appropriate and personally satisfying. Occasionally, children are born with neurological circuits that predispose them to be tense or combative (Eisenberg, 2006). Children enter educational settings with marked individual differences in their self-regulatory abilities. Some are able to deal productively with disappointment, whereas others cannot easily restrain themselves when frustrated (Blair, 2002). Children who lack self-regulatory skills need the same loving, sensitive care as other children as well as extra guidance in expressing their emotions productively. (We cover emotional self-regulation in Chapter 11.)

- *We give children opportunities to plan ahead.* In children, long-term planning and self-control is not yet fully established. To help children develop such critical executive functions as goal-setting and preparing, we may encourage them to use a calendar or diary, help set agendas for class meetings, keep track of homework assignments, and determine steps needed to meet assessment requirements (Meltzer, Pollica, & Barzillai, 2007). (We address behavioural self-regulation in Chapter 13.)
- *We help children who have been neglected or abused to experience trustworthy, warm, and stable relationships.* Early relationships leave impressions on children's brains (Insel, 2000; Siegel, 2001). Children develop neurologically based expectations about how relationships unfold (e.g. whether caregivers are trustworthy or inconsistent), how emotions progress (e.g. whether anger defuses or explodes in a turbulent outburst), and how they are valued (e.g. whether they are told that they are loved or called 'useless'). Recognising children's resilience, responsive adults can help ill-treated children learn new ways of relating to others. (We deal with children's attachments and other aspects of emotional development in Chapter 11.)
- *We consider the connections between cognitive processes, emotional experiences and bodily sensations.* Although we can think about intellectual objectives for children independently of their social–emotional and physical needs, in children's brains these continually intermingle, as shown by Christopher's sudden adoption of a mindset that included sporting involvement. Children's thoughts regularly trigger emotions, which in turn play out as sensations in the body (Immordino-Yang & Damasio, 2007). For example, as children listen to a teacher's description of a bushfire in the news, they may become visibly distressed—fists clench, bodies fidget, and facial expressions become drawn. Teachers might talk about their own feelings, advise children about how emergency services and charities are responding to the tragedy, and perhaps solicit children's ideas about how they and their parents might help avoid such a calamity. Children who are emotionally distressed by situations at home may find it hard to think clearly. A teacher may make allowances for distraction and failure to engage with academic activities.
- *We endeavour to safeguard adolescents from risk.* Despite increasingly efficient intellectual abilities, adolescents' powers of restraint are not fully mature. For example, while they are able to identify the risks of potentially dangerous behaviours (e.g. drink-driving, unprotected sex), they may fail to apply this understanding in the heat of the moment, especially when with peers (Reyna & Farley, 2006; Steinberg, 2007). A particular issue emerges with young refugees dislocated from their cultural norms (Dean, Mitchell, Donald Stewart, & Debattista, 2016). However, a combination of cultural change, consistent risk education and steps to reduce access to sources of risk can lead to reduced risk-taking in specific areas (AIHW, 2018a). For instance, adults can educate adolescents about problems with binge-drinking, but it is also important to make it harder for teens to obtain alcohol.

LO 5.3

Explain the course of physical development during childhood and adolescence

▶ PHYSICAL DEVELOPMENT DURING CHILDHOOD

As we have seen, systematic changes take place in physical size, bodily proportions and neurological structures throughout childhood and adolescence, with new opportunities to practise motor skills, develop healthy habits, engage in physical activity, and relate to peers in unprecedented ways. We now describe developmental periods in more detail.

INFANCY (BIRTH TO 2 YEARS)

Infancy is a period of rapid growth and development. At birth, infants already display remarkable reflexes. Before the umbilical cord is cut, the first reflex, *breathing*, begins, providing oxygen and removing carbon dioxide. Breathing and a few other reflexes begin in infancy and operate throughout life. Other reflexes, such as automatically grasping small objects placed in hands and responding to loud noises by flaring out arms and legs, last only a few months. Reflexes are evidence of normal neurological development, and their absence in early infancy is a matter of concern (Rennie et al., 2012).

As infants grow, they add motor skills to their physical repertoire; slowly at first, then more rapidly. In the first 12–18 months, infants learn to hold up their heads, roll over, reach for objects, sit, crawl and walk. In the second year, they walk with increasing balance and coordination, and manipulate small objects with their hands.

Motor skills emerge in a particular order, described as *cephalocaudal* and *proximodistal*. The **cephalocaudal trend** refers to skills emerging from the head downward. Infants first learn to control their heads, then their shoulders and trunk, and later their arms and legs. The **proximodistal trend** refers to the inside-to-outside pattern of growth outward from the spine. Infants first learn to control their arms, then their hands, and finally, their fingers. Such general trends always coexist with sizeable individual differences in styles and pathways to proficiency.

cephalocaudal trend Vertical ordering of motor skills and physical development from the head (*cephalo-*) and down the spinal column (*-caudal*).

proximodistal trend Centre-to-periphery ordering of motor skills and physical development from the parts closest to the centre (*proximo-*) to the most outlying parts (*-distal*).

Because infants cannot use words to communicate physical needs, practitioners seek information from families about their babies' sleeping, eating, drinking, nappy change and comforting preferences and habits. We offer ideas of what to look for in the *Observation guidelines* table 'Assessing physical development in infancy'.

OBSERVATION GUIDELINES
Assessing physical development in infancy

Characteristic	Look for	Example	Implication
Eating habits	▸ Ability to express hunger to adults. ▸ Developing ability to suck, chew and swallow. ▸ Ability to enjoy and digest food without abdominal upset. ▸ Cultural and individual differences in how families feed infants.	Wendy is a listless eater who doesn't seem as interested in food as other infants in her childcare program. The caregiver decides to talk with the parents in case professional intervention might be needed.	▸ Talk with parents and families about what they believe is appropriate feeding of children.
Mobility	▸ Developing ability to coordinate looking and touching. ▸ Growing ability to move towards objects. ▸ Temperamental factors that might affect exploration. ▸ Physical challenges that might affect exploration, including hearing and visual impairments. ▸ Temporary declines in exploration on occasion, such as when first separating from parents.	Due to neurological damage at birth, Daniel's left arm and leg are less strong than those on his right. His new carer notices that he is reluctant to move around in the centre. During a home visit, she finds that Daniel's movements are somewhat lopsided, but he crawls around energetically. The carer realises that Daniel needs to feel secure at the centre before he can freely explore there.	▸ Compare infants' behaviour in different situations. ▸ Organise a safe, predictable, attractive and interesting environment. ▸ Help children match challenges and opportunities to their abilities.
Resting patterns	▸ Methods babies use to put themselves to sleep. ▸ Difficulties in falling asleep. ▸ Families' expectations for sleeping arrangements. ▸ Evidence that families understand risk factors for sudden infant death syndrome (SIDS).	Angie cries a lot when placed on her back to sleep, in part because she is used to sleeping on her stomach at home. Her carer rubs Angie's head to soothe her and help her adjust to her new sleeping position.	▸ Talk to parents about risk factors and precautions for SIDS.
Health issues	▸ Physical disabilities requiring accommodation. ▸ Possible symptoms of infections: unusual behaviour, irritability, fever and respiratory difficulty. ▸ Suspicious injuries and unusual behaviours that may indicate abuse. ▸ Possible symptoms of prenatal drug exposure: difficulty sleeping, extreme sensitivity, and irritability.	A childcare worker cares for Michael, age 18 months. His cerebral palsy makes it difficult for him to scoot around. She encourages him to move towards objects, but also brings things to him to examine and play with.	▸ Remain alert to signs of illness and infection in children. ▸ Contact family members when infants have a fever or other physical symptoms.

EARLY CHILDHOOD (2–6 YEARS)

gross motor skills Movements of large components of the body that permit activity through and within the environment.

fine motor skills Small, precise movements of particular parts of the body, especially the hands.

If we visit a local playground, we see preschool children engaged in non-stop physical activity. Physical movement is a hallmark of early childhood, and dramatic changes occur in both gross and fine motor skills. **Gross motor skills** (e.g. running, hopping, tumbling, climbing and swinging) permit large movement through and within the environment. **Fine motor skills** (e.g. drawing, writing, cutting with scissors and manipulating small objects) involve more limited, controlled and precise movements, primarily with the hands.

During preschool years, children typically learn such culture-specific motor skills as riding a tricycle, throwing, and eating with chopsticks. Motor skills become smoother and better coordinated as a result of practice, longer arms and legs, and genetically guided increases in muscular control. A lot of chatter, imagination and joy accompanies gross motor movements in early childhood. Young children infuse their physical play with 'pretend' roles. They become superheroes and villains, cowboys and princesses, astronauts and mermaids.

Young children also make major strides in fine motor skills. They begin to dress and undress themselves and eat with utensils. Some develop an interest in building blocks, putting jigsaw puzzles together or stringing beads. Others spend considerable time drawing and cutting, and form their own creative shapes (e.g. by combining circles and lines to represent human beings), represent objects from the real world, and mimic adults' cursive writing with wavy lines or connected loops (Braswell & Callanan, 2003; Kellogg, 1967).

