving home is a pivotal moment in the life of many young people.

Friendships in adolescence

Relationships with friends play a very important role in social and emotional development during adolescence. Friendships are more stable and adolescents generally spend more time with their peers than they did during childhood. An adolescent's friendship group becomes a means of transition from family to independent, adult life. It is by using increasing social opportunities and the ability to choose and make new relationships with peers that adolescents gradually separate from their parents.

Social and emotional development in adulthood and old age

Your assessment criteria:

P1 Describe physical, intellectual, emotional and social development for each of the life stages of an individual

P1 Adulthood

People typically leave home to live independently of their family in early adulthood. Greater independence from the family requires new relationships. Often young adults make new friendships through work and social life, focusing on finding a partner and sustaining an intimate relationship. New responsibilities and an extension of the person's social circle may also result from marriage or cohabitation. Much of adulthood is concerned with trying to find a balance between the competing demands of work, family and friends. Each of these types of relationship contributes to social development by giving the person a sense of connection and belonging to others.

New parenthood is also a common feature of early adulthood. For most people it appears to be an experience that brings profound satisfaction, a greater sense of purpose and increased self-worth. It also introduces a number of role changes. Sex roles and spouse relationships tend to change when children arrive. The birth of a child appears to result in a drop in partners' relationship satisfaction and an increase in 'role strain' because the roles of parent and spouse are partly incompatible.

The multiple roles of adulthood (partner, parent and worker) change as an individual progresses through this life stage. When children leave home, the role of parent is affected. Work tends to be less demanding and there are usually fewer potential promotion opportunities by middle age. Relationships, especially partnerships, are likely to be given more time and assume a new significance. Partnership satisfaction tends to rise in mid-life, possibly due to the reduction in role strain. Effectively, partners have more time to spend together in mid-adulthood. Also, poor marriages tend to have ended by this point.

Older adulthood

Older adulthood is a time when considerable changes in roles and relationships are experienced. Many long-standing roles are shed. The role of worker is largely lost as people retire. The role of spouse is lost when a partner dies. The role of son or daughter is lost when parents die. The roles that remain are less complex and usually involve fewer duties. There can be less structure to life as a result.

Partner relationships in later life tend to be based on loyalty, familiarity and mutual investment in the relationship. Partners tend to spend more

time with each other, but may live alone when a partner dies. Many older people see their adult children regularly for purposes of practical help and emotional support. Continuity and adaptation are the themes of later adulthood relationships. Bee (1995) refers to the creation of a 'convoy' of stable relationships throughout life: 'a protective layer of family and friends who surround us and help us to deal with life's challenges'. People tend to choose friends who have similar social and psychological characteristics and who are at the same life stage.

Case study

June and Bert have been married for 38 years. June is 62 and Bert 64 years old. They have three grown-up children. Bert is in his last year of working for a printing company. He has worked there for the last 29 years. June works for 7 hours a week as a dinner lady.

1. Make a list of the issues and changes that June and Bert may experience in retirement.
2. Using your list, write down some suggestions to help them deal successfully with these issues and changes.
3. Think of someone you know well who has retired. Without revealing personal details about them, describe the ways in which their retirement has been a positive or negative experience.

What do you know?

1. Identify the key psychological process that affects early relationships in infancy.
2. Describe the pattern of social and emotional development that occurs during childhood.
3. How does an individual's sense of self or identity tend to change during childhood?
4. What part do friends play in social and emotional development during adolescence?
5. Identify two factors that influence emotional and social development during adulthood.
6. Explain how a change in life roles can affect emotional and social development during older adulthood.