

Introductory Kinesiology, Grade 12

University Preparation

PSK4U

This course focuses on the study of human movement and of systems, factors, and principles involved in human development. Students will learn about the effects of physical activity on health and performance, the evolution of physical activity and sport, and the physiological, psychological, and social factors that influence an individual's participation in physical activity and sport. The course prepares students for university programs in physical education and health, kinesiology, health sciences, health studies, recreation, and sports administration.

Prerequisite: Any Grade 11 university or university/college preparation course in science, or any Grade 11 or 12 course in health and physical education

A. PHYSICAL ACTIVITY AND SPORT IN SOCIETY

OVERALL EXPECTATIONS

By the end of this course, students will:

- A1.** demonstrate an understanding of how the social and cultural significance of physical activity and sport has evolved historically, and analyse current social issues relating to physical activity and sport;
- A2.** demonstrate an understanding of the individual and social benefits of participation in physical activity and sport and the factors that enable and constrain participation.

SPECIFIC EXPECTATIONS

A1. Social Change and Current Issues

By the end of this course, students will:

- A1.1** describe how the role of physical activity and sport in society has evolved historically, with reference to key events and trends, changing views of the social role and value of physical activity and sport (*e.g., physical activity as a requirement for meeting basic survival needs, sport as military training, athletic competition as an end in itself, emergence of health and physical education as part of the school curriculum, recognition of physical activity and/or sport as an essential foundation for personal lifelong fitness, recognition of physical literacy as an essential foundation for living a healthy active life*), and the contributions of individuals, including prominent Canadians

Teacher prompt: “Physical activity and sport have been a part of human culture from very early times, but their role in society has varied considerably. Reasons for participating in sport, apart from just having fun, have included status and prestige (both for individuals and their societies), military training, the building of character and leadership skills in youth, and monetary reward. How has the role of sport in society changed over the past century?”

Students: “Personal fitness and health have become key reasons for lifelong involvement in physical activity and sport.” “Sport and physical activity have become an important part of education. Schools have played a leading role in the development of many sports and their rules.” “Over the past century, there has been a strong trend towards the professionalization of sport and the development of sport as a business.” “There has been increasing recognition of the importance of incorporating physical activity into daily life by doing such things as taking the stairs instead of the elevator or using active instead of sedentary transportation.”

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Teacher prompt: “The North American Indigenous Games (NAIG), which are held every three years, celebrate a legacy of sport among North America’s First Peoples that goes back thousands of years. Historical records indicate that many modern team sports were derived from traditional indigenous games. In addition to celebrating this legacy, the games also promote the development of personal and social values. What qualities can be developed through sport and physical activity that are valuable throughout life?”

Student: “Sport and physical activity can help young people develop many qualities that have lifelong benefits. These include honesty, courage, respect for others, a desire for personal excellence, the ability to work with others, and gratitude for the guidance of parents, elders, and communities.”

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Teacher prompt: “The history of sport and physical activity in Canada has been shaped by the contributions of Canadians from many different backgrounds. Can you name some individuals who have become prominent as a result of their athletic achievements or their contribution to the development of sport and physical activity in Canada?”

Students: “Tom Longboat from the Six Nations community of Ohsweken, Ontario: he was one of the greatest distance runners in the world in the early 1900s.” “Dr. James Naismith, from Almonte, Ontario: he invented basketball.” “The women of the Edmonton Grads basketball team: Dr. Naismith called them ‘the finest basketball team that ever stepped on the floor’.” “Terry Fox: after losing a leg to cancer when he was a university student in B.C., he attempted to run across Canada to raise money for cancer research. His example has inspired many people to participate in fundraising runs for cancer research and other causes.” “World champion freestyle skier Sarah Burke: her advocacy for freestyle skiing contributed to the inclusion of the half-pipe event in the 2014 Olympic Games.” “Philippe de Gaspé Beaubien: he’s a businessman from Montreal who founded ParticipACTION, an organization that has encouraged many Canadians to become more physically active.” “Joyce Fairbairn, a senator from Alberta: she’s one of the founders of Friends of the Paralympics, which has helped to ensure that Canadian paralympic athletes are able to compete at the highest levels of their sports.”

