

A GAME OF FOOTBALL (LEVEL 3)

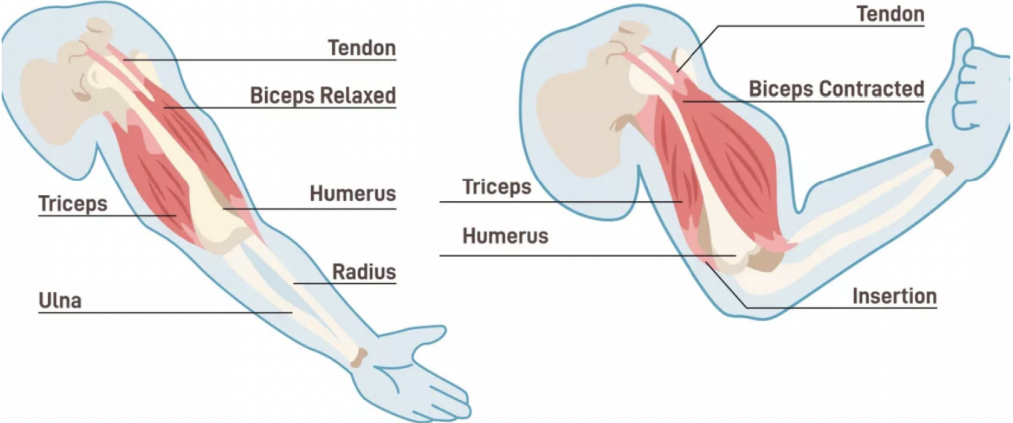
Description	Learners will improve their performance in the game of football! They will learn the concepts of body movements in humans, distance, and motion and measurement to understand the science behind a game of football. Then, they will work strategically using these concepts to improve their performance!
Leading question	Can science help us better our game at sports?
Subjects covered	Science, Physical Education, Numeracy
Total time required	40-60 min a day for 5 days
Resources required	Football (<i>alternative: any inflated ball</i>), ruler, paper, pencil, drawing sheets (<i>optional</i>), an encyclopaedia on animals (<i>optional</i>)
Learning outcomes:	<p>By the end of this project, learners will be able to:</p> <p>Knowledge-Based Outcomes:</p> <ol style="list-style-type: none"> 1. Describe the different types of movements shown by animals (such as walking, crawling and flying). 2. Relate the type of movement with the structure of the body parts responsible for the movement. 3. Explain how distance, motion and body movements can help achieve a goal in football. <p>21st Century Skill Outcomes:</p> <ol style="list-style-type: none"> 1. Use critical thinking skills to analyse the role of distance, motion and body movements in a game of football. 2. Work collaboratively to play football. 3. Communicate effectively with other players while playing football. 4. Show creativity in applying concepts of distance, motion and body movements to score goals while playing football.
Previous Learning	Characteristics of living things, dimensions of solid objects
Supervision required	Medium

Day 1 -

Today, you will learn about the body parts involved in our movement and how to care for them.

Time	Activity and Description
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5 minutes	<p>Introduction</p> <p>Most of us enjoy sports and different kinds of games and activities!</p> <ul style="list-style-type: none"> - What is your favourite game or sport? Why? - What does it take to play a sport well? (<i>practice, coordination with the team, understanding the rules, knowing the strengths and weaknesses of the opponents</i>) <p>One important element in sports is movement. In this project, we will learn how to use science to improve our movement and improve ourselves at playing football!</p>
10 minutes	<p>Body Movements</p> <p>Before we play a sport, we are often asked to do warm-up exercises such as stretching, running, jumping or practising kicking a ball. Which body parts help us do this?</p> <p>Bones, muscles and some other tissues together help us move in various ways. It is because of these body parts that we can sit, walk, run, stand, catch a ball, and even lie down in our beds!</p> <p>Let us do an activity to experience how bones and muscles help us move!</p> <p>Note: <i>Learners will need a partner to perform this activity. They can either do it with a friend or a family member. If that's not possible, the teacher/ facilitator can partner with them.</i></p> <ul style="list-style-type: none"> - Face each other and take turns to try out different body movements without touching each other. You can move various body parts such as arms, legs, neck and fingers. - While one partner leads the body movement, the other will follow. - As you move your body along with your partner, think of the various body parts that are moving. <p>Let us think about what happened!</p> <ul style="list-style-type: none"> - Were you able to move the same way as your partner? - What body structures do you think helped you move? (<i>bones and muscles</i>) <p>Tip: <i>If learners already know that bones and muscles help them move, you can introduce ligaments (tissues that connect two bones at a joint) and tendons (tissues that connect a muscle to a bone) as other tissues that help us move.</i></p>
10 minutes	<p>Skeletal System/ Skeleton</p> <p>During the previous activity, you were all standing and moving during our previous experiment. Which body part makes it possible for us to stand?</p> <p>Bones in our body give us a shape and a structure. It is because of bones that we can stand erect!</p> <ul style="list-style-type: none"> - An adult human being has 206 bones. These bones together make the skeleton or the skeletal system.