Optimism and persistence in motor tasks play a role as well. For instance, from the time this author's oldest granddaughter was 3, she pestered her grandmother to let her do the 'crafty' things she observed 'Nanny' doing. Undeterred by her inability to manipulate scissors and pencils with any deftness, she was always delighted with the 'artefacts' she produced. Her efforts paid off, and by 8 she demonstrated a flair for artistic endeavours. At 15 she creates masks and cosplay outfits and uses technology to create fantasy characters for stories she writes.

There are substantial individual differences in young children's fine motor skills. Some, such as those born with certain chromosomal conditions (e.g. Turner syndrome; see Table 4.1) and those exposed to alcohol during prenatal development, show delays in fine motor skills (Connor, Sampson, Streissguth, Bookstein, & Barr, 2006; Starke, Wikland, & Möller, 2003). Fortunately, explicit instruction and practice can help children improve fine motor skills, although some differences in dexterity often persist (Maraj & Bonertz, 2007).

MIDDLE CHILDHOOD (6–10 YEARS)

During middle childhood, children typically show slow but steady gains in height and weight without altering the basic structures. Proportions of body parts change less than in infancy or early childhood. There are also a few losses; 20 baby teeth are replaced with permanent teeth that at first appear oversized in the small mouths of young children. Girls mature more quickly than boys, erupting permanent teeth sooner and progressing towards skeletal maturity earlier.

In middle childhood, children extend their emerging physical capabilities. Many once-awkward gross motor skills are now executed smoothly. To preschoolers' joy in running, primary school children add use in organised games and sports. They improve speed and coordination in running, kicking, catching and throwing. Proficiency in athletic skills can be gratifying for children.

Children within this age range also further improve their fine motor skills. Supported by physiological maturation and cognitive advances, drawings are more detailed, and handwriting becomes smaller, smoother and more consistent (see Chapter 10). They also tackle such fine motor activities as sewing, model building, and arts and crafts projects.

As children progress through middle childhood, they become increasingly sensitive and self-conscious about their physical appearance, especially as they approach puberty and other people notice and comment on their physical appearance. People generally respond more favourably to children they perceive to be physically attractive (Boyce, 1979). In some, but not all, cultures, physical attractiveness is correlated with, and probably a causal factor in, self-esteem (Dohnt & Tiggemann, 2006; Latner, Knight, & Illingworth, 2011; Tiggemann, 2005). Although some

children exaggerate their physical flaws, appearance is influential in social relationships and does affect how children feel about themselves.

In the *Development and practice* feature 'Accommodating the physical needs of infants and children' we give examples of strategies for meeting individual and group needs for physical care, creating a hazard-free environment and integrating physical activity into the curriculum.

EARLY ADOLESCENCE (10–14 YEARS)

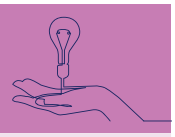
The most obvious physical change at the beginning of adolescence is the onset of puberty, though increasingly this is occurring in later childhood (Biro & Wien, 2010; Mensah & Patton, 2013). Ushered in by a cascade of hormones, **puberty** involves a series of biological changes that lead to reproductive maturity. It is marked by both the maturation of gender-specific characteristics and a **growth spurt**, a rapid increase in height and weight. The hormone release has other physiological repercussions, such as increases in bone density, facial oil production (often causing acne) and sweat gland activity (Styne, 2003).

puberty Physiological changes that occur in early adolescence and lead to reproductive maturation.

growth spurt Rapid increase in height and weight during puberty.

Girls typically progress through puberty before boys do. Puberty begins in girls between ages 7 and 13½ (usually between 10 and 11 years). It is first evidenced by a growth spurt, 'budding' of the breasts and the emergence of pubic hair. Whereas such changes are typically gradual, the

DEVELOPMENT AND PRACTICE
Accommodating the physical needs of infants and children



- **We meet the individual physical needs of infants rather than requiring conformity to a universal fixed schedule.**
  A caregiver keeps a schedule of times infants usually receive bottles and naps so that they can plan their day to give each as much attention as possible.
- **We view meeting infants' physical needs as essential curriculum for care and education.**
  An infant-toddler caregiver meets physical needs in ways that establish and deepen relationships with each child. They use one-to-one activities such as nappy changing and bottle-feeding as occasions to play together.
- **We remove sharp edges, peeling paint, or other environmental hazards to which young children may be particularly vulnerable.**
  After new carpet is installed in their centre, a preschool director notices that several children complain of stomach aches and headaches. Suspecting that the recently applied carpet adhesive may be to blame, they ask a consultant to evaluate the situation. Meanwhile, they conduct most of the day's activities outdoors.
- **We provide frequent opportunities for physical activity.**
  A preschool teacher schedules 'Music and Marching' to start the session, outdoor free play after 'mat time', and a nature walk to collect leaves for an art project before going home.
- **We plan activities that help children develop fine motor skills.**
  An out-of-school hours caregiving (OSHC) program engages children in making mosaics. They glue small objects (e.g. beads, pasta, beans, coloured rice) onto line drawings they make of cars, trains and other vehicles.
- **We design physical activities requiring widely differing skill levels so that each student can successfully participate.**
  During a unit on tennis, a physical education teacher has children practise the forehand stroke using tennis racquets. First, the teacher asks them to practise bouncing and then hitting the ball against the wall of the gymnasium. As students master these basic skills, the teacher asks them to see how many times in succession they can hit the ball against the wall. When they reach five successive hits, the teacher tells them to vary the height of the ball from waist high to shoulder high (Logsdon, Alleman, Straits, Belka, & Clark, 1997).
- **We integrate physical activity with academic lessons.**
  To show how molecules behave when something is cold, a Year 5 teacher asks children to cluster in an open area of the classroom, to stay close together and to creep around. To contrast how molecules behave when something is hot, the teacher asks them to spread apart and run around.
- **We give children time to rest.**
  After a preschool group has been playing outside, their teacher offers a snack of apple slices, crackers and milk. Once they have cleaned up, they gather around the teacher on the floor to listen to a story.
- **We respect children's growing ability to care for their own bodies.**
  In an OSHC program, a carer allows the children to go to the toilet whenever they need to, hanging a peg with their name on an 'out rope' when they leave the room and removing the peg when they return.

menarche First menstrual period.

onset of menstruation, **menarche**, is an abrupt event that can be either positive or frightening depending on a girl's awareness and preparation. The first menstrual period tends to occur rather late in puberty, between 9 and 16 years (usually between 12 and 13) (Merck Serono, 2015). Menstruation, and with it the possibility of conception, is apparently delayed until girls are physically strong and close to their adult height and therefore physiologically better able to have a successful pregnancy.

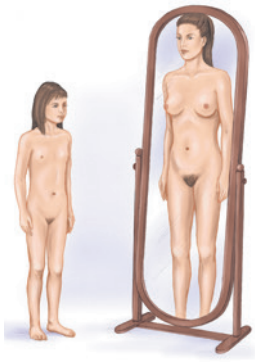
For boys, puberty starts between 9 and 14½ years (usually between 11 and 12 years), when the testes enlarge and the scrotum changes in texture and colour. A year or so later, the penis grows larger and pubic hair appears; the growth spurt begins soon after. At about 13 to 14 years, boys have their first ejaculation experience, **spermarche**, often while sleeping (a *wet dream*) (Bergin et al., 2015). Boys seem to receive less information from parents about this milestone than girls do about menstruation, and little is known about boys' feelings about it. Later developments include growth of facial hair, deepening of the voice, and attainment of adult height. (The course of puberty for both boys and girls is depicted in Figure 5.8.)

spermarche First ejaculation.

In addition to obvious differences in sexual physiology, boys and girls become increasingly distinct in other ways. On average boys grow taller than girls, having both a longer period of steady prepubescent growth and more growth than girls during their adolescent growth spurt. Boys also gain considerably more muscle mass than girls, a consequence of the male hormone *testosterone*.