- A1.2** analyse selected social issues of current significance relating to physical activity and sport (e.g., more sedentary lifestyles, rising obesity rates, increased health care costs, violence in sport, cheating in sport, cost as a barrier to participation in physical activity and sports programs, early specialization versus participation in multiple sports for children and youth, inclusive versus specialized sports programs for persons with special needs)

Teacher prompt: “The concepts of fair play and playing for the spirit of the game are commonly emphasized in organized sport. Despite the fact that these messages are well communicated, there continue to be athletes, coaches, and parents who want to win at all costs. This attitude encourages violence and cheating in sport. Think about the lessons learned and the personal growth that can be achieved through participation in sport and physical activity: for example, the development of self-awareness, of interpersonal and communication skills, and of the ability to set goals and/or work as a member of a team. Now consider the notion of winning at all costs. What impact is this having on sport at all levels in our society? What are young children learning? How might this affect involvement in sport? What is the purpose of sport, and what is lost if fair play is not embedded in what we learn through involvement in sport? How might society change its views on the ‘winning at all costs’ attitude?”

- A1.3** describe the scope of physical activity and sport in today’s economy (e.g., economic activity related to professional or recreational sports, tourism, sporting goods and outdoor activity equipment, media, instructional services, facilities), and identify a wide range of career opportunities in related fields (e.g., fitness instructor, health and physical education teacher, health promotion specialist, kinesiologist, physiotherapist, athletic therapist, sports professional, outdoor recreation instructor, wilderness guide, event organizer, dancer, choreographer, sports marketing specialist, fitness trainer, community recreation programmer or leader, holistic health practitioner)

- A1.4** analyse the impacts on individuals and society of business involvement in physical activity and sport (e.g., sponsorship of amateur teams and events, professionalization of sport, increased/decreased participation, changes in availability of facilities, dependence on advertising and sponsorship money, influence of endorsements by professional athletes, need for consumer awareness)

Teacher prompt: “Business is involved in almost every aspect of sport, from professional leagues to community sports. While business provides the money that makes many community physical activity and sports programs possible, it also has a focus on profitability and influences our habits as consumers. Examine examples of business sponsorship of teams and facilities in your own community. What is the relationship? Who benefits from these relationships, and what is the impact on sport and physical activity in the community?”

Student: “In our community, a soccer league for young children is sponsored by a local business. This subsidizes the costs of uniforms and facilities and thus makes the sport accessible to most of the children who want to play. In return, the business gets publicity that will help it attract and keep customers.”

A2. Participation – Influences and Benefits

By the end of this course, students will:

- A2.1** describe factors that influence participation in physical activity and sport (e.g., built environment, demographics, technology, social trends, social and cultural norms, role models, environmental conditions, personal perceptions of physical activity, motivation and perceptions of one’s own capabilities, physical and health literacy)

Teacher prompt: “The built environment is that part of our surroundings that has been constructed by humans. It is where most of our activities take place. A city is a built environment. So is a cabin in the woods or a farm. A growing body of evidence suggests there is a relationship between the built environment and physical activity, rates of obesity, and heart disease and stroke. How can the characteristics of a built environment affect physical activity rates and the health of a community? What can be done to make a community’s built environment healthier?”

Student: “A built environment that offers lots of opportunities for physical activity and makes active transportation safe, practical, and attractive is likely to encourage people to be more active and will help to improve their health. Ensuring that neighbourhoods have adequate, well-lit sidewalks and accessible bike paths and parks, for example, will help to make the community more active and healthier.”

- A2.2** analyse the role of social and cultural factors (e.g., sex, racial and ethnic background, socioeconomic status, age distribution, range of abilities within the population) in determining access to physical activity and sports programs

Teacher prompt: “Efforts to increase opportunities for women and girls to participate in physical activity and sport have increased considerably over the past few decades and have had considerable success, as seen in 1996, when, for the first time, there were more women than men on the Canadian Olympic team. However, there are still hurdles to overcome before gender equality is achieved. What are the societal factors that have made physical activity and sport less accessible for women and girls? What has changed and what has driven the movement to make these changes? What might be done to achieve not only greater gender equality in physical activity and sport but also greater equality of access to physical activity and sports programs for everyone? Think of a group whose access to physical activity or sports opportunities is limited in comparison to other groups in the population, and suggest ways in which their access could be increased.”

