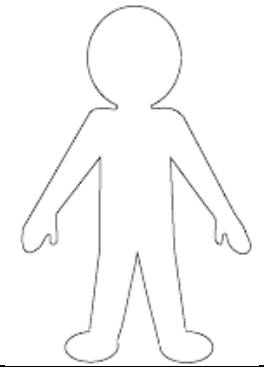
GROWING UP

Ages 8 to 10 years (Level 2)

Description:	Learners will explore the human body including movements of the skeletal structure, organs, exploring the five senses, doing some physical activity and observing some of our magical bodily functions
Leading question:	How do we change as we grow?
Age group:	8 – 10 years
Subjects:	Biology (Science), Physical Exercise, Art and Design
Total time required:	~5 hours over 5 days
Self-guided / Supervised activity:	Medium Supervision
Resources required:	Paper and Pen, cloth or water and flour, toothpick or straw, small glass object, balloon (optional)

Day	Time	Activity and Description
1	15 minutes	Learners will explore their body and its functions with a focus on the senses and the skeletal structure. Explain to the learner that they should keep in their mind how we grow and change over the years We will start with their skeletal structure Learners will begin by drawing a self-portrait of their body as a blank figure and label all the body parts that they are familiar with – they can use the template below. They will fold in the piece of paper from both sides to form a door like a cupboard. On the top of the folded section they will draw their own blank figure on the cover half on either side of paper and mark the limbs and label the different parts of their arms and legs including thigh, ankle, toes, heel, fingers, thumbs, wrist and elbow etc. Learners will illustrate all the functions that our limbs help us with for example: arms and fingers help us hold things, feed ourselves, and write etc. legs help us walk, run, jump etc. 

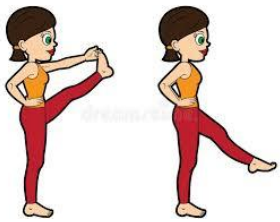
	15 minutes 15 minutes 15 minutes	We will explore some of the main functions of the skeleton including support, movement and protection Let us start with the support the skeletal structure provides. Imagine a building without pillars or columns – that is what would happen to our body without a skeletal structure. Learners will first try and cut out a human figure with cloth (skin) or make one with dough (flour and water) or a 2D paper figure – this is what our muscles and skin would be like without a skeleton or bones. How would this stand up without a skeletal structure? Learners will now create a skeletal structure for their paper or cloth figure. Learners can use toothpicks or straws to create a strawman that stands and drape the cloth on that or create a stand (similar to one for a photo frame) and make the paper figure stand. The skeleton provides the core structure One of the main parts of our skeletal structure is our backbone or vertebrae that helps us stand up straight. Learners can touch their backbone or that of their family to understand how it extends from their hip all the way up to their neck. All animals including human beings that have the backbone are called vertebrates. Imagine animals that do not have a backbone or skeleton – they are called invertebrates – Leaners can try and guess and name three animals that do not have backbones and instead have soft bodies like worms, jellyfish or harder outer casing exoskeleton like a spider etc. which have an external skeleton outside of their bodies unlike humans. Learners can draw these different animals
2	20 minutes	Learners will explore the second important function of the skeletal structure which is to assist with movement – through this day learners should keep thinking about how motion and flexibility changes with age Learners will need to think of the different directions in which their bones permit them to move. Let us begin with our knee joint – we can straighten our legs and fold them backward when we sit on our knees. We will try a few yoga poses to explore this range of motion with your knees: Try a chair hold position: Imagine you are sitting on a chair without there actually being a chair – for how long can you hold that position? Try 60 seconds

Try a tree pose: Stand straight and fold your hands and extend over your head. Now lift one leg and bend it and place it on the other leg. Try and balance on one leg for 30 seconds. Now change the leg

For a challenge, gradually straighten the bent leg and hold onto the toe, while continuing to stand on one leg

Sit on the ground and keep both your legs straight and touch your toes by reaching out. Now bend one knee and reach forward to touch your head to the knee of the leg that is straight

For a challenge, stand on leg and extend the other leg straight behind you – lean forward so that your body makes a T. Can you hold this position for 60 seconds?