Accompanying the physical changes of puberty are changes in adolescents' cognitive capacities, social relationships and feelings about themselves (Harré & Bullen, 2010; Williams, Pocock, & Bridge, 2009). As we have seen, continuing cortical development allows more-complex thought, and other changes in the brain and hormonal fluctuations affect emotions. Adolescents' rapidly changing physical characteristics can be a source of either excitement or dismay. For instance, Anne Frank looked positively on puberty, as this entry in her famous diary shows:

> *I think what is happening to me is so wonderful, and not only what can be seen on my body, but all that is taking place inside … Each time I have a period—and that has only been three times—I have the feeling that in spite of all the pain, unpleasantness, and nastiness, I have a sweet secret, and that is why, although it is nothing but a nuisance to me in a way, I always long for the time that I shall feel that secret within me again.* (Frank, 1967, p. 146)



IN GIRLS
Initial elevation of breasts and beginning of growth spurt (typically between 7 and 13 years; on average, at 10 years)
Appearance of pubic hair (sometimes occurs before elevation of breasts)
Increase in size and structure of uterus, vagina, labia and clitoris
Further development of breasts
Peak of growth spurt
Menarche, or onset of menstrual cycle (typically between 9 and 16 years)
Completion of height gain (about 2 years after menarche) and attainment of adult height
Completion of breast development and pubic hair growth

IN BOYS
Enlargement of the testes and changes in texture and colour of scrotum (typically between 9 and 14 years; on average, at 11½ years)
Increase in penis size and appearance of pubic hair
Beginning of growth spurt (on average, at 12½ years)
Spermarche, or first ejaculation
Peak of growth spurt, accompanied by more rapid penis growth
Appearance of facial hair
Deepening voice, as size of larynx and length of vocal cords increase
Completion of penis growth
Completion of height gain and attainment of adult height
Completion of pubic hair growth

FIGURE 5.8 Maturational sequences of puberty

We also saw in our case study that Chris used the changes as an opportunity to 'bulk up'. Others are not at all happy with their changing bodies. In *Reviving Ophelia*, therapist Mary Pipher (1994) describes Year 9 Cayenne's perspective:

> *She hated her looks. She thought her hair was too bright, her hips and thighs too flabby. She tried to lose weight but couldn't. She dyed her hair, but it turned a weird purple colour and dried out. She felt almost every girl was prettier. She said, 'Let's face it. I'm a dog.'* (p. 32)

Puberty seems to loosen restraints on problem behaviours, partly because of increased freedom from parental control. For some, the onset of puberty is associated with increased aggression; alcohol, drug and cigarette use; and experimentation with such behaviours as shoplifting, jumping from heights and exploding things (Carr-Gregg, Enderby, & Grover, 2003; Chapman & Sheehan, 2005; Lubman, Hides, Yucel, & Toumbourou, 2007). As suggested above, adolescent risk-taking may be based partly on new brain circuits. It seems that having a teenage brain orients young people to experiment, show off, and affiliate with like-minded peers.

Age of onset of puberty is another significant aspect of adolescents' adjustment. Genetic factors have by far the strongest influence on the specific age at which children go through puberty, but environment also plays an important role (Mustanski, Viken, Kaprio, Pulkkinen, & Rose, 2004). In general, there has been a steady trend towards earlier puberty in industrialised nations during the past hundred years, with better nutrition and consumption of more kilojoules probably being the primary reasons for the trend (de Muinck Keizer-Schrama & Mul, 2001; Ellis, 2004). Individual experiences are also influential. For example, family conflict and father absence seems to accelerate puberty in girls, possibly because of its effects on stress hormones, whereas low-income family environments delay girls' maturation, perhaps because of their links to inadequate nutrition (Hulanicka, Gronkiewicz, & Koniarek, 2001; Tither & Ellis, 2008). Less information is available about personal factors associated with the maturational timing of boys.

Extremely early or late maturation can cause serious concern for adolescents and their families. Researchers have focused primarily on the vulnerabilities of early-maturing girls who become heavier and more curvaceous at younger ages, are often dissatisfied with their bodies, and may be swept into new, and sometimes risky, social networks with older adolescents (Ge et al., 2003). Early-maturing girls are more likely to be unhappy and at risk for developing eating disorders, precocious sexual behaviours and other problem behaviours than are later-maturing girls (ElHage, 2017; Mensah & Patton, 2013). Early-maturing boys also face temptations and undergo stressful change during puberty, but their difficulties seem to be relatively short-lived (Ge et al., 2003; Mensah & Patton, 2013).

Children who mature late experience other stresses. They may not cope well with being shorter and be embarrassed by their lack of secondary sexual development. They are sometimes excluded or last picked for sport, not invited to social activities, or bullied. Boys may show immature and aggressive behaviours and avoid any situation where they can be observed undressed by their peers (Merck Serono, 2015). They tend to be less athletically inclined, more preoccupied with their musculature, and less popular with peers (Lindfors et al., 2007; McCabe & Ricciardelli, 2004). However, late-maturing boys are less likely to engage in risky behaviours such as smoking, drinking and delinquent activities (Duncan, Ritter, Dornbusch, Gross, & Carlsmith, 1985; Susman et al., 1985). Late-maturing girls generally show fewer health risks than early-maturing girls but may experience distinct vulnerabilities, including concern with body image (McCabe & Ricciardelli, 2004).

The timing of puberty does not necessarily establish lifelong patterns. Many adolescents learn constructive lessons from the issues of their teenage years. The ability of adolescents

The rapid physical changes of puberty are accompanied by new intellectual abilities and social relationships.

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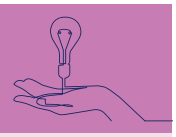
DEVELOPMENT AND PRACTICE
Accommodating the physical needs of adolescents



- **We demonstrate sensitivity to self-conscious feelings that adolescents have about their changing bodies.**
  A high school swimming coach gives students plenty of time to change before and after practice and ensures that showers preserve privacy.
- **We keep in mind that menstruation can begin at unexpected times.**
  A Year 8 girl comes into class obviously upset, and her best friend approaches their teacher to explain that the two of them need to go home right away. The teacher realises what has probably just happened, confirms this with the girl, reassures her and contacts her mother.
- **We ensure that adolescents understand what sexual harassment is, and why we do not, and they should not, tolerate it when it occurs.**
  A high school includes a sexual harassment policy in its student handbook, and homeroom teachers explain the policy very early in the school year. When a student violates the policy by teasing a classmate about being 'flat as a board', his teacher takes him aside and explains that his comment not only constituted sexual harassment (and so violates school policy) but also embarrassed the girl. The boy indicates that he had not realised that and, after class, tells the girl he is sorry.
- **We are sensitive to adolescents' feelings about early or late maturation.**
  A school's health curriculum, in clearly describing the typical sequence of biological changes that accompanies puberty, stresses the diversity and normality of the timing of these changes.

to adjust positively to puberty depends to a large degree on their culture, parents and school setting (Blyth, Simmons, & Zakin, 1985; Hill, Holmbeck, Marlow, Green, & Lynch, 1985; Peterson & Taylor, 1980; Stattin & Magnusson, 1989). In some cultures puberty is welcomed by formal celebrations, such as the bar mitzvahs and bat mitzvahs for 13-year-olds of the Jewish faith, tattooing for Māori and circumcision for traditional Aboriginal boys.

Educators can help children adjust by giving advance warning about physiological changes and reassuring them that considerable variations in timing are well within the normal range. In the *Development and practice* feature 'Accommodating the physical needs of adolescents' we give additional examples of strategies for accommodating both the changes of puberty and the diversity that exists among young adolescents.

LATE ADOLESCENCE (14–18 YEARS)

At about age 15 for girls and 17 for boys the growth spurt ends, and in the later teenage years most adolescents reach sexual maturity, with increasing involvement in sexual activity (exact figures vary between surveys and over time; the following were taken in 2014):

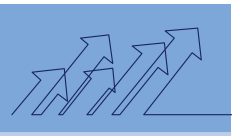
- About 23 per cent of Year 10 students and 50 per cent of Year 12 students have had vaginal intercourse.
- Of young people who have ever had sex, 30 per cent had two or more sexual partners in the past year.
- 38.7 per cent of students have engaged in giving and 39 per cent in receiving oral sex.
- 25 per cent of students report having unwanted sex.
- The most recent sexual encounter for about two-thirds of young people was with their regular girlfriend or boyfriend.
- The most recent sexual encounter for 7.7 per cent of teenagers was with someone they had met for the first time, with higher figures for males (14.2 per cent) than for females (3.7 per cent) (A. Mitchell, Patrick, Heywood, Blackman, & Pitts, 2014).

Later in this chapter, we consider health risks associated with unprotected sexual contact between peers.

Brain pathways continue to be refined during adolescence, permitting more-thoughtful control of emotions and more-deliberate reflection about consequences of behaviours. Nevertheless, many older adolescents engage in behaviours that could undermine their long-term physical health—for instance, binge-drinking and high-speed driving (Clark et al., 2010).

The *Developmental trends* table 'Physical development at different age levels' summarises key characteristics of each age group and provides implications for teachers and other professionals.