	<ul style="list-style-type: none"> - Bones are connected at structures called joints. Joints, such as those located in the knees, elbows and knuckles, make it possible for us to move. Two or more bones may be connected at a joint. - What other joints can you locate in your body? (<i>bones in the spine, wrist, ankle etc</i>) <p>What do you think are some other functions of the skeleton in our body? Think about your skull and ribcage!</p> <ul style="list-style-type: none"> - Our skeleton system also plays an important role in protecting our internal organs. For example, the skull protects the brain and the ribcage protects the heart and the lungs.
10 minutes	<p>Roles of Bones and Muscles in Movement How do bones and muscles help us move?</p> <p>Note: Use the diagram below to explain how bones and muscles work together to help bones connected at different joints move.</p> 
5 minutes	<p>Keeping Bones and Muscles Healthy Do you think bones and muscles are important to us?</p> <ul style="list-style-type: none"> - Why do you say so? - What can we do to keep them healthy? <p>We have learnt that bones and muscles are crucial to help us perform different kinds of movements. Even writing and typing need bones and muscles to work well together!</p> <ul style="list-style-type: none"> - Bones and muscles need different nutrients to stay strong. Bones need calcium while muscles need protein to be strong. <ul style="list-style-type: none"> - Some food items that are rich in calcium are milk and milk products. - Some food items rich in proteins are beans, lentils, eggs and meat. - Consuming a sufficient amount of these nutrients will help us keep our bones and muscles healthy. - In addition to eating a sufficient amount of foods rich in these nutrients, exercising regularly makes sure that our muscles stay flexible and our bones stay strong!
At home activities	Try out some basic exercises and see how your body is moving. Note down which bone(s) and muscle(s) move during each exercise.

Day 2

Today, you will explore movements in animals and compare them with movements in humans.

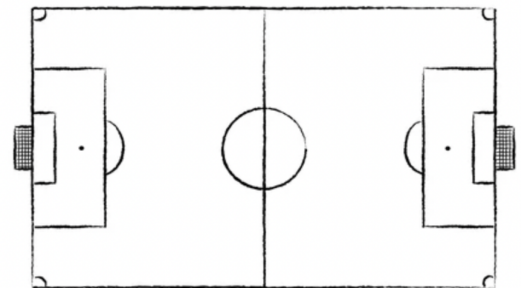
Time	Activity and Description
10 minutes	<p>Introduction to Movement in Animals</p> <p>We have seen various animals around us, such as cows, dogs, cats, birds and snakes. Today we will learn about the movement they show in detail!</p> <p>Let us first try and imitate the movement that different animals show! Try out the movements of these animals:</p> <ul style="list-style-type: none"> - Cat - Snake - Crow - Monkey <p>Did you move the same way when you imitated the different animals? Why do you think different animals move differently? (<i>Each animal has its own body structures which help perform different kinds of movements.</i>)</p>
20 minutes	<p>Movements of Animals</p> <p>We have learnt how we move as humans. Now we will think about the movement of various animals.</p> <p>Note: <i>If possible, provide learners with an encyclopaedia on animals to refer to during this activity. If that's not possible, ask them to refer to the appendix.</i></p> <ul style="list-style-type: none"> - Choose any four animals of your choice from this list: Earthworm, snake, monkey, pigeon, goldfish, spider, cheetah, cow and elephant. - Find out how each of the four animals you chose moves (using the encyclopaedia or the appendix). - Once done, think and answer these questions: <ul style="list-style-type: none"> - What body parts does this animal use to move? - What kind of internal body structure do you think this animal has? - How do you think the movement this animal shows helps it survive in its environment?
10 minutes	<p>Comparing Movements</p> <p>Think about the movements shown by the four animals you chose and the movements you show.</p> <ul style="list-style-type: none"> - How are the movements different? - How are they similar? <p>The main difference between humans and animals is the way our bodies are designed.</p>

