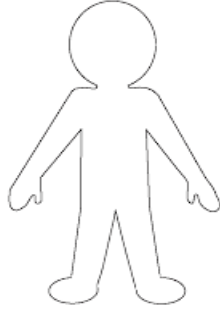


## GROWING UP (LEVEL 2)

<b>Description</b>	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
<b>Leading Question</b>	How do we change as we grow?
<b>Total Time Required</b>	6.5 hours over 5 days
<b>Resources Required</b>	Paper and Pen, cloth or water and flour, toothpick or straw, small glass object, balloon (optional)
<b>Subjects</b>	Science (Biology), Physical Exercise, Art and Design, Literacy
<b>Self-guided/ Supervised activity</b>	Medium
<b>Learning Outcomes</b>	<p>By the end of this project, learners will be able to:</p> <ol style="list-style-type: none"> <li>1. Demonstrate an understanding of the role of bones in protecting, facilitating movement, and providing support to the body.</li> <li>2. Apply knowledge to label major bones of the human skeleton, including the skull, ribs, kneecaps, and pelvis.</li> <li>3. Explain the impact of exercise on heart rate and pulse, and identify how exercise affects cardiovascular health.</li> <li>4. Identify and describe various body parts and their corresponding anatomical structures in the human body.</li> <li>5. Compare and contrast physiological changes in the body resulting from exercise and stress.</li> <li>6. Comprehend the process of human growth and development, including the factors influencing it.</li> <li>7. Explain the functions of different sensory organs and their roles in perceiving the environment.</li> <li>8. Develop the ability to collect relevant information and data related to health phenomena for analysis and interpretation.</li> </ol>
<b>Previous Learning</b>	Knowledge of the body parts including kneecap, shoulder girdle, pelvic girdle, elbow joint, spine etc.

**DAY 1-** Today, you will learn about your skeletal structure.

Time	Activity and Description
15 minutes	<ul style="list-style-type: none"> <li>• Begin by drawing a self-portrait of their body as a blank figure and label all the body parts that you are familiar with – you can use the template below. Fold in the piece of paper from both sides to form a door like a cupboard.</li> </ul>

	<ul style="list-style-type: none"> <li>● On the top of the folded section, draw your 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.</li> </ul>  <ul style="list-style-type: none"> <li>● 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.</li> <li>● Explore some of the main functions of the skeleton including support, movement and protection.</li> </ul>
15 minutes	<ul style="list-style-type: none"> <li>● Let's 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.</li> </ul>
15 minutes	<ul style="list-style-type: none"> <li>● Try to 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?</li> </ul>
15 minutes	<ul style="list-style-type: none"> <li>● Create a skeletal structure for your paper or cloth figure.</li> <li>● Use toothpicks or straws to create a strawman that stands and drape the cloth on that or create a stand and make the paper figure stand. The skeleton provides the core structures.</li> <li>● One of the main parts of our skeletal structure is our backbone or vertebrae that helps us stand up straight. Touch your backbone or that of your family to understand how it extends from their hip all the way up to your neck.</li> <li>● 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 – you can 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. Draw these different animals!</li> </ul>

**DAY 2**— Today, you will continue exploring the skeletal structure and movement!

Time	Activity and Description
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20 minutes

- Let's begin with our knee joint – we can straighten our legs and fold them backward when we sit on our knees.
- Let's 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, bend it and place it on the other leg. Try to 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 one 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?

	 <ul style="list-style-type: none"> <li>- This range of motion of the knee joint is similar to another joint – can you guess which one it is? (<i>Hint: think of the similar joint as the knee in your other limbs – the elbow joint.</i>)</li> </ul>
<p><b>20 minutes</b></p>	<ul style="list-style-type: none"> <li>● Challenge yourself to make up your own yoga asanas (poses) and try to spell all the letters of the alphabet while lying down on your back with your legs in the air or while standing with your whole body. E.g. While lying down you can lift your backs and join your heels together in the air whilst keeping the back of your head down to form a triangle or an A shape with your legs, etc.</li> </ul>
<p><b>20 minutes</b></p>	<ul style="list-style-type: none"> <li>● Now you will explore our multiaxial 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. Guess the number of movements that are possible in the hip area, and then draw a diagram for each while trying these. Following this you 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</li> <li>- Standing in your 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.</li> </ul>  <ul style="list-style-type: none"> <li>- 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.</li> </ul>

	 <p>- Finally, sit in a butterfly position or cross-legged on the floor.</p> 
<p><b>10 minutes</b></p>	<ul style="list-style-type: none"> <li>● The shoulder girdle is similar to the hip girdle.</li> <li>● Make up 3 – 4 of your own exercises for the shoulder girdle to explore the range of motion (<i>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.</i>)</li> </ul>
<p><b>20 minutes</b></p>	<ul style="list-style-type: none"> <li>● <i>Numeracy extension:</i> draw and then form the three kinds of triangles with your arms and shoulders             <ol style="list-style-type: none"> <li>i) A right angle triangle like an L with your hands</li> <li>ii) An equilateral triangle with all the sides being equal and all the angles being 60 degrees</li> <li>iii) An isosceles triangle where 2 of the sides are equal etc. Hint:</li> </ol> </li> </ul> 



- Design a small yoga guide for your family with the yoga asanas you designed describing the importance of the skeletal structure for movement.