DEVELOPMENTAL TRENDS
Physical development at different age levels



Age	What you might observe	Diversity in	Implications
Infancy (birth to 2 years)	▸ Emergence and disappearance of reflexes. ▸ Rapid growth and change in body proportions. ▸ Ability to move, first by squirming; then rolling, crawling, creeping or scooting; finally, by walking. ▸ Coordination of small muscles of hands and eyes. ▸ Self-help skills in feeding, dressing, washing, and toileting.	▸ Timing and quality of gross motor skills. ▸ Fine motor skills and eye–hand coordination. ▸ Self-help skills.	▸ Celebrate unique growth patterns, watching for any that require accommodation or intervention. ▸ Provide a choice of appropriate indoor and outdoor experiences to practise developing motor skills. ▸ Don't rush infants; allow them to thoroughly experience each phase of physical development. ▸ Call for professional intervention for serious developmental delays.
Early childhood (2–6 years)	▸ Loss of rounded, babyish appearance; arms and legs lengthen and take on more-mature proportions. ▸ Boundless physical energy for new gross motor skills such as running and climbing. ▸ Acquisition of fine motor skills such as functional pencil grip and use of scissors. ▸ Transition away from an afternoon nap, which may initially be marked by fussiness in the afternoon.	▸ Age at which children master various motor skills. ▸ Physical activity based on gender; boys are more physically active. ▸ Health based on gender; girls are healthier. ▸ Home settings (e.g. flats, houses without backyards, lead in environment) which affect how well children can engage in vigorous physical activity. ▸ Genetic factors which may preclude or delay motor skills.	▸ Provide frequent opportunities to play outside or in a large indoor space. ▸ Intersperse vigorous physical exercise with rest and quiet time. ▸ Encourage fine motor skills through activities requiring close physical coordination. ▸ Choose activities that accommodate diversity in gross and fine motor skills.
Middle childhood (6–10 years)	▸ Steady gains in height and weight. ▸ Loss and replacement of baby teeth. ▸ Refinement and consolidation of gross motor skills and their integration into structured play activities. ▸ Participation in rule-based sports. ▸ Increasing facility in fine motor skills, such as handwriting and drawing.	▸ Weight and height at every age. ▸ Specific athletic talents and interests. ▸ Preferences for sports and physical activities based on gender. ▸ Accomplishment of fine motor skills (e.g. even handwriting). ▸ Non-school time in sedentary activities, such as reading, or electronic media.	▸ Integrate physical movement with academic activities. ▸ Provide regular opportunities to engage in self-organised play activities. ▸ Teach the basics of various sports and games, and support participation in organised sports programs. ▸ Encourage practice of fine motor skills, and support those with delayed fine motor precision.
Early adolescence (10–14 years)	▸ Periods of rapid growth. ▸ Beginnings of puberty. ▸ Self-consciousness about physical changes. ▸ Some risk-taking behaviour.	▸ Onset of puberty. ▸ Leisure activities. ▸ Amount of regular exercise. ▸ Strength and physical endurance, as well as specific talents for sports. ▸ Gender-based physical abilities. ▸ Peer group influence and risky behaviour.	▸ Model a commitment to physical fitness and good eating habits. ▸ Provide privacy for showering and changing after physical education. ▸ Explain sexual harassment, and why it's not tolerated. ▸ Encourage after-school clubs and leisure activities that foster constructive life choices. ▸ Explain how risky behaviours cause real harm.
Late adolescence (14–18 years)	▸ Girls: completion of growth spurt and attainment of mature height. ▸ Boys: ongoing increases in stature. ▸ Ravenous appetites. ▸ Increasing sexual interest. ▸ Possibility of serious risky behaviours (e.g. binge-drinking). ▸ Evidence of sexual harassment or bullying.	▸ Physical abilities based on gender. ▸ Engagement or avoidance of risky behaviours. ▸ Healthy eating, with disorders becoming more common. ▸ Level of medical care. ▸ Exposure to hazardous substances.	▸ Ensure that adolescents understand about sexual intercourse and conception. ▸ Encourage sexually responsible behaviour, either abstinence or risk minimisation. ▸ Encourage formation of goals for the future that motivate productive actions. ▸ Where possible, reduce adolescents' exposure to potentially risky situations. ▸ Develop and enforce policies related to sexual harassment and bullying.

References: Bredekamp & Copple, 1997; Gallahue & Ozmun, 1998; Reyna & Farley, 2006; Steinberg, 2007; Tanner, 1990.

In the next section, we examine practices that contribute to good health and, conversely, choices that undermine it.

LO 5.4

Discuss the factors involved in ensuring the physical wellbeing of children and adolescents

▶ PHYSICAL WELLBEING

With age, children and adolescents become more aware of 'good health'. However, they do not always make the best decisions for their health. In the following sections, we consider issues related to health and wellbeing, including eating habits, physical activity, rest and sleep, and health-compromising behaviours. We also identify strategies that encourage young people to develop healthy lifestyles.

EATING HABITS

Children's nutrition affects all aspects of their physical wellbeing, including their energy level, growth and ability to concentrate. Given its importance, an essential question is 'How do children learn to eat well?'

Good eating habits start at birth. Breastfeeding is the ideal method of feeding infants because breast milk is rich in needed vitamins, provides infants with antibodies against illness, is easier to digest than infant formula and promotes bonding with the mother (Oddy et al., 2011). Breast milk also gives the developing brain the nutrients it needs to form protective myelin layers around neurons (London, Ladewig, Ball, & Bindler, 2007). Some mothers cannot easily breastfeed, others do not want to, and still others (e.g. mothers who carry infectious diseases or are undergoing certain medical treatments) cannot do so safely because it is possible to transmit infections and medications through breast milk. Many parents select a formula derived from the proteins of cow's milk or soybeans and commercially prepared to match infants' digestive abilities and needs for kilojoules, vitamins and minerals. Specialty formulas are available for food allergies and intolerances. Professional caregivers generally try to support parents' preferences but also suggest sound strategies, such as introducing nutritious soft cereals, vegetables and fruits at around 4 to 6 months and avoiding hard foods that infants cannot easily chew and swallow.

Families and caregivers continue to play an important role in children's diets. Parents who have limited financial resources, are homeless, are physically or mentally ill, do not understand nutrition or have limited access to nutritious food struggle to ensure that children are well fed (Grant, Wall, Yates, & Crengle, 2010; Hudson, 2009/2010). Even in more comfortable personal circumstances, parents under pressure may neglect to feed themselves or their children adequately. The outcomes for undernourished children can be serious. For example, half of children in developing countries and more than 8 per cent of children under age 5 in Australia have anaemia (iron deficiency), which can cause developmental delays and behavioural disturbances (Killip, Bennett, & Chambers, 2007; Walker et al., 2007).

As children begin to make their own dietary decisions, their nutrition can deteriorate. In an extensive study of American children, 27 per cent aged 2 to 6 had a good diet, but only 5 per cent aged 13 to 18 did (Federal Interagency Forum on Child and Family Statistics, 2007). As they get older, some children skip breakfast, and this may result in difficulty concentrating in school (CDC, 2005). Their preferred foods (often 'fast foods' and snacks) may lack essential nutrients. In general, adolescents' diets contain too much refined carbohydrates, saturated fat, sugar and sodium, and too little fruit, vegetables and whole grains. In an Australian Bureau of Statistics (ABS) study, adolescents reported that on the previous day:

- 51 per cent of males had consumed soft drinks
- 25 per cent had eaten a burger, and 20 per cent had eaten chips
- only 40 per cent of adolescent Australian males and 50 per cent of females reported eating fruit
- just under two-thirds reported consuming vegetables—almost all of this was potato, and mainly as chips. (ABS, 2014)

Part of the problem is that the understanding of how eating habits relate to health is not innate. Consequently, nutrition education has become an important part of primary school curricula (children are taught about 'the five food groups' and 'the food pyramid'—e.g. Eatforhealth, 2015; Nutrition Australia, n.d.) and there is a lot of information for parents and children online (e.g. https://kidshealth.org, www.kidshealth.org.nz). Nevertheless, adolescents still show a predilection for unhealthy foods, especially those promoted in the media (Jolly, 2011).

Overweight children. A concerning number of children have been identified as overweight during the past few decades and for many children, problems with eating and inactivity begin in early childhood. Although estimates vary, in 2014–15 one-quarter of Australian children between 2 and 17 years were found to be overweight or obese (AIHW, 2017a) peaking at 38 per cent for those aged 10 to 14 years; rates are higher among Indigenous than non-Indigenous children (Cancer Australia, 2017). There are many different ways to identify **childhood obesity**, most commonly as a function of body mass index (BMI); though some use a proportion, usually 120 per cent, of 'ideal' weight, or 125 per cent (boys) or 132 per cent (girls) of their body fat percentage. Obesity has long been considered a global health epidemic by the World Health Organization (2000). Some obese children outgrow their 'baby fat', but others do not. Most obese children become obese adults, and most obese adults were overweight as children. Childhood obesity may lead to serious health risks in adulthood, including diabetes, high blood pressure, high cholesterol, asthma, arthritis and poor health status (Biro & Wien, 2010). It has social consequences as well. Peers may bully obese children, call them names and exclude them from social activities. Moreover, childhood obesity seems to accelerate the onset of puberty (W. Li et al., 2017).

childhood obesity Condition in which a child carries excess fat beyond what is considered conducive to good health.

Some weight problems have a genetic basis, but environmental factors, such as availability of 'fast foods', family eating patterns and restricted exercise, also play a role (Day & Pearce, 2011; Henderson, Coveney, Ward, & Taylor, 2009; Thomas, 2006). Fortunately, interventions such as dietary counselling, kilojoule restriction combined with increases in physical activity, and behavioural techniques (e.g. setting specific goals, monitoring progress towards goals, and recognising and rewarding progress) are often effective if supported by parents.

Increasingly, educators are recognising that schools provide an important setting to address children's potential weight problems. The Australian Government provides healthy eating guidelines for school canteens (Department of Health, 2014b). Other appropriate goals for schools include ensuring that students obtain adequate amounts of physical activity, decreasing time spent in sedentary activities (e.g. time spent working at a computer), and helping students take control of their own bodies (Department of Health, 2014a). Some school programs have asked students to keep track of their consumption of fat and soft drinks and their physical activity (Haerens et al., 2006). Coupled with motivational techniques, such record-keeping can have desirable effects on children's weight and health.