A2.3 describe the benefits of school and community physical activity and sports programs for themselves and for society (*e.g., increased opportunity for participation; increased fitness and better overall health; decreased stress, higher self-esteem, better mood, and generally improved mental health and well-being; better cognitive functioning; better school spirit; increased community cohesion; lower crime rates; lower health care costs; better workplace performance; decreased absenteeism*)

Teacher prompt: “With rates of inactivity and obesity rising among some children and youth, the role of schools, communities, and governments in promoting healthy, active living is becoming increasingly important. A healthy school has a learning environment that promotes and supports not just academic success but also the development of the whole child and student – cognitively, emotionally, socially, and physically. Think about a school that provides multiple opportunities for healthy and inclusive activity, with a wide range of health and physical education courses, many intramural programs, and a broad choice of school sports. What impact would this have on you personally? How would it affect others in the school? What would the overall impact be on the well-being of your school community? What insights do your conclusions provide about the benefits and importance of having healthy schools in our community?”

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Teacher prompt: “The Canadian Physical Activity Guidelines for Youth provide recommendations about how much physical activity is generally needed to achieve health benefits. How can school courses and activities and community programs help young people achieve the recommended standards in these guidelines?”

Student: “The guidelines provide information about the different types of activity you need – moderate to vigorous activity, strength-building activity, and general daily activity – as well as the amount. The amount and kind of activity you get at school will depend on the courses you are taking and the activities that you are involved in. For most people, these will provide part but not all of the activity they need. Community programs can provide additional activities, and there are also many ways of being more active at home. The important thing is to look at everything you do and take advantage of opportunities to be physically active at school, at home, and in the community.”

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Teacher prompt: “Canada also has guidelines for sedentary behaviour, which provide recommendations to Canadian children and youth on how they can reduce health risks by limiting sedentary behaviour during their free time. What can you do to limit sedentary behaviour?”

Student: “You can begin by monitoring your recreational screen time, as well as other sedentary activities, such as riding in cars and buses. Look at the amount of time you spend indoors throughout the day too, because that may involve a lot of sitting. You can then make decisions about substituting active alternatives, such as doing things outdoors, participating in school or community recreation programs, or using active transportation – for example, walking or biking to get where you want to go.”

B. THE BASIS OF MOVEMENT

OVERALL EXPECTATIONS

By the end of this course, students will:

- B1.** describe the structure and function of major body systems involved in human movement, and demonstrate an understanding of related anatomical and physiological concepts and theories;
- B2.** demonstrate an understanding of and assess factors that affect performance during human movement.

SPECIFIC EXPECTATIONS

B1. Anatomy and Physiology

By the end of this course, students will:

- B1.1** use correct anatomical terminology to describe human movement (*e.g., anatomical position, body planes and axes, basic movement terms such as flexion and extension, terms pertaining to body position such as anterior and superior*)

Teacher prompt: “Watch a class member perform a movement such as skipping, doing sit-ups or crunches, touching their toes, picking up a book, or doing a triangle pose in yoga. Using your own words, describe the movement to the class. Listen to other class members’ descriptions. What do you notice about these descriptions?”

Student: “Although the same movement is being described, different people use different words to get their meaning across, and we don’t get a consistent picture of how the movement was actually performed.”

Teacher: “How does using standardized anatomical and movement terminology resolve this problem?”

Student: “When we use standard anatomical terminology, we use terms that have very specific and precise meanings. They mean the same thing to everyone who uses them. By using standard terminology, we make it easier to describe things accurately and consistently. The anatomical position, for example, gives us a common starting point for describing the location and movement of bones and muscles, and anatomical terms always have the same meaning.”

- B1.2** identify the major muscles and bones of the musculoskeletal system (*e.g., according to their location, origin and insertion, structure, function*), and describe the ways in which they interact to create movement (*e.g., flexion, extension, adduction, abduction*)

Teacher prompt: “Think about the ways in which skeletal muscles and bones work together to allow for movement in everyday activities as well as physical activities. In order to understand the effects of origin and insertion on joint movement, consider one or two of the major muscles or muscle groups and describe how the muscle originates proximally and inserts distally to cause a movement at the joints that are crossed. What types of movement does this create, and what are some actions that involve the use of these movements?”