	<ul style="list-style-type: none"> - Animals move in ways different from us because their body structures are different from ours. - Some have wings, some have legs, and some have fins. <p>Do you think if we played a sport like a specific animal, such as a cheetah or an elephant, we might be able to play it better?</p> <p>The sports we play are designed for the movements that we can show. However, by observing and learning animal movements, we get creative ideas and strategies in sports. For example, elephants may play basketball well because they are all and their trunks can reach up high!</p>
At home activities	Learners can observe the movements of any animals in their surroundings and draw the animals showing those movements. Once done, they will think and describe the body structures of the animals that help them make the movements.

Day 3 –

Today, you will learn about measurement and use it to design a football field.

Time	Activity and Description
5 minutes	<p>Introduction</p> <p>In the previous class, we learnt about movements in animals and humans, and started to think about whether certain movements shown by animals would be useful while playing sports! Now we will start to think about using movements effectively while playing football.</p> <p>Before we do that, let us learn about football! Today we will start exploring football in detail!</p> <ul style="list-style-type: none"> - What rules of football do you know of? (<i>kicking the ball to move it, avoiding hand contact (except the goalkeeper), aiming to shoot goals</i>) - How does a team win a game of football? (<i>by scoring more goals than the other team in a given amount of time</i>)
10 minutes	<p>Dimensions of a Football Field</p> <p>Have you ever seen a game of football?</p> <ul style="list-style-type: none"> - How big is a football field? - Can you draw what a football field looks like? <p>Note: Once learners have tried, share the given image with them.</p> <p>What are some things that you notice about a football field?</p> <ul style="list-style-type: none"> - What is its shape? (<i>rectangular</i>) - Which has how many shapes do you see inside the field? (<i>six rectangles, one circle, two semicircles, four quarter circles, one line segment</i>)