**DAY 3**— Today, you will continue learning about your body.

Time	Activity and Description
15 minutes	<ul style="list-style-type: none"> <li>● Think of the protection offered by the skeleton by designing your own heart made of glass, your own brain made with dough and or lungs made by balloons or inflated water or air filled plastic bags. You can paint a small glass object or wrap it with red paper as the heart, you can make a brain using dough and blow up 2 plastic bags with air as lungs</li> </ul>
5 minutes	<ul style="list-style-type: none"> <li>● Think about how to protect these organs given how delicate glass, dough or plastic is</li> <li>● You 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</li> </ul>
5 minutes	<ul style="list-style-type: none"> <li>● Write about and draw the skeleton and explain how it protects the different organs including: <ul style="list-style-type: none"> <li>- The skull protecting the brain</li> <li>- The vertebrae protecting the spinal cord</li> <li>- The rib cage, spine and sternum protect the lungs and heart.</li> </ul> </li> </ul>
5 minutes	<ul style="list-style-type: none"> <li>● <b>Breathing:</b> you will first take notice of your breathing. Close your eyes and count your breaths within a minute. Notice your stomach and chest rising and falling by placing your hand on your stomach.</li> </ul>
5 minutes	<ul style="list-style-type: none"> <li>● <b>Pulse:</b> you will place your thumb on your wrist until you can feel your pulse. Count the number of times your pulse beats in a minute.</li> </ul>

<b>5 minutes</b>	<ul style="list-style-type: none"> <li>Now do some exercise and think about the reactions that your body has after 50 jumps or jogging on the spot.</li> </ul>
<b>10 minutes</b>	<ul style="list-style-type: none"> <li>Think about the reactions that your body has when it is under stress or exercising. E.g. breathing, pace of the pulse rate, sweat, etc.</li> </ul>
<b>15 minutes</b>	<ul style="list-style-type: none"> <li><i>Numeracy extension:</i> Compare the number of breaths you 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 pre and post exercise?</li> <li>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. Calculate the percentage difference in your pulse rate</li> <li>Calculate the number of jumping jacks per 1 minute 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?</li> </ul>

**DAY 4**— Today, you will focus on exploring the senses of your family members and check the flexibility and range of motion of your family members.

<b>Time</b>	<b>Activity and Description</b>
<b>20 minutes</b>	<ul style="list-style-type: none"> <li>Our five senses – seeing, hearing, smelling, tasting and touching – help us to notice and understand the world around us. We use our eyes to see, our ears to hear, our nose to smell, our tongue to taste and our skin to touch.</li> </ul> <p><b>Eye test</b></p> <ul style="list-style-type: none"> <li>You will become doctors today to conduct a health check up on your family members</li> <li>Assume the role of an ophthalmologist or eye doctor and check your family member's eyesight. Create your own reading chart with 35 words. Divide this with 5 words on each of the 7 rows. Reduce the size of the words on each row from large to very small in the last row as shown in the image below. Write words instead of letters:</li> </ul>



<p><b>20 minutes</b></p>	<ul style="list-style-type: none"> <li>● Hold the eye test chart at a distance and ask your siblings, parents and grandparents to read the chart. Read 2 of the letters on each row with one eye closed and the other 3 words with the other eye closed.</li> <li>● Write a few sentences diagnosing family members and comparing their eyesight, including the details of what they were able to read or not.</li> </ul> <p><b>Sensory stations</b></p> <p>Set up sensory centers for each of the three senses of smell, hearing and touch to test the ability of family members to identify materials using their senses.</p> <p><b>1. Hearing station:</b></p> <p>You will need materials like a marble, a paper clip, rice, water, sand, stones and so on. In 5 small containers, separately place a marble, a paper clip, rice, water and sand. You can use different materials of your own choice. The containers should not be transparent and should be sealed and labeled 1, 2, 3, 4 and 5. Ask family members to shake each container and identify the material in each container based on the sound made without seeing the content of the container.</p> <p><b>2. Smelling station</b></p> <p>You will need 5 small plastic containers, cotton balls, water, vinegar, orange juice, vanilla, lemon or other fragrant material (material with a pleasant smell). Place a cotton ball in each container and then add some fragrant material so that the cotton ball is damp. Close the lids tightly and label the containers 1, 2, 3, 4 and 5. Waft the odor to their nose and ask them to gently sniff the air in order to describe and identify the scents.</p> <p><b>3. Touching station</b></p> <p>You will need five bags or boxes and a variety of materials for family members to feel. These materials may include sandpaper, feathers, different cloth samples, plastic straws and so on. One or two materials are placed in each bag and the bags are labeled 1,2,3,4 and 5.</p> <p>Ask family members to close their eyes, place their hands in each bag, describe and identify the material(s) in each bag</p> <p>Ask the different family members about how easy or difficult it was for them to identify the materials using their senses. Was there any significant difference between the young and old family members?</p>
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15 minutes	<ul style="list-style-type: none"> <li>● Now assume the role of a physiotherapist and check on the flexibility and range of momembers and check on the how many of the movements they can do and with what level of ease</li> <li>● Write a diagnosis for your family members on what positions they can do.</li> </ul>
15 minutes	<ul style="list-style-type: none"> <li>● Finally, let’s test the ability of your family members to do exercise.</li> <li>● Try the same exercises and yoga asanas with your family members – including your 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.</li> <li>● Now, lead an exercise session with the family and measure their pulse rate and body temperature before and after exercises</li> <li>● Note: it is important to moderate the exercise for older family members depending on their health conditions and age</li> <li>● Younger and/or more fit family members can do jumping jacks, jogging on the spot etc. Older family members and those with health issues can do brisk walking or other light movements.</li> </ul>
10 minutes	<ul style="list-style-type: none"> <li>● 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.</li> </ul>
15 minutes	<ul style="list-style-type: none"> <li>● <i>Literacy extension:</i> Ask family members about any health conditions and write a report on what these health issues are, its symptoms (what aches and pains it causes), how this health condition affects their daily life and how they are currently treating it.</li> </ul>