Students: “The quadriceps muscle group consists of four muscles that insert on the tibia. Three originate on the femur. The fourth crosses on the anterior side of the pelvis. Because of this arrangement, the quadriceps muscles are able to create the movement of flexion at the hip and extension at the knee. We use these movements when kicking a soccer ball.”
“The biceps muscle originates in the shoulder joint area and inserts on the radius. It is

one of the muscles that produce flexion at the shoulder joint, which allows for raising the arm above the head, as in a tennis serve. This also produces flexion at the elbow joint, which allows the bending of the elbow in a tennis serve, as well as in everyday movements such as lifting an object or scratching your head.”

- B1.3** demonstrate an understanding of the articular system (*e.g., function, components, types of joints and their advantages and disadvantages, joint mechanics*), and explain the role of different kinds of joints in facilitating movement (*e.g., the elbow as a hinge joint allows for flexion and extension as seen in a biceps curl or a chest pass in basketball; the shoulder as a ball-and-socket joint allows for various movements such as abduction and adduction as seen in a butterfly stroke, flexion and extension as seen in bowling a bocce ball, and medial and lateral rotation as seen in a forearm tennis stroke*)

Teacher prompt: “The articular system joins the different parts of the skeleton together and allows or restrains movement. Individual joints are described and classified by three qualities: the amount of movement permitted by the joint, the structure of the joint, and the location of the joint. Consider the role of joints within the human body and how they allow for movement in a particular way. How would changing the ankle joint from a hinge to a ball and socket affect the stability of the joint? How would it affect your ability to move the joint? Would you be able to walk or run? What impact would this have on the movements that you are able to do with your body?”

- B1.4** explain the chemical and physical processes involved in muscle contraction, as described by the excitation-contraction coupling theory and the sliding filament theory (*e.g., the role of neurotransmitters and calcium ions in stimulating contraction, of adenosine triphosphate [ATP] in providing energy for contraction, and of myosin and actin in producing contraction*), and describe how skeletal muscles work to create movement (*e.g., the role of agonistic and antagonistic muscle pairs and concentric and eccentric contractions in controlling movement; the role of differences in muscle fibre types and recruitment sequence in controlling contraction strength*)

Teacher prompt: “Muscle fibres differ in their speed of contraction and resistance to fatigue. The pattern in which the fibres are recruited varies with the amount of force that the muscle has to produce. In what order are the fibres recruited?”

Student: “The slow fibres are always recruited first and then the faster fibres are recruited as more force is needed.”

- B1.5** describe the three energy systems (*ATP-PC [adenosine triphosphate phosphocreatine], anaerobic, and aerobic*), and explain their contribution to muscle contraction and energy production during physical activity of different intensity and/or duration (*e.g., the ATP-PC system is used for high intensity activities of very short duration [up to approximately ten seconds] that require short bursts of energy; the anaerobic system is used for moderate to high intensity activities of moderate duration [up to thirty to fifty seconds]; and the aerobic system is used for lower intensity activities of longer duration [more than two minutes]*)

Teacher prompt: “Pick an activity such as walking, wheeling, yoga, distance running, squash, cricket, soccer, badminton, or ice hockey, and consider how the intensity of the activity and a person’s energy needs might change throughout the activity. In ice hockey or sledge hockey, for example, how do variations in the intensity of activity determine which energy system is used? Which system is predominant, and how do the other two systems contribute to overall performance?”

Student: “While all energy systems are always in use during an ice hockey or sledge hockey game, the anaerobic system is the predominant source of the energy that a player would need for a forty-five-second shift. Within that shift the player may need the ATP-PC system for a sprint to the puck. The player’s ability to sustain activity for the entire game would rely on the capacity of the aerobic system to produce ATP.”