Eating disorders. Whereas some young people eat too much, others eat too little and develop eating disorders that seriously threaten their health. People with **anorexia nervosa** eat little, if anything; people with **bulimia** eat voraciously, especially fattening foods, and then purge their bodies by taking laxatives or forcing themselves to vomit. Extreme weight control methods, such as not eating, taking diet pills, vomiting and taking laxatives, are fairly widespread among adolescents (Patton et al., 2006).

anorexia nervosa Eating disorder in which a person eats little or nothing for weeks or months because of an unrealistic fear of gaining weight and a distorted view of body image.

bulimia Eating disorder in which a person has episodes of binge-eating followed by guilt, depression and self-loathing, and then purposely purges the food by vomiting or taking laxatives.

Individuals with eating disorders often have a distorted body image (believing they are 'fat' even while they appear grossly thin to others), and may exercise or diet compulsively to lose additional weight. Eating disorders jeopardise physical health and tend to slow the bodily changes associated with puberty (London et al., 2007). The malnutrition that accompanies anorexia in particular can cause heart failure. Anorexia is associated with higher-than-usual rates of suicide attempts (Preti, Camboni, & Miorro, 2011).

Research suggests that society's obsession with thinness contributes to anorexia nervosa and bulimia—thin is 'sexy'—sometimes magnifying other influences such as loneliness, depression and anxiety, repercussions of child abuse or substance abuse (Tiggemann & Slater, 2013).

Encouraging individuals to change their eating habits is seldom effective with anorexia nervosa and bulimia. These conditions frequently require intensive and long-term intervention by medical and psychological specialists (Hay et al., 2014). Educators should be alert to common symptoms such as increasing thinness, complaints of being too fat, and a lack of energy. When we suspect an eating disorder, we consult a counsellor, school psychologist, pastoral care worker or principal. However, treatment may only have a 40 to 50 per cent success rate (McAleavey, 2008).

Food allergies. Allergic reaction to a range of normally healthy foods is a rapidly growing problem, particularly among affluent groups in major cities and those born during autumn/winter (Mullins, Clark, & Camargo, 2010; Mullins et al., 2011). Possible allergens include peanuts, lupins, tree nuts, milk, eggs, sesame seeds, fish, shellfish, soy and wheat. As the opening case study shows, something as mundane as an orange can be an allergen. Reactions include dermatitis, respiratory and gastrointestinal distress and, most serious, life-threatening anaphylaxis. All Australian states/territories and New Zealand have guidelines for educators. For instance, in South Australia every child at risk must have an *Allergy Care Plan* and an *Anaphylaxis Action Plan* provided by their treating doctor (Department of Education and Children's Services, 2008). Educators need to be able to recognise the signs of the onset of an allergic response and know how to respond.

Promoting good eating habits. Here are some thoughts about how educators can foster good nutrition and eating habits:

- *We provide healthy between-meal snacks when children are hungry.* Children need periodic snacks as well as regular meals, and nutritious snacks like vegetable sticks and fruit slices are particularly important for rapidly growing children or those who receive inadequate meals at home. Educators would consider food allergies, cultural food requirements and possible limitations in chewing and swallowing.
- *We offer nutritious foods and avoid common allergens.* Educators support parent advocacy for healthy foods and drinks in canteens and childcare menus. When children are permitted to bring snacks, educators send home written suggestions for children and their families. For example, a children's farm offers birthday parties with only healthy food and even limits the type of birthday cake that parents are allowed to provide.
- *We encourage children to try new foods.* Children who have grown accustomed to processed food may initially resist fresh food. Young children may not want to try a new food until they have seen it multiple times, sometimes only after 10 to 15 presentations (Blissett & Fogel, 2013). Strategies that successfully encourage exploration include offering new foods next to preferred foods; using such healthy foods as yoghurt, hummus and low-fat/low-sugar salad dressings side by side with new vegetables and fruits; and enlisting the involvement of children in preparation of the meal. Another strategy has been to create a school garden that produces fresh food and have students plant and harvest the crops, then cook and share meals made with the crops they have grown together (Garden to Table Trust, n.d.; Stephanie Alexander's Kitchen Garden Foundation, 2018).
- *We regularly review the basics of good nutrition, and ask children to set goals for improving their eating habits.* Well-planned school- and centre-based programs can affect children's eating habits, reducing their fat, sodium, sugar and cholesterol intake. Success is more likely when children are asked to set specific goals (e.g. reducing consumption of salty chips), encouraged to chart their progress towards these goals, reinforce new eating patterns, and take cultural practices into account (ACARA, 2010; Sadegholvad, Yeatman, Parrish, & Worsley, 2017). A first step is to introduce basic food groups and the food pyramid, and ask children to evaluate their diets based on recommended servings for each group.
- *We respond when we suspect that children have eating disorders.* If a child shows indications of an eating disorder, we contact the principal or director immediately. Children with eating disorders need

urgent medical intervention, but this requires cooperation from parents whom we would consult immediately. Even with medical care, these children may have trouble concentrating and need services from counsellors or psychologists. Underlying problems with depression and anxiety are unlikely to be resolved overnight and require continued consideration.

- *We educate about good and bad diets.* Educators show how good nutrition contributes to people achieving their goals. We use social education classes to take the glamour out of being excessively thin. For instance, a Year 3 teacher provides a unit on body types emphasising positive aspects of diversity.
- *We follow up when we suspect serious nutritional problems.* When low family income is the cause, practitioners can help families access financial support. When parental neglect is possibly involved, teachers may need to report their misgivings to principals, and consult counsellors or pastoral care workers to find an approach to protect vulnerable children.
- *We are alert to the signs of food allergies.* Educators are familiar with policies around allergies. We consult with parents and avoid exposing children to foods to which they are allergic. We respond quickly to sudden onset of itchy mouth or difficulty swallowing or breathing; nausea, vomiting, diarrhoea or abdominal pain; hives or asthma, or symptoms of anaphylaxis by following identified guidelines.
- *We convey respect for children's and adolescents' feelings about their bodies.* Students who struggle with obesity or eating disorders are distressed by unflattering comments about their appearance. Educators insist that classrooms, childcare centres and after-school programs are 'no-tease zones'. Some children may be embarrassed about their families' limited financial circumstances. In response, educators minimise the extent to which these children feel that they stand out or miss out on activities. For instance, a teacher arranges for a sports store to donate items for children whose families cannot afford to supply them.

PHYSICAL ACTIVITY

Infants and toddlers are highly motivated to master new physical skills. As they wriggle, squirm, reach and grasp, they exercise motor and manipulative skills and learn about the world. For young children, physical activity is intrinsically rewarding and they become even more active (about 6 hours each day) during the preschool years. Activity then decreases in middle childhood and adolescence, to 1.5 hours each day. Over 20 per cent of primary school children take over 12,000 steps each day, but less then 10 per cent of adolescents do so (Department of Health, 2017b).

rough-and-tumble play Playful physical 'fighting' common in early and middle childhood.

Children continue to need physical activity as they grow. Unfortunately, they are not always given sufficient outlets to move. One problem is a mismatch between adult expectations and children's desire to be lively and boisterous, particularly in formal classrooms. A common quality of physical activity in early and middle childhood is **rough-and-tumble play**, or good-natured 'play fighting', especially with boys (Pellegrini, 2006). Children often derive considerable pleasure from vigorous play as a healthy release from intellectually demanding tasks, and defend it to adults as just 'playing' or 'messing about'. Yet in many schools and childcare centres, rough play is banned despite research and clear educational thinking suggesting preferable approaches (Cupit, 2013; Holland, 2003). Educators face the challenge of protecting children from serious harm while allowing them to run, shout and be exuberant. Many educators handle this dilemma sensibly by arranging for a safe playground and reasonable rules that reduce the chances of injury, and some proactively find ways to incorporate the play into their curriculum. For example, a Year 3 teacher uses interest in *Teenage Mutant Ninja Turtles* to stimulate classes on wildlife (turtles), Japanese culture (ninjas), nutrition (pizzas), and Renaissance art (Raphael, Donnatello, etc.).

Infants are highly motivated to master new physical skills and explore their environment.

Sozaijiten

Another deterrent to physical activity is the misperception that outdoor play takes time from academic lessons. Reducing time for free play is inappropriate given children's inability to sit and

concentrate for long stretches of time without regular breaks for active play and interaction (Pellegrini & Bohn-Gettler, 2013; Strong et al., 2005). Moving in the outdoors not only fosters a general sense of wellbeing but actually helps children focus attention on academic learning. In many schools, children—particularly young children—are allowed to move around within the classroom between and during lessons. Having a chance to get up, if only for a few moments, can help children prepare learning materials and settle into a learning task.