		 This range of motion of the knee joint is similar to another joint – can you guess which one it is? (Hint: think of the similar joint as the knee in your other limbs – the elbow joint. They could have also thought of our fingers or toes that bend and straighten) Learners can now have a challenge to make up their own yoga asana's and try and spell all the letters of the alphabet while lying down with their legs in the air or while standing with their whole body e.g. while lying down learners can join their heels together in the air to form a triangle or an A shape with their legs etc.
	20 minutes 20 minutes	Learners can now explore our multi-axial joints, which are joints that allow us to move in different directions and have a broader range of movement. We will be exploring the hip or pelvic girdle. A girdle is a structure containing many bones and joints. Learners can guess the number of movements that are possible in the hip area, and then draw a diagram for each while trying these. Following this they can try the six motions that the hip joint allows us: move the leg forward and backward, out and in sideways and also rotate it open. Let's try some yoga positions for these movements Standing in our place lift one leg in the air and swing it forward and backward. To make this position more challenging, we can try and hold the toe of the leg lifted off the ground  Lying on your side on the floor try lifting the leg on top upward and downward without bending the knee. Try doing this movement 20 times

	10 minutes 20 minutes	 Finally, sit in a butterfly position or cross-legged on the floor  The shoulder girdle is similar to the hip girdle – learners will make up 3 – 4 of their own exercises for the shoulder girdle to explore the range of motion (Hint: you can lift your arms up in the air and stretch, to the side and over your body and bend, rotate your arms etc.) Numeracy extension: Learners can draw and then form the three kinds of triangles with their arms and shoulders i) A right angle triangle like an L with their hands, ii) An equilateral triangle with all the sides being equal and all the angles being 60 degrees, iii) An isosceles triangle where 2 of the sides are equal etc. Hint: 

		 Learners will design a small yoga guide for their family members with the yoga asanas that they designed describing the importance of the skeletal structure for movement.
3	15 minutes 5 minutes 5 minutes 5 minutes 5 minutes 5 minutes	Learners will also think of the protection offered by the skeleton by designing their own heart made of glass, their own brain made with dough and or lungs made by balloons or inflated water or air-filled plastic bags. Learners can paint a small glass object or wrap it with red paper as the heart, they can make a brain using dough and blow up 2 plastic bags with air as lungs. Learners will think about how to protect these organs given how delicate glass, dough or plastic is? Learners will need to design the protective bone structure e.g. a helmet that represents the skull to protect the brain, a storage box or Tupperware bottle that represents the rib cage within which the lungs and heart is safe Learners will write about and draw the skeleton and how it protects the different organs including: - The skull protecting the brain - The vertebrae protecting the spinal cord - The ribcage, spine and sternum protecting the lungs and heart Learners will explore some magical things about the human body - Breathing: Learners will first take notice of their breathing. Learners can close their eyes and count their breaths within a minute, they will notice their stomach and chest rising and falling placing their hand on their stomach. - Pulse: Learners will place their thumb on their wrist until they can feel their pulse. Learners will count the number of times their pulse beats in a minute - Learners will now do some exercise and think about the reactions that their body has after 50 jumps or jogging on the spot etc.

	10 minutes 15 minutes	- Learners will think about the reactions that their body has when it is under stress or exercising e.g. speed of breathing, pace of the pulse rate, sweat etc. Numeracy extension: Learners will compare the number of breaths they took within a minute in a resting state and after exercise. If you took 55 breaths per minute before exercise and 80 breaths per minute after the exercise, how many breaths did you take per second pre and post exercise? What is the percentage difference in the number of breaths post and pre exercise? Learners will similarly compare the number of pulse beats in a resting state and after exercise. Calculate the number of pulse beats per second pre and post exercise. Learners can calculate the percentage difference in their pulse rate Learners can calculate the number of jumping jacks per 1 minutes and then calculate the number of jumping jacks per second e.g. if you can do 50 jumping jacks per minute, how many jumping jacks can you do every second?
4	20 minutes	Learners will become doctors today to conduct a health check up on their different family members Learners will first assume the role of an ophthalmologist or eye doctor and check their family member's eyesight. Learners will design their own reading chart with 35 words. Learners will divide this with 5 words on each of the 7 rows. Learners will reduce the size of the words on each row from large to very small in the last row as shown in the image below. Learners will write words instead of letters: 