- B1.6** explain how the cardiorespiratory system contributes to the functioning of working muscles (e.g., blood transports oxygen and energy-providing nutrients, like glucose, to working muscles and removes waste products, heat, and carbon dioxide from them; enhanced ability of cardiorespiratory system to transport oxygen helps to raise the anaerobic threshold and increases aerobic capacity, thus increasing muscular endurance)

Teacher prompt: “Think about an occasion when you experienced muscular fatigue while performing a physical activity, or when you felt an inability to move particular muscles properly for a certain length of time, or felt a burning sensation in your leg muscles when exercising strenuously. Although your cardiorespiratory system was working to transport the oxygen and nutrients required for you to perform the activity, you felt too tired to continue. This feeling is known as short-term fatigue; we sometimes describe it as ‘hitting the wall’. What causes it?”

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Teacher prompt: “Muscle pain and soreness that might be felt after physical activity is known as long-term fatigue and can linger and limit performance for days. This may be due to delayed onset muscle soreness (DOMS). What causes DOMS? How might you prevent it from occurring?”

- B1.7** describe the acute and chronic effects of physical activity on the human body (e.g., **acute:** increased endorphin levels, increased heart rate and breathing frequency, increased stroke volume and cardiac output; **chronic:** muscular hypertrophy, increased cardiorespiratory endurance, increased muscle strength)

B2. Human Performance

By the end of this course, students will:

- B2.1** describe basic training principles (e.g., specificity, overload, progression, reversibility), and explain how various training methods (e.g., circuit training, cross-training, strength training, fartlek training, interval training) can be used to enhance individual health-related fitness or athletic performance (e.g., identifying and applying the training methods and principles that are best suited to achieving specific fitness, health, or physical activity goals; avoiding overtraining and ensuring proper recovery to prevent injury)

Teacher prompt: “Training can make the body work more effectively. Many different training options are available. The choice of options will depend on the objective, whether it is simply improving individual fitness, improving skill or game ability in a sport, or improving performance and effectiveness in the workplace. By using selected training principles as a framework, an individual training program can be designed to achieve specific goals. To make the body work more effectively, a training program increases the load or demand on various muscle groups or body systems to produce a physiological response that will increase the desired aspects of health-related fitness, such as cardiorespiratory endurance, muscular strength, muscular endurance, or flexibility. Select a physical activity, a sport, or a fitness goal, and decide which training principles and methods would provide the most effective basis for a training program for participants in that sport or activity or for an individual wanting to achieve a personal fitness goal.”

- B2.2** describe intrinsic and extrinsic factors that can affect performance during physical activity (e.g., **intrinsic:** motivation, experience, self-efficacy, imagery/visualization, fatigue, goal-setting; **extrinsic:** environmental conditions such as altitude and weather)

Teacher prompt: “Environmental factors can have a significant effect on performance. Higher altitudes, for example, can both inhibit and improve performance. In 1968, when the Olympics were held in Mexico City, records fell at unprecedented rates, mainly

because the city's average elevation is more than 2200 metres, and the thin air provided much less resistance to runners' bodies or to thrown objects like javelins. Performance declined, however, in the long-distance running events, because the lower concentration of oxygen limited the aerobic capacity of the athletes. Consider some other examples of environmental factors, and explain what effects they can have on performance and why."

Students: "The weather can affect your performance either positively or negatively. For example, a tailwind will improve a cyclist's performance, but a headwind will impair it." "Extreme heat makes it more difficult for the body to cool itself and maintain a constant temperature, so prolonged exertion becomes more stressful, performance diminishes, and the danger of heat exhaustion or heat stroke increases. High humidity, which limits evaporation, reduces the cooling effect of sweating and adds to heat stress. Heavy sweating may result in a reduction of cardiovascular capacity as a result of fluid loss."

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- B2.3** describe the role of nutrition in supporting physical activity (*e.g., healthy nutrition maintains the nutrient balance needed to meet daily activity requirements; macronutrients provide energy and build muscle; micronutrients and hydration help the body function effectively*), and assess the nutritional needs of individuals or specific groups within the population in relation to their activity levels

Teacher prompt: "Compare the dietary needs of a person who is active and healthy, a person who would be considered sedentary, and a person who is a competitive athlete. What would each person need to consider in order to maintain a good balance between food intake and his or her daily energy needs? How do Canada's Food Guide and Canada's Food Guide – First Nations, Inuit and Métis help us identify the kinds and amounts of food that are needed for the body to function most effectively at a certain level of activity? What are the most important factors to consider?"