	<ul style="list-style-type: none"> - What is the purpose of each of these shapes? <ul style="list-style-type: none"> - <i>(Rectangle (Field Boundary): The overall shape of the football field is a rectangular area. It outlines the boundaries within which the game is played.</i> - <i>Center Circle: This circle is placed at the centre of the field. It's where the game begins with a kickoff, and at the start of each half or after a goal is scored.</i> - <i>Goal Area (Penalty Area): Marked by a larger rectangular box in front of each goal. It's the area where the goalkeeper has certain privileges and penalty kicks are awarded if fouls occur within this space.</i> - <i>Penalty Spot: Positioned inside the goal area, this is where penalty kicks are taken by players against the goalkeeper.</i> - <i>Corner Arcs: Small arcs located at each corner of the field. They mark the area from where corner kicks are taken when the ball crosses the goal line but is last touched by a defending player.</i> - <i>Halfway Line: Divides the field into two equal halves. It's the line where the game restarts after a goal is scored, beginning each half, and where players must be positioned during the kickoff.)</i> - Why do you think the distance from the middle to the goalpost is the same on both sides? <i>(for the game to be fair)</i> 																
10 minutes	<p>Measuring Objects</p> <p>We will now design our own football field using our own measurements! However, before we do that, we need to learn how to measure accurately.</p> <p>Note: <i>The goal of this activity is to show learners why using standard units for measuring is important.</i></p> <ul style="list-style-type: none"> - <i>Ask someone to measure using the same method as the learner.</i> - <i>The difference in measurements will help learners understand the importance of standard units.</i> - <i>If a friend or family member isn't available, please measure the objects together with the learner.</i> <p><i>Have the learner draw the table shown below to record their observations in.</i></p> <table border="1" data-bbox="367 1394 1479 1654"> <thead> <tr> <th>Object</th> <th>Method of Measurement</th> <th>Value 1</th> <th>Value 2</th> </tr> </thead> <tbody> <tr> <td>Table</td> <td>Length of palm</td> <td></td> <td></td> </tr> <tr> <td>Eraser</td> <td>Width of forefinger</td> <td></td> <td></td> </tr> <tr> <td>Chair</td> <td>Length of arm</td> <td></td> <td></td> </tr> </tbody> </table> <p>To do this, you will</p> <ul style="list-style-type: none"> - Choose any three objects around you (such as a desk, a chair, your room or your bed). - Using any method of your choice (such as your palm or feet), measure how long each object is. However, you cannot use a ruler! 	Object	Method of Measurement	Value 1	Value 2	Table	Length of palm			Eraser	Width of forefinger			Chair	Length of arm		
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	<ul style="list-style-type: none"> - Record your observations in the table you drew. <p>Think about these questions:</p> <ul style="list-style-type: none"> - What methods of measurement did you use? - What were the values based on your measurement? - What were the values based on your partner's measurement? - Were the values for each object the same? Why or why not? <p>In the olden days, people used their hands and feet to measure but people soon realised that the measurements were different for different people. So they decided to come up with standard units of measurement. The value of these units does not change from person to person. Centimetres, metres and kilometres are some examples of standard units.</p>
15 minutes	<p>Designing the Football Field</p> <p>Now that we have learned about standard units of measurement, let us use our rulers and create a football field in our notebooks. Keep in mind these things while designing the football field:</p> <ul style="list-style-type: none"> - Include all the shapes present in a football field. - Make sure that the shapes are located and used accurately. For example: <ul style="list-style-type: none"> - The field should be rectangular in shape. - The line segment should be drawn exactly in the middle of the rectangle. - Both the goalposts should be of the same size and placed exactly opposite to each other. <p><i>Note: Check the football field that learners design and share feedback, if needed, around the inclusion of all the shapes at their correct positions.</i></p>
At home activities	<ul style="list-style-type: none"> - Complete designing the football field. - Use a ruler to measure any five lengths at home. Also, ask a friend or a family member to measure. Compare the measurements and check if they are the same or different.

Day 4 –

Today, you will find out how to score a goal using the most suitable body movements.

Time	Activity and Description
5 minutes	<p>Introduction</p> <p>We know that the team that scores more goals in a game of football wins.</p> <ul style="list-style-type: none"> - Do you know of any footballers that are famous for scoring goals? - What strategies do you think they use to score goals? <p>Today we are going to try and find out the best way to score a goal using our body movement, and the concepts of distance and motion.</p>
15 minutes	<p>Role of Movement, Motion and Distance</p> <p>Let us learn about each of these one by one.</p>