Children also get exercise through physical education, and this is an integral part of curricula in Australia and New Zealand. The New Zealand Ministry of Education requires of both primary and secondary schools that they provide 'physical activity', 'sport studies' and 'outdoor education' (Ministry of Education, 2007). Each Australian and territory identifies physical education as a curriculum requirement of schools, allowing Christopher in our case study to find an outlet for his new 'stocky' self-image (ACARA, 2016; Brooker & Clennett, 2006).

Exercise helps adolescents to maintain physical fitness and cope effectively with life's frustrations and stresses (Brand et al., 2010; Sund, Larsson, & Wichstrøm, 2011). However, school tasks become increasingly sedentary in high school, and so adolescents are more likely to find vigorous activity outside the curriculum. Many do not get sufficient exercise. Australian health statistics indicate that 57 per cent of adolescent boys and 75 per cent of adolescent girls do not meet the Government-recommended levels for physical activity; New Zealand adolescent girls spend only 36 minutes, and boys 55 minutes, a day in 'moderate-to-vigorous-intensity physical activity' (AIHW, 2018b; Maddison et al., 2016).

Organised sports and individual athletic activities. Organised sports offer the means for maintaining and enhancing physical strength, endurance and agility. Sports promote social development by fostering communication, cooperation and leadership skills. Particularly when parents and coaches encourage children to focus on endeavour and teamwork, children derive a great deal of enjoyment from sports and come to see themselves as reasonably competent athletes (Coté, Horton, MacDonald, & Wilkes, 2009).

Organised sports can have a down-side when adults promote a 'win at all costs mentality', put excessive pressure on children to 'perform', or encourage athletically talented children at the expense of less gifted team-mates. This approach can bolster children's athletic skills, but can also rob children of intrinsic enjoyment of sports and cause them to overextend and become injured (Meuse, 2017). Parents vocally criticising their children's athletic performance from the sidelines can be extremely destructive. Some team sports, such as football and hockey, represent a significant risk of injury.

Some children who do not like team sports but nevertheless want to exercise are drawn to individual athletic activities such as running, skateboarding, surfing and dance. Children who engage in individual sports often socialise while participating. Individual athletic activities have the advantages of requiring initiative and at least moderate levels of exercise. However, some individual sports (e.g. skiing, hang-gliding) also incur risk of injury and are not easy to supervise.

Encouraging physical activity. Here are some specific strategies that educators can follow to promote physical activity:

- *We are 'pro-ACTIVE'.* Educators incorporate physical movement wherever possible, particularly in early childhood centres and primary schools. Regular breaks that include physical activity actually increase children's attention to more desk-bound, cognitively demanding tasks (Pellegrini & Bohn-Gettler, 2013).
- *We provide appropriate equipment and guidance so that children can safely engage in physical activity.* Open space, playground equipment, balls and other athletic props encourage physical exercise. We choose equipment carefully to allow children to experiment freely yet safely, ideally minimising situations where adults have to forbid certain activities (Bronson, 2000). Equipment and exercise facilities should be correctly designed to fit children's body sizes and abilities and properly maintained (Frost, Shin, & Jacobs, 1998).

Expectations should not exceed children's developmental abilities. For example, swimming lessons recommended in both Australia and New Zealand for infants and toddlers are specifically designed to recognise their vulnerabilities. They include parent education to ensure families understand that small children need supervision around water.

By the middle primary years, children organise many physical activities and games themselves. Coaches, teachers and club directors usually need to tolerate some bickering and fuss over rules as children get along. Even so, adults occasionally need to intervene to minimise physical aggression, remind children to follow safety rules, and integrate children who do not readily join in.

Adults can help adolescents see how enjoyable and worthwhile exercise can be.

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- *We make exercise enjoyable.* Children are more likely to engage in a physical activity if they enjoy it and find it reasonably challenging (Bailey, Cope, & Pearce, 2013). They may have intrinsic interest in developing particular skills (e.g. in karate), take pleasure in physical self-expression (e.g. through dance), or appreciate the camaraderie they gain from team sports and other group activities. High school educators may need to counter negative attitudes stemming from previous unpleasant experiences with physical exercise (Alexander, Stafford, & Lewis, 2011) or lack of family support for or modelling of physical exercise.
- *We plan physical activities with diversity in mind.* Only a minority of children or adolescents find success in competitive sports: not everyone can be a full forward, and not everyone likes netball. But nearly all can find enjoyment in physical activity of some form. Offering a range of activities, from dance to volleyball, and modifying them for children with special needs maximises the number of students who can participate. For example, a girl who is unusually short might consider activities such as soccer, trampoline or diving that do not require exceptional height (David, 2012); a boy in a wheelchair might find his niche in wheelchair rugby, also called 'murderball'; and Chris, after trying rugby league found his place playing soccer.
- *We focus on self-improvement, rather than comparison with peers.* For most children, focusing on your own improvement is far more motivating than comparing your performance with peers, especially if it compares poorly. Dwelling on comparison with others leads some to negative self-evaluation, obsessive overtraining and risk-taking.

  One way to promote self-improvement is to teach skills progressively from simple to complex. For example, a preschool teacher might ask children to hop on both feet as they pretend to be 'Skippy'. Once they have mastered that skill, the teacher can progress to more-complex skills, such as hopping on one foot and skipping. Carefully sequenced teaching makes physical activities enjoyable by giving children feelings of success. Even in competitive sports, the emphasis should be on how well children 'played the game'—on whether they worked well together, treated members of the opposing team with respect, and were good sports—rather than on whether they won or lost.

  Another tactic is to ask children to chart their progress on particular athletic skills and exercises; students will find this easy and enjoy engaging with electronic devices (CDC, 2002; Parks, 2017).
- *We make sure that children do not overdo things.* Becoming excessively involved in exercise can create medical problems for children. The soft and spongy parts of bones in growing children are susceptible to injury from repeated use, and especially from excessive weight-bearing forces, and childhood sports injuries are common (Huguenin, 2016), though actual statistics are confused by issues like varying definitions (Yu, Walker, & Green, 2007). Weight-training machines are almost always designed for adult-sized bodies, intensifying children's chances for injury. Overuse injuries are also an increasing concern (Valovich

McLeod et al., 2011). Furthermore, excessive concern about being successful in athletics can lead to health-compromising choices (taking steroids, gaining or losing weight too quickly, etc.). Medical experts recommend that children be discouraged from concentrating solely on one sport before adolescence (Bridge & Toms, 2013), that they never be asked to 'work through' stress fractures, and that they receive regular supervision from a doctor who can monitor possible health effects of intensive training (e.g. delays in sexual maturation) (Yu et al., 2007).

REST AND SLEEP

Rest and sleep are essential to growth and health. Sleep actually helps young people grow because growth hormones are released at higher rates as children doze. Sleep may help the brain maintain normal functioning and promote its development (Carlson, 2007).

Infancy. Newborn babies spend a long time sleeping, on average 16 to 18 hours a day, decreasing to 14 hours by 6 months (Iglowstein, Jenni, Molinari, & Largo, 2003). Gradually, infants develop wake/sleep cycles that correspond to adults' day/night cycles (Raising Children Network, 2018a). They begin to sleep through the night when they are ready, but are influenced by sleeping arrangements and other environmental factors. Babies seem indifferent to guidelines. Glenn's youngest son did not sleep through until after his third birthday. Infants' sleeping habits are affected not only by individual but also by cultural differences, suggesting that there is no single 'best' way to put babies to sleep (Mindell et al., 2010).

sudden infant death syndrome (SIDS) When infants in the first year of life die suddenly while asleep without warning and without an apparent medical cause

Although there is no best way, there is definitely one ill-advised way to put babies to sleep: placing babies on their stomachs for sleeping. This increases the risk of **sudden infant death syndrome (SIDS)**, death that occurs during sleep without an apparent medical cause (Healthdirect, n.d.). SIDS was a leading cause of death among infants in South Australia, peaking at 2.4 deaths per 1000 births in 1986 before decreasing following effective parent education programs (Beal, 2000). There seem to be multiple factors in the occurrence of SIDS and for many deaths no cause can be ascertained.

Current recommendations for reducing the risk of SIDS and other sources of suffocation include ensuring that babies sleep on their backs (face up); providing a firm mattress; avoiding soft toys or loose bedding; no one smoking nearby; ensuring that babies don't sleep with parents; prolonging breastfeeding; ensuring that all immunisations are done; considering access to a dummy; preventing babies from overheating; avoiding honey under 12 months; and avoiding products that claim they can reduce SIDS (Healthdirect, n.d.; WebMD, 2017).

Early childhood through adolescence. Time spent sleeping decreases steadily over the course of childhood and adolescence. Two-year-olds typically sleep for 13 hours, 3- to 5-year-olds sleep 11 to 12.5 hours, 10- to 13-year-olds 9 to 10 hours, and 14- to 18-year-olds 8 to 9 hours (Iglowstein et al., 2003). Of course, the number of hours of sleep children need in order to feel rested varies greatly.