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- B2.4** assess the effects of various ergogenic (performance-enhancing) methods, substances, and equipment on human performance (*e.g., nutritional aids, such as caffeine or herbal supplements; pharmacological aids, such as anabolic steroids or pain-masking drugs; physiological aids, such as blood doping; psychological aids, such as relaxation or meditation; mechanical aids, such as performance-enhancing equipment*)

Teacher prompt: "People wanting to improve their physical performance sometimes turn to performance-enhancing methods, substances, or equipment known as 'ergogenic aids'. Some of these are legal, but others are illegal or banned from use in competition. Some may not give the performance boost that is claimed for them, and some may also be detrimental to human health. What criteria should be used to determine the appropriateness of using an aid to increase performance?"

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Teacher prompt: "Recent advances in prosthetic technology are now making it possible for athletes with physical disabilities to match the performance of able-bodied athletes, but questions have also been raised about whether prostheses provide a competitive advantage. In 2014, for example, Paralympic athlete Markus Rehm won the German long-jump championships but was excluded from participating in the European Athletics Championships on the grounds that his prosthesis enhanced his performance.

"Identify some recent technological advances that are now being used in various physical activities and sports, and assess their effectiveness, impacts, and implications. Do they actually increase performance? By how much? Do they require any changes in the way that the activity is performed? Do they have any physical side effects? Do they make physical activity and sports more accessible and inclusive for people with physical disabilities?"

C. BIOMECHANICS AND MOTOR DEVELOPMENT

OVERALL EXPECTATIONS

By the end of this course, students will:

- C1.** demonstrate an understanding of the phases of movement and of physical laws and biomechanical principles related to improving movement;
- C2.** demonstrate an understanding of human growth and motor development, and apply it to the design of age-appropriate movement activities and to the enhancement of movement skills.

SPECIFIC EXPECTATIONS

C1. The Mechanics of Movement

By the end of this course, students will:

- C1.1** explain basic laws and concepts of physics that relate to human movement (*e.g., the concept of force and its relationship to motion, Newton’s three laws of motion, types of motion, levers and the law of levers*)

Teacher prompt: “Newton’s laws of motion describe how the forces acting on a body determine its motion. There are three of these laws: the law of inertia, the law of acceleration, and the law of reaction. Identify and describe an example of each of Newton’s three laws of motion, and then explain how each law can be applied to human movement.”

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Teacher prompt: “Levers reduce the amount of effort that is needed to move something. In the human body, levers formed by our muscles and joints play a critical role in our ability to move. There are three types of levers. A class I lever has its fulcrum (the pivot point) between the force and the load. A class II lever has the fulcrum and force at opposite ends and the load in the middle. In a class III lever the fulcrum and load are at opposite ends and the force is applied in the middle. Think about an everyday activity (*e.g., nodding your head, walking up stairs, shovelling snow*), identify the type of lever that is used, and explain how that particular class of lever causes the desired movement. What type of lever is most commonly found in our bodies?”

Student: “When I’m shovelling snow, the loaded snow shovel is at the end of my arm, and my elbow joint acts as the fulcrum. The force required to lift the snow is generated by my biceps muscle and applied to my forearm, thus lifting the shovel upwards. Because the force is applied between the fulcrum and the load, this is a class III lever. This is the most common type of lever in the human body.”

- C1.2** describe the biomechanical principles that govern stability and human movement (*e.g., stability, maximization of force, linear motion, angular motion*), and explain how they can be applied to improve a movement or skill

Teacher prompt: “In the 1968 Olympics in Mexico, Dick Fosbury, an American high jumper, won the gold medal and set a new world record using a technique that had never been tried before. Until then, high jumpers traditionally cleared the bar while remaining head up, first throwing one leg over the bar and then the other (straddle style). Instead, Fosbury twisted and arched his body so that he went over head first, with his back next to the bar. Jumpers using the straddle technique had to generate enough energy on take-off to get their centre of mass over the bar, but with the Fosbury technique the jumper’s centre of mass actually stayed underneath the body and passed under the bar. By using the Fosbury flop, jumpers could thus clear a greater height using the same amount of energy they would have needed to clear a lower height with the straddle technique.