**DAY 5—** Today, you will put together everything you learned and think of the role of the skeletal structure, senses, and of how you grow by illustrating five stages of life.

Time	Activity and Description
25 minutes	<ul style="list-style-type: none"> <li>● The first stage is a baby at birth. Draw yourself as a baby or a baby you are familiar with (siblings, cousins etc.) and describe the movements and senses. Check one of your baby pictures for reference.</li> <li>● Describe what you 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?</li> <li>● Describe your 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 you are</li> </ul>

	able to recognize your mother and find a source of milk? Did you know that babies can recognize their mother's voice?
<b>15 minutes</b>	<ul style="list-style-type: none"> <li>● Now draw an image of yourselves at your current age at the childhood phase.</li> <li>● Describe your flexibility and range of motion with relation to the limbs. Also describe the senses.</li> </ul>
<b>20 minutes</b>	<ul style="list-style-type: none"> <li>● Draw an image of your parents or another adult in your family at adulthood. How different do they look and what physical changes do you observe?</li> <li>● Describe their flexibility and range of motion with relation to the limbs. Also describe their senses e.g., are they beginning to need reading glasses or spectacles etc.? Also describe any chronic health issues that are beginning to appear at adulthood.</li> </ul>
<b>15 minutes</b>	<ul style="list-style-type: none"> <li>● Draw an image of an older person such as grandmother or grandfather in their home. Record the age or age range of this family member</li> <li>● Describe the strength and flexibility of their limbs. Will they be able to do the same yoga asanas the same way? Why not? Do they have issues with any of their joints and pains? Why do you think that is?</li> <li>● Now do a sensory check on your grandparent; are all their senses as sharp as yours are? Why do you think this is?</li> </ul>
<b>5 minutes</b>	<ul style="list-style-type: none"> <li>● Write a short summary of how you think your body and senses change as you grow through the four stages as your bodies change and age as they grow.</li> </ul>
<b>5 minutes</b>	<p><b>Reflection:</b> Reflect on your own learning:</p> <ul style="list-style-type: none"> <li>● What are the three most important things I have learned from the project about growing up?</li> <li>● What else would I like to learn about growing up?</li> <li>● What changes would I expect as I grow up?</li> <li>● How better can I assist elderly people?</li> </ul>

<b>Additional Extension Activities</b>	<ul style="list-style-type: none"> <li>● <b>Day 1: Create a Body Collage:</b> Encourage learners to create collages using magazines or drawings to represent the different body parts. This can reinforce their understanding of the functions of each body part.</li> <li>● <b>Day 2: Family Yoga Challenge:</b> Have a family yoga session where each family member creates and leads their own yoga pose. This promotes creativity, physical activity, and family bonding.</li> <li>● <b>Day 3: Personal Physiology Journal:</b> Have learners keep a simple journal for a day, recording observations about their own breathing, pulse, and</li> </ul>
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	<p>reactions to different activities. This encourages self-awareness and observation skills.</p> <ul style="list-style-type: none"> <li>● <b>Day 4: Blindfold Challenge:</b> Have a blindfold challenge where family members take turns being blindfolded and identifying objects based on touch, smell, and sound. This enhances sensory awareness.</li> <li>● <b>Interview Elders:</b> Have learners interview elderly family members or neighbors about their experiences growing up, changes they've noticed, and wisdom they would like to share.</li> <li>● Learners can draw the circulatory and respiratory system</li> </ul>
<b>Modifications for Simplification</b>	<p>Yoga Poses:</p> <ul style="list-style-type: none"> <li>● Animal Poses: Relate poses to animals but choose common ones like cat or dog.</li> <li>● Shorter Duration: Keep poses shorter and gradually increase duration.</li> </ul>

## ASSESSMENT CRITERIA

By the end of the project, most of the learners were able to:

- Label different body parts on the paper figure
- Identify the senses, limbs and different human body phenomena
- Justify their answers related to aging
- Collect information and data on health phenomena and changes pre-post exercise
- design yoga asanas and exercises creatively that explore the range of motions