	<p><u>Motion</u></p> <ul style="list-style-type: none"> - Motion refers to a change in the position of an object over time. - Can you look around and spot any objects in motion? (<i>the fan, a bird flying etc</i>) - What kind of motion do you think we will require to score a goal? - We need to do some amount of running, kicking and aiming motions to score a goal. <p><u>Body Movement</u></p> <ul style="list-style-type: none"> - What body movements do you think we will use to score a goal? (Note: <i>allow learners to show the motion instead of describing it in words</i>). - To score a goal, we will need to move our legs and feet in a certain way to aim a football towards a goal. <p><u>Distance</u></p> <ul style="list-style-type: none"> - Do you think it is important to consider the distance at which you are from the goalpost before trying to aim a goal? Why or why not? - Because a football field is quite large if we are too far from the goalpost, we may not be able to shoot the football into the goal. Therefore, it is important to be at a minimum amount of distance from the goalpost to be able to shoot a goal. <p>How can taking care of our motion, body movement and distance from the goalpost help us play football better? <i>(Motion: We need to do some amount of running and kicking to play football.</i> <i>Body movements: We need to show specific types of body movements to be able to kick the ball into the goal.</i> <i>Distance: We need to be at a minimum distance from the goalpost to be able to shoot goals.)</i></p>
20 minutes	<p>Scoring a Goal</p> <p>Note: <i>For this activity, take learners to an open area where it is safe to kick a football around.</i></p> <ul style="list-style-type: none"> - <i>Place two objects at some distance from each other to earmark a “goalpost.”</i> - <i>Allow learners to position themselves at different distances, and use different kinds of motion and body movements to try and shoot a goal.</i> - <i>Allow them to make multiple attempts and arrive at their own combination of motion + body movements + distance = goal.</i> <p>Think and answer these questions:</p> <ul style="list-style-type: none"> - What about your motion, distance from the goalpost, and body movements worked for you and helped you score goals? - What did not work and needs to be improved?.
At home activities	Practice shooting more goals to determine the maximum distance from the goalpost that allows you to successfully score. Show your performance to a friend or family member and ask for suggestions on what you can do to improve based on your motion and distance from the goalpost.

Day 5 -

Today, you will share your learnings of the science of football with your friends!

Time	Activity and Description
5 minutes	<ul style="list-style-type: none"> - What is the maximum distance from the goalpost at which you can successfully score? - In what way did your combination of body movements and motion change after you practised at home? <p>Today we are going to summarise everything we have learned so far and make a poster about the science of football to share with our friends!</p>
25 minutes	<p>Poster-Making</p> <p>Make a poster in your notebook covering the various concepts of science we learned. Think about the following questions while creating the poster:</p> <ul style="list-style-type: none"> - What will be the title of your poster? - What kind of pictures and text will you include in it? - What can you include based on what you have learned about body movements, measurements, motion and distance? - How does knowledge of these concepts help improve your performance in football? - How are body movements different in humans and animals?
10 minutes	<p>Presentation</p> <p>Present your poster to your friends/family and seek their feedback by asking these questions:</p> <ul style="list-style-type: none"> - What did you like the most about the poster? - What did you like the least? - What did you already know? - What did you learn from the poster?
At home activities	Play a game of football with your friends/family and together practise the techniques of motion, body movement and distance from the goalpost to make goals!

Additional enrichment activities:	<ul style="list-style-type: none"> - Learners can be asked to make a model using simple materials such as string, sticky tape, rulers and pencils to show how muscles and bones work together to help us move. - Learners can try other sports and apply the concepts of motion and body movements to improve their performance.
Modifications for simplification	The section on how bones and muscles work together to make movement happen in humans can be skipped.

ASSESSMENT CRITERIA

A majority of my students were able to:

- Measure objects using standard units of measurement.
- Identify body movements in animals and humans.
- Understand what causes body movements in animals and humans.
- Understand the concept of motion and distance.
- Suggest ways to improve their performance in football based on the concepts of motion and distance.

APPENDIX

Description of Movement in Different Animals

1. Earthworm:
Earthworms move by stretching and squeezing their muscles since they don't have bones. This muscle action helps them move ahead.
2. Snake:
Snakes slither using their long backbone. They move with thin, flexible muscles.
3. Monkey:
Monkeys are built similar to humans. They have bones and muscles for moving and jumping. Their longer hands assist in jumping and getting around.
4. Bird:
Birds fly using wings made of bones and muscles.
5. Fish:
Fish swim with their fins, supported by their bone and muscle structure for movement.
6. Spider:
Spiders have eight legs for movement, using their muscles as they don't have bones.
7. Cheetah:
Cheetahs move fast using their bones and strong leg muscles for running.
8. Cow:
Cows have bones and muscles for moving and standing for long periods. Their strong leg muscles support their mobility.
9. Elephant:
Elephants have strong leg muscles to carry their weight. Their bones provide stability while moving deliberately. The elephant trunk is flexible without bones.