“Think of some advanced skills and techniques that have been developed in other sports: for example, the jump serve in volleyball, the bent arm pull in swimming, and quad jumps in figure skating. How has an improved understanding of biomechanical principles helped in creating these techniques? How can the understanding of these principles improve skill execution in any physical activity?”

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- C1.3** use appropriate laws of physics and/or biomechanical principles (*e.g., Newton’s third law of motion, principles of maximization of force and angular motion*) to analyse and improve the effectiveness or quality of a movement pattern used in a physical activity (*e.g., sprint start in track or swimming, overhead pass in volleyball, pirouette in a dance sequence*)
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- C1.4** apply their knowledge of the phases of movement to analyse movement patterns and enhance skill development in a variety of physical activities

Teacher prompt: “In a golf or field hockey swing, the backswing of the club or stick from the starting position occurs during the preparatory phase, the forward drive and moment of contact between the ball and the club or stick occur during the execution phase, and the decelerating motion of the club or stick after striking the ball occurs during the follow-through phase. Pick a movement in a physical activity that you are familiar with, and explain what happens in each of the phases of that movement when you perform it. How does knowing the phases of movement help you improve your technique in an activity?”

C2. Growth and Motor Development

By the end of this course, students will:

- C2.1** identify the stages of human growth and development from infancy to adulthood, and describe the factors (*e.g., heredity, nutrition, physical activity, physical and social environment*) that affect physical growth and motor development

Teacher prompt: “Reflect on your own life to this point and think of some of the factors that have influenced your growth and development. How do factors such as heredity or nutrition affect your growth and development? Consider also factors in your physical and social environment, such as clean air and water, access to medical care, and opportunities for leisure and recreation, that might affect your overall development. Select a stage of development – infancy/toddlerhood, childhood, puberty/adolescence, early adulthood, or late adulthood – and identify the factors that have the most important effects on physical growth and motor development within that particular stage.”

- C2.2** demonstrate the ability to design a movement-based activity appropriate to a particular age and stage of development

Teacher prompt: “In creating developmentally appropriate activities for a child, we need to consider the frequency, intensity, duration, and type of activity that will lead to optimal growth and development. The physical, cognitive, and social demands placed upon an individual child need to be suitable for his or her abilities and stage of development. It is also important to keep in mind that a stage of development can also include different phases. For example, in childhood, the fundamental movement stage of movement skill acquisition, which usually occurs between ages two and seven, includes two phases (rudimentary and fundamental) whose onset and duration can vary greatly, depending on the personal developmental factors affecting each child.

“How would you apply knowledge about what is developmentally or individually appropriate to the development of an activity for a particular age group, such as five-year-olds or eleven-year-olds, or for individuals with different abilities, such as those whose sight or hearing is impaired or who have other physical disabilities?”

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- C2.3** describe the stages of psychomotor learning (i.e., cognitive, associative, autonomous) and the role of feedback and transferability (e.g., *similarity of the ready position in basketball to that in cricket and field hockey*) in facilitating skill acquisition

Teacher prompt: “In the cognitive stage, an individual who is learning a skill is mainly trying to understand what the skill involves and what he or she has to do to perform it. In the associative stage, the learner is trying to put all of the different components of the skill together and perform them smoothly. The emphasis at this point is on practice, and feedback is particularly important as the person tries to refine the components of the skill and combine them efficiently. Individuals who reach the autonomous stage – and many do not – can perform the skill expertly and automatically, without having to think about how to do it.

“Transferability is the ability to take skills that you learned in one activity and apply them to another. It makes it easier for you to learn new activities because you don’t have to start from scratch. You are already past the cognitive stage for some of the skills you need. Suppose you are learning to serve a tennis ball, and you are already good at throwing a baseball (or a softball or cricket ball). What does an overhand throw in baseball have in common with serving a tennis ball? Which of the skills that you use in throwing a baseball would you also use in making a tennis serve? Are there any skills that you use in throwing a baseball that won’t help you serve a tennis ball? Does serving a tennis ball require any additional skills that you have not already learned in throwing a baseball?”