	20 minutes	Learners will hold the eye test chart at a distance and ask their siblings, parents and grandparents to read the chart. Learners will read 2 of the words on each row with one eye closed and the other 3 words with the other eye closed. Learners will write a few sentences diagnosing family members and comparing their eyesight, including the details of what they were able to read or not
	15 minutes	Learners will now assume the role of a physiotherapist and check on the flexibility and range of motion of their family members. Learners will lead a yoga session with their family members and check on the how many of the movements they are able to do and with what level of ease Learners will write a diagnosis for their family members on what positions they are able to do
	15 minutes	Learners will finally test the ability of family members to do exercise Learners will try the same exercises and yoga asanas with their family members – including their grandparents, parents or siblings to observe the different range of motion and flexibility for different members of the family and the impact of exercise on them Learners will now lead an exercise session with the family and measure their pulse rate and body temperature before and after exercises Note: it is important to moderate the exercise for older family members depending on their health conditions and age For younger and fit family members they can do jumping jacks, mountain biking, jogging on the spot etc. For older family members and those with health issues they can do brisk walking.
	10 minutes	Learners will observe and write a report of the impact of the exercise on each of the family members and ask them how the exercise made them feel immediately after the exercise and later in the day
	15 minutes	Literacy extension: Learners will ask family members about any health conditions and write a report on what these health issues are, what aches and pains it results in, how this health condition affects their daily life and how they are currently treating it.
5		Learners will put together everything that they have learned and think of how the skeletal structure, their senses and of how they grow. Learners will try and illustrate all five stages of birth, childhood, adolescence, adulthood and old age.

	25 minutes	- The first stage is a baby at birth. They can draw themselves as a baby or a baby they are familiar with (siblings, cousins etc.) and describe their movements and senses. Learners can check one of their baby pictures for reference. - Learners will describe what they were able to do back then with reference to limbs. Were you able to walk with your legs and hold things with your hands? Did your body have the same range of motion and flexibility? - Learners will describe their senses as a baby. Did you know that babies are not born with the same eyesight as we have now – they are unable to see all colors or see things that are at a distance? Given the eyesight of babies, how do you think they are able to recognize their mother and find a source of milk? Did you know that babies can recognize their mother's voice from when they were in the womb?
	15 minutes	- Learners will now draw an image of themselves at their current age at the childhood phase - Learners will describe their flexibility now and range of motion with relation to the limbs. They will also describe the senses
	20 minutes	- Learners will draw an image of their parents or another adult in their family at adulthood. How different do they look and what physical changes do you observe? - Learners will describe their flexibility and range of motion with relation to the limbs. They will also describe their senses e.g. are they beginning to need spectacles etc.? Learners will also describe any chronic health issues that are beginning to appear at adulthood.
	15 minutes	- Learners will finally draw an image of an older person such as grandmother or grandfather in their home. They will mark the age range of this family member - Learners will describe the strength and flexibility of their limbs. Will they be able to do the same yoga asana's the same way? Why not? Do they have issues with any of their joints and pains? Why do you think that is? - Learners will now do a sensory check on their grandparent, are all their senses as sharp as yours are? Why do you think this is?
	5 minutes	- Learners will write a short summary of how they think their bodies change as they grow through the four stages as their bodies change and age as they grow
Assessment Criteria:		- Illustrations and labelling of the paper figure - Critical thinking in identifying and understanding the senses, limbs and different human body phenomena - Student engages in scientific questions and justifies their answers related to aging - Ability to collect information and data on health phenomena and changes pre-post exercise

	- Creativity in designing yoga asanas and exercises that explore the range of motions

Learning outcomes:	- Understanding the role of bones in protecting, moving and supporting the body - Label a human skeleton with some of its major bones (e.g. Skull, ribs, kneecaps, pelvis). - Examine how exercise affects heart rate and pulse. - Identifying different body parts and human anatomy - Sensing the differences in the body due to exercise and stress - Human growth and development
Required previous learning:	Knowledge of the body parts including kneecap, shoulder girdle, pelvic girdle, elbow joint, spine etc.
Inspiration:	None
Additional enrichment activities:	Learners can draw the circulatory and respiratory system
Modifications to simplify the project tasks if need be	Learners can reduce the number of yoga poses and exercises conducted