

We are so excited to have you visit The Franklin Institute with your learners!

**The following document is meant to help you guide learners in making connections between the *Science of Soccer* activities and interactives at The Franklin Institute.**

The museum exhibits will give learners opportunities to engage further with some of the *Science of Soccer* ideas and help them broaden their understanding of these science and engineering concepts. We hope the museum continues to inspire your young learners and foster their curiosity.

<b>SportsZone, 3<sup>rd</sup> Floor</b>	
<b>Train your Brain</b>	<p>Soccer players rely on quick reaction times to perform their best.</p> <ul style="list-style-type: none"> <li>Have learners follow the prompts to test their reaction speed and observe how it changes with practice.</li> <li><b>Ask:</b> <ul style="list-style-type: none"> <li><i>What did you notice about your reaction time before and after practicing?</i></li> <li><i>Why do you think practice helps improve reaction time?</i></li> <li><i>How might being tired or distracted affect your reaction time?</i></li> <li><i>What strategies could help someone improve their reaction time?</i></li> </ul> </li> </ul>
<b>Ball Spin</b>	<p>Sometimes, soccer players add spin to the ball to curve it around a defender and reach their target.</p> <ul style="list-style-type: none"> <li>Have learners follow the prompts to apply spin to the ball and aim for the target.</li> <li><b>Ask:</b> <ul style="list-style-type: none"> <li><i>What happened when you added spin to the ball?</i></li> <li><i>How did the direction or speed of the ball change?</i></li> <li><i>Why do you think the ball curves when it spins?</i></li> <li><i>How could changing the amount of spin affect your accuracy?</i></li> </ul> </li> </ul>
<b>Bodies in Motion</b>	<p>Soccer players are constantly moving, and sometimes they need to jump to head the ball.</p> <ul style="list-style-type: none"> <li>Have learners follow the prompts to compare how high they can jump from a standing position versus a running start</li> <li><b>Ask:</b> <ul style="list-style-type: none"> <li><i>Was your jump higher when you started running or when you stood still?</i></li> <li><i>Why do you think running before jumping makes a difference?</i></li> <li><i>What muscles help you jump higher?</i></li> <li><i>How could soccer players use this skill during a game?</i></li> <li><i>What techniques might help improve your jumping height?</i></li> </ul> </li> </ul>

<b>Weighing Impacts</b>	<p>Sports equipment engineers make more than soccer cleats—they also create helmets to protect athletes.</p> <ul style="list-style-type: none"> <li>• Have learners follow the prompts to test the helmets.</li> <li>• <b>Ask:</b> <ul style="list-style-type: none"> <li>○ <i>Which helmet absorbed the most impact?</i></li> <li>○ <i>How does the material or design of a helmet affect safety?</i></li> <li>○ <i>How do engineers decide what materials to use for helmets?</i></li> <li>○ <i>Can you think of other sports or activities where impact protection is important?</i></li> <li>○ <i>How could testing help improve helmet designs in the future?</i></li> </ul> </li> </ul>
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<b>Sir Issacs Loft, 3<sup>rd</sup> Floor</b>	
<b>Momentum Table</b>	<p>Both soccer players and the soccer ball are always in motion during a soccer game.</p> <ul style="list-style-type: none"> <li>• Have learners follow to put the ball and ring in motion.</li> <li>• <b>Ask:</b> <ul style="list-style-type: none"> <li>○ <i>What did you notice about the motion?</i></li> <li>○ <i>How do they roll across the surface?</i></li> <li>○ <i>What affects how far or fast they travel?</i></li> <li>○ <i>Can you predict where the ball or ring will go next?</i></li> </ul> </li> </ul>
<b>Energy Transfer</b>	<p>Soccer players transfer energy from their feet to the ball to make it move.</p> <ul style="list-style-type: none"> <li>• Have learners follow the prompts to set the strings in motion and observe the energy transfer.</li> <li>• <b>Ask:</b> <ul style="list-style-type: none"> <li>○ <i>What happened when you moved the strings?</i></li> <li>○ <i>How did the energy from your hands transfer to the strings?</i></li> <li>○ <i>Did all parts of the string move the <u>same</u> way? Why or why not?</i></li> <li>○ <i>How is this similar to how a soccer player kicks a ball?</i></li> <li>○ <i>How could you make the string move faster or farther?</i></li> </ul> </li> </ul>
<b>Gravity Well</b>	<p>When soccer players hit a ball they put it into motion.</p> <ul style="list-style-type: none"> <li>• Have learners follow the prompt to release the ball into the gravity well.</li> <li>• <b>Ask:</b> <ul style="list-style-type: none"> <li>○ <i>What did you notice about the way the ball moves?</i></li> <li>○ <i>What happens when you release the ball faster or slower?</i></li> <li>○ <i>How is this similar to the way a soccer ball moves when it's kicked?</i></li> </ul> </li> </ul>

## Body Odyssey, 2<sup>nd</sup> Floor

<p><b>How do you get your muscles strong?</b></p>	<ul style="list-style-type: none"> <li>• Have learners follow the prompt to explore how exercise makes your muscles stronger.</li> <li>• <b>Ask:</b> <ul style="list-style-type: none"> <li>○ <i>Why do you think your muscles get stronger with regular exercise?</i></li> <li>○ <i>What types of movements seem to make your muscles work the most?</i></li> <li>○ <i>How might exercise help prevent injuries or improve performance in sports?</i></li> </ul> </li> </ul>
<p><b>Design Your Best Kicks</b></p>	<ul style="list-style-type: none"> <li>• Have learners follow the prompts to select design features for their sneakers.</li> <li>• <b>Ask:</b> <ul style="list-style-type: none"> <li>○ <i>Which design factors did you choose and why?</i></li> <li>○ <i>How do you think each factor will affect performance or comfort?</i></li> <li>○ <i>How do professional athletes' sneakers differ from everyday shoes?</i></li> <li>○ <i>How might testing and feedback help improve your sneaker design?</i></li> </ul> </li> </ul>

## The Brain, 2<sup>nd</sup> Floor

<p><b>Count the Hits</b></p>	<p>Our brain helps us pay attention and make quick decisions during a soccer game.</p> <ul style="list-style-type: none"> <li>• Have learners follow the prompt to hit the tennis ball as many times as they can.</li> <li>• <b>Ask:</b> <ul style="list-style-type: none"> <li>○ <i>Did you notice the background changing?</i></li> <li>○ <i>Why do you think you might have missed it?</i></li> <li>○ <i>What happens when our brain is distracted?</i></li> </ul> </li> </ul>
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