Occasional sleep problems are expected in childhood. Nightmares are common between ages 3 and 6, and children may ask adults to help them battle the demons of the night that seem so real. Glenn's wife taught their son a 'spell to drive away tigers' to successfully exorcise a persistent night visitor. However, pronounced sleep disturbances (e.g. waking repeatedly during the night) may be due to serious health problems, excessive stress, bullying, exposure to street drugs, or side effects from prescribed medications. Repeated nightmares are especially common among children who have been victims of abuse or other traumatic incidents (Humphreys, Lowe, & Williams, 2009). Moreover, children with certain disabilities (e.g. Down syndrome, obesity, spina bifida) often have difficulty sleeping (Waters, Suresh, & Nixon, 2013).

Everyday experience tells us that adolescents are less likely than younger children to get sufficient sleep. Although they require less sleep than in their earlier years, adolescents are still growing rapidly, and their bodies need considerable time to rest (Mitru, Millrood, & Mateika, 2002). However, out-of-school 'obligations'—extracurricular activities, gaming, social engagements and homework—may keep teenagers up until the small hours of the morning. In

some cases, adolescents make up for lost sleep at school. Some high school teachers (and university lecturers) find students napping during class time—hardly conducive to learning!

When children and adolescents get insufficient sleep, they are likely to become irritable and have difficulty with changes in routine. Depending on their age, sleep-deprived children may become aggressive or depressed, have trouble concentrating, perform at low levels academically, and engage in high-risk behaviours (Dahl & Lewin, 2002; Sadeh, Gruber, & Raviv, 2002). Of course, children who stay up late and find it hard to sleep may suffer a good deal of stress independent of sleeping problems, and lack of sleep is probably only one factor in their adjustment problems.

Accommodating children's needs for rest and sleep. Educators often have children in their classrooms who do not sleep easily and soundly, including some who are truly sleep-deprived. We offer the following suggestions:

- *When appropriate, we provide time for sleep during the day.* Infants and toddlers need sleep during the day. Educators include nap-time in the schedule of childcare and preschool. A few older children and adolescents—for instance, children with brain injuries or other chronic health conditions—may need an hour or two of sleep as well (Ormrod & McGuire, 2007).
- *We include time for rest in the daily schedule.* Young children typically give up their daytime nap sometime between ages 2 and 5, but for quite some time they need to 'recharge their batteries' with quiet and restful activities (e.g. listening to stories or music). Children at any age learn most effectively when they take an occasional, restful break from intense activity.
- *We watch for children who appear sleepy, irritable or distractible.* Educators speak tactfully with family members when they think that chronic fatigue is causing children to have trouble concentrating, maintaining reasonably good spirits and resisting aggressive impulses.
- *We encourage children to make steady progress on assignments rather than wait to start the night before they are due.* At high school, adolescents may have hours of homework each night. Add to this workload extracurricular events, social activities, family commitments and part-time jobs, and some are seriously overstretched. When an out-of-school task, such as a major project or a research paper, is lengthy and complex, teachers encourage regular progress by giving interim deadlines for various parts of the project.
- *We recognise that sleep problems can be a sign of illness or emotional stress.* Words of acknowledgment and kindness ('You look tired today, Darragh. Did you sleep alright last night?') may give children permission to share their troubles and, as a result, take the first step towards resolving them.

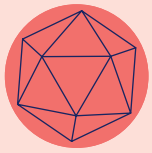
Advances in physical development take many forms and depend on several distinct factors, including maturational processes, adequate nutrition, physical activity and sleep. In the *Basic developmental issues* table 'Physical development' (overleaf) we summarise how physical development shows nature and nurture, universality and diversity, and qualitative and quantitative change. Because good health comes not only from health-promoting habits but also from avoiding risk, we focus next on the important topic of health-compromising behaviours.

HEALTH-COMPROMISING BEHAVIOURS

As they grow older and gain increasing independence from adult supervision, children and adolescents face many choices about how to spend their leisure time, some of which undermine their health and physical wellbeing. Here we look at three health-compromising behaviours: cigarette smoking, alcohol and drug use, and unsafe sexual activity.

Cigarette smoking. Given that the health risks of smoking are so well publicised, it is concerning that some adolescents continue to smoke. Undoubtedly, 'image' is a factor and governments continue to try to limit advertising. Those who continue are likely to develop serious health problems, which can lead to premature death (ABS, 2015; AIHW, 2017b).

BASIC DEVELOPMENTAL ISSUES
Physical development

Issue	Physical growth	Motor skills	Physical health and activity
Nature and nurture 	▸ Genes specify the changes that occur and provide a range of possibilities for outcomes. ▸ Typical progression depends on healthy environments and experiences.	▸ Genes set boundaries for motor skills at any age. ▸ Regular exercise allows children to expand and refine developing motor skills.	▸ Nature influences activity levels and susceptibility to infection and illness. ▸ Nurture affects activity and health through habits learned from parents and others.
Universality and diversity 	▸ Similar sequences in physical development across a wide range of environments and cultures. ▸ Variable rates of development.	▸ Virtually universal sequences in motor skills. ▸ Diversity in the specific ages at which motor skills are mastered.	▸ Universal need for good nutrition, plenty of rest, and a moderate amount of physical activity. ▸ Great variation in activity levels and eating habits. ▸ Differing susceptibility to illness.
Qualitative and quantitative change 	▸ Physical characteristics that emerge with puberty are rapid and not foreshadowed. ▸ Most physical progressions result from gradual physiological changes.	▸ Some motor skills emerge suddenly. ▸ Children usually need lots of practice before executing motor skills easily and gracefully.	▸ Sudden shift from preoccupation with safety to a thrill-seeking mind-set. ▸ Increasing control over eating and leisure time.

Alcohol and drug use. Alcohol and drug use also pose serious threats to physical health in adolescents (Department of Health, 2017a). Cannabis remains the most common illicit drug, but there is also an increasing use of crystal methamphetamine (ice), which has dramatic effects, including aggressive behaviour, 'come-down', dehydration, dilated pupils and blurred vision, dry mouth, headaches and dizziness, increased energy, increased heart rate and blood pressure, insomnia, jaw clenching and teeth grinding, reduced appetite, stomach cramps, sweaty, cold and clammy skin, and trembling; in the long term, dental problems, increased tooth sensitivity, cracked teeth, cavities and gum disease, dependence, exhaustion, heart and lung problems, increased risk of hepatitis C and HIV in injecting users, kidney problems including kidney failure, malnutrition, movement problems and stroke.

Losing judgment under the influence of alcohol or drugs can result in dangerous driving, fights or unprotected sexual activity. Sharing needles by intravenous drug users puts them at risk of contracting infectious diseases such as hepatitis.

A variety of factors appear responsible for adolescents' use of alcohol and drugs. Adolescence is a time of trying new things. For some, it is just curiosity: after hearing about alcohol and drugs from peers, adults and the media, teens may want to experience the effects first-hand. For others, it is a way to seek self-definition (Who shall I be? How does it feel to be a certain kind of me?), leading to experimentation with a variety of new roles and behaviours, including drug use (Durkin, 1995; Shedler & Block, 1990).

Regardless of their initial reasons for trying alcohol and drugs, continued use often creates serious problems for children. If these substances give adolescents pleasure, satisfy a desire for thrills, alleviate anxieties or deaden feelings of pain and depression, they may begin to use them regularly. Some eventually develop biological and psychological dependence on them (**addiction**).

addiction Physical or psychological dependence on a substance, such that increasing quantities must be taken to produce the desired effect and withdrawal produces adverse physiological and psychological effects.

They grow accustomed to having the substance in their system and need increasing quantities to produce a desired effect. If they try to stop, addicts experience intense cravings and severe physiological and psychological reactions (Bronson, Swift, & Peers, 2005; Pennay & Lee, 2011). Teenagers who are impulsive and disruptive, perform poorly in school, find little value in education, and have family members with mental illness or substance-abuse problems, are especially at risk for becoming dependent on alcohol and drugs (Chassin et al., 2004; Kassel, Weinstein, Skitch, Veilleux, & Mermelstein, 2005).

Children and adolescents are less likely to engage in health-compromising behaviours when they have constructive alternatives for their leisure time.

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Unsafe sexual activity. Teenagers get mixed messages about the advisability of sexual activity. Adults often advocate waiting till they are older, yet peers may mock those who do not participate. While schools offer curriculum support, there is little evidence that it helps students avoid many of the difficulties (Goldman, 2010; Hillier & Mitchell, 2008; Ministry of Education, 2018).

At Year 12, half of Australian teens have had vaginal intercourse, rising from a third in Year 11 and a quarter in Year 10, and 23 per cent of sexually active youth had sex with more than three partners in the previous year. A quarter reported unwanted sex because of being drunk, being influenced by a partner, or out of fear; and almost as many males reported this as females. Among the sexually active, use of contraception was far from universal (A. Mitchell et al., 2014).

Some 70 per cent of girls and 91 per cent of boys report using pornography to gain ideas on how to have sex (Lim, Agius, Carrotte, Vella, & Hellard, 2017; Sauers, 2007). A growing problem is 'sexting'—adolescents and some children sending nude or semi-nude pictures of themselves, often in provocative poses, to 'friends' via electronic media. Not only can these images be transferred to others for whom they were not intended, but increasing numbers are being charged with child pornography offences (Svantesson, 2011; SWGFL/UK Safer Internet Centre, University of Plymouth, Netsafe New Zealand, & Office of the eSafety Commissioner, Australia, 2017; Victoria Legal Aid, 2018). From the perspective of physical health, early sexual activity is problematic because it can lead to sexually transmitted infection, pregnancy, or both.

- **Sexually transmitted infection.** Sexually transmitted infections (STIs) vary in severity and prevalence. Bacterial STIs like chlamydia, syphilis and gonorrhoea can be treated with antibiotics, but teens do not always seek prompt medical help when they develop symptoms. Viral STIs, like HIV, genital herpes, genital warts, hepatitis and others, are not curable but the effects can be reduced by appropriate medication. Without treatment, STIs can generate serious problems, including infertility and sterility, heart problems, and birth defects in future offspring (Miller, 2018).
- **Pregnancy.** The teenage pregnancy rate is at a historically low rate of 2.2 per cent in Australia and 2.4 per cent in New Zealand; in both countries, figures on abortion rates vary widely but are generally held to be at historically low levels (National Institute of Demographic and Economic Analysis, n.d.; Pregnancy Outcome Unit, SA Health, 2018). The rates are much higher in disadvantaged areas and among Indigenous girls, those with less education, and those with a family history of teenage pregnancies, abuse and neglect (Marino, Lewis, Bateson, Hickey, & Skinner, 2016).

  When mothers have not fully matured physically, and especially when they lack adequate nutrition and healthcare, they are at greater risk for medical complications before, during and after delivery (Socolov et al., 2017; Straton & Stanley, 2017). Teenage mothers have poorer educational and employment outcomes, are more economically disadvantaged,

have more health problems than other adolescent girls, and may be alienated from family and peers, including the biological father.

Addressing health-compromising behaviours. Educational and community organisations can do a great deal to address behaviours that put children and adolescents at physical risk. We offer a few thoughts on appropriate support:

- *We provide healthy options for free time.* Children and adolescents are less likely to engage in health-compromising behaviours when there are better alternatives. Community leaders can advocate for youth centres, volunteer for sports clubs and sponsor public service programs for young people. For example, Operation Flinders, a South Australian charitable program for young offenders and young people at risk, has for 25 years taken participants aged 14 to 18 years on an eight-day wilderness adventure in the arid Flinders Ranges, allowing them to disentangle from their past and gain skills needed to become valued members of the community. In 2016–17, 418 adolescents lived out and slept on the ground, prepared their own food, navigated through remote and rugged wilderness, and learned the values of teamwork and respect. The program has been sufficiently effective to win an award from UNESCO and an Australian Crime and Violence Prevention Award (Operation Flinders Foundation, 2018).
- *We ask adolescents to prioritise their long-term goals.* Teens need personally relevant reasons to avoid drugs and make wise sexual choices. Firm long-term goals and optimism about the future help them resist destructive peer and media pressure.
- *We prevent problems.* It is much easier to teach children and adolescents to decline cigarettes, alcohol and drugs than to treat dependence. One important approach is a 'no tolerance' policy on school grounds, in out-of-school programs and in community centres. Children are less likely to smoke, drink or take drugs if they think they might be caught (Voelkl & Frone, 2000). Programs that strive to change *behaviours* seem to work better than scare tactics, information about the detrimental effects, or attempts to enhance self-esteem. Behavioural programs provide strategies for solving social problems, coping with anxiety and resisting pressure to conform.
- *We implement programs that have demonstrated success.* The programs that educators implement are determined largely by their professional responsibilities and the needs of adolescents with whom they work. For instance, one effective drug prevention program for young athletes was developed by coaching staff in the Forest Hills School District in Cincinnati, Ohio (see Figure 5.9). This program enlists participation by school coaches, principals and staff, team captains, parents and the adolescents themselves. Coaches speak openly and often with athletes about substance use. Peer pressure is used to discourage alcohol and drug use. There are defined consequences for athlete rule-breaking, but associated with hope that they will comply in future (US Drug Enforcement Administration, 2002).
- *We seek help for any who have become dependent on drugs or alcohol.* Teachers and other practitioners can raise concerns with parents and counsellors knowing that various forms of treatment, including medication, counselling and residential programs, can help manage painful withdrawal and support resistance in the future. Some adolescents go through treatment voluntarily, whereas others are required by families and court orders to participate. Relapses in drug and alcohol use are relatively common and signify the need for additional intervention.
- *We encourage adolescents to protect themselves.* Approaches to preventing pregnancy and transmission of STIs among adolescents are somewhat controversial. Programs that encourage sexual abstinence can be effective for individuals if reinforced by cultural, religious or familial values (A. Mitchell et al., 2014), but otherwise appear to be relatively ineffective over the long term (Dreweke & Wind, 2007). Having condoms available may increase condom use for students who are already sexually active (offering protection against some STIs), but use is inconsistent, in part because of interpersonal factors (e.g. reluctance to ask a partner to use one) and

Student's Pledge

As a participant in the _____ High School Athletic Program, I agree to abide by all training rules regarding the use of alcohol, tobacco, and other drugs. Chemical dependency is a progressive but treatable disease, characterized by continued drinking or other drug use in spite of recurring problems resulting from that use. Therefore, I accept and pledge to abide by the training rules listed in the athletic handbook and others established by my coach. To demonstrate my support, I pledge to:

1. Support my fellow students by setting an example and abstaining from the use of alcohol, tobacco, and other drugs.
2. Not enable my fellow students who use these substances. I will not cover up for them or lie for them if any rules are broken. I will hold my teammates responsible and accountable for their actions.
3. Seek information and assistance in dealing with my own or my fellow students' problems.
4. Be honest and open with my parents about my feelings, needs, and problems.
5. Be honest and open with my coach and other school personnel when the best interests of my fellow students are being jeopardized.

Student _____ Date _____

**PARENTS: We ask that you co-sign this pledge to show your support.

Sample Letter from Coach to Parent about a Drug or Alcohol Violation

Dear Parent:

Your daughter _____ has violated the _____ High School extra-curricular activities code of conduct. She voluntarily came forward on Thursday afternoon and admitted her violation of the code, specifically, drinking alcohol. The code is attached.

We respect her honesty and integrity and hope you do as well. Admitting a mistake such as this is very difficult for her. Not only does she have to deal with authorities such as us, she must face you, her parents, as well as her peers—which is probably the most difficult. We understand that no one is perfect and that people do make mistakes. Our code, and the resulting consequences of violating the code, is a nationally recognized model and is designed to encourage this type of self-reporting where the student can seek help and shelter from guilt without harsh initial penalties. She has admitted to making a mistake and is willing to work to alleviate the negative effects of the mistake.

As you can see in the enclosed code, we require that your daughter complete 10 hours of drug and alcohol in-service education and counseling. In addition, she must sit out 10 practice days of competition. She is still part of the team and must attend practices and competition; she is just not allowed to compete or participate in games for 10 days.

We hope you understand and support our effort to provide a healthy athletic program for the students. If you have any questions, please call either one of us at the high school.

Sincerely,

FIGURE 5.9 Team Up drug prevention materials from high school athletic coaches.

Source: From US Drug Enforcement Administration (2002). Team Up: A drug prevention manual for high school athletic coaches. *Washington, DC: US Department of Justice Drug Enforcement Administration.*

situational factors (e.g. impaired judgment due to alcohol or drugs) (East, Jackson, O'Brien & Peters, 2007).

Messages to adolescents need to be tailored to the current risks they face. Adolescents who have not yet been sexually intimate can be encouraged to resist social pressures towards sexual activity. Those who are sexually active need advice on how to avoid STDs and unwanted pregnancies.

- *We explain the risks involved in sexting.* We explain to girls in particular that although intended only for an existing or potential 'boyfriend', many images end up widely distributed. We warn adolescents that distributing such images, personally or online, constitutes a serious criminal offence. In Australia, for example, 'Possessing, controlling, supplying or obtaining child pornography material for use through a carriage service' is illegal under Division 474.20 of the *Crimes Legislation Amendment (Telecommunications Offences and Other Measures) Act (No. 2) 2004*, scheduled under the *Criminal Code Act 1995* (Australian Government, 2018). The law makes no distinction between sexting and more heinous sexual crimes such as paedophilia.
- *We encourage adolescents with STDs to abstain from sex or to take precautions.* Many adolescents are already infected with STDs. They need medical treatment and encouragement to prevent the further spread of the infection. If they remain sexually active, precautions are essential. Unfortunately, teenagers are not always prepared to hear such messages. For instance, although estimates vary and there is a dearth of recent statistics, in the United States perhaps 40 to 70 per cent of HIV-infected teenagers engage in unprotected sex (Belzer et al., 2001; Murphy et al., 2001).

The four areas we have discussed in this section all have major effects on children's physical development. In the *Observation guidelines* table 'Assessing health behaviours of children and adolescents' (overleaf) we identify characteristics and behaviours that bear on quality of health. (Practitioners should never draw inferences about health or provide treatment for which they are not qualified.)

We turn next to children with special physical needs, and practices that can help these children achieve their full potential.