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1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <title>Electromagnetic Induction</title>
6   <style>
7     body {
8       font-family: 'Segoe UI', sans-serif;
9       background-color: #f4f9ff;
10      margin: 0;
11      padding: 0;
12    }
13    header {
14      background-color: #004080;
15      color: white;
16      padding: 30px 0;
17      text-align: center;
18    }
19    section {
20      padding: 40px;
21      text-align: center;
22      max-width: 900px;
23      margin: auto;
24    }
25    h2 {
26      color: #004080;
27    }
28    p {
29      line-height: 1.8;
30      font-size: 17px;
31    }
32    .equation {
33      background-color: #e0ebf5;
34      display: inline-block;
35      padding: 10px 20px;
36      font-weight: bold;
37      margin: 10px 0;
38      border-radius: 8px;
39    }
40    footer {
41      background-color: #eeeeee;
42      text-align: center;
43      padding: 15px;
44      font-size: 14px;
45      margin-top: 30px;
46    }
47    a {
48      color: #004080;
49      font-weight: bold;
50      display: inline-block;
51      margin: 15px 0;
52    }
53    iframe {
54      margin-top: 30px;
55      border-radius: 10px;
56    }
57    .quiz {
58      background-color: #f0f8ff;
59      border-radius: 8px;
60      padding: 20px;
61      margin-top: 30px;
62    }
63    .quiz button {
64      background-color: #004080;
65      color: white;
66      padding: 10px 20px;
67      font-size: 16px;
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68     border: none;
69     border-radius: 5px;
70     cursor: pointer;
71 }
72 .quiz button:hover {
73     background-color: #0059b3;
74 }
75 </style>
76 </head>
77 <body>
78
79 <header>
80     <h1>Ⓢ Electromagnetic Induction</h1>
81     <p>Understanding how changing magnetic fields create electricity</p>
82 </header>
83
84 <section>
85     <h2>What is Electromagnetic Induction?</h2>
86     <p>
87         Electromagnetic induction is the process of generating electric current from a
88         changing magnetic field.
89         It was discovered by Michael Faraday in 1831. It's the principle behind many
90         everyday devices such as electric generators and transformers.
91     </p>
92     <a href=
93         "https://content.alefed.com/data/ccl/content/33/c2/b9/e7/122983/source/LVF3V5LP27UIU7
94         FQM2LCAVDKRVA/Explore_slide_04.gif" target="_blank">
95         ▶ Click here to view Faraday's Law Diagram
96     </a>
97 </section>
98
99 <section>
100     <h2>Oersted's Experiment Ⓢ</h2>
101     <p>
102         In 1820, Hans Christian Oersted discovered that an electric current in a wire
103         creates a magnetic field around it.
104         This showed that <strong>electricity can create magnetism</strong>.
105     </p>
106     <p>
107         But later, Faraday and others found the <strong>opposite is also true</strong>: a
108         changing magnetic field can create electricity!
109         This is what electromagnetic induction is all about – the two phenomena are
110         connected.
111     </p>
112     <a href=
113         "https://content.alefed.com/data/ccl/content/fa/2f/5b/29/121174/source/LKXM63PO3MRUEL
114         KE5FF44LYERFE_LKOBX5A7NW3AE7KETR2L5KYPSPY/PH10_MLO_343_IMG_034.jpg" target="_blank">
115         ▶ Click here to view Oersted's Experiment Picture
116     </a>
117 </section>
118
119 <section>
120     <h2>What is EMF?</h2>
121     <p>
122         EMF stands for <strong>Electromotive Force</strong>, but it doesn't mean a real
123         "force" – it's actually a voltage.
124         So, EMF is very similar to potential difference (<strong>V</strong>). It tells us
125         how much electrical energy is being pushed through a circuit.
126     </p>
127     <div class="equation">
128         EMF = B × L × V × sin(θ)
129     </div>
130     <p>
131         Where:<br>
132         B = magnetic field strength (Tesla)<br>
133         L = length of the wire in the magnetic field (meters)<br>
134         V = velocity (speed of the wire)<br>

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124      $\theta$  = angle between the wire and the field lines
125 </p>
126 </section>
127
128 <section>
129   <h2>Right-Hand Rule 🖐️</h2>
130   <p>
131     To find the direction of the induced current, use the <strong>right-hand rule
132     </strong> for generators:
133   </p>
134   <p>
135     ➤ Point your thumb in the direction of the wire's motion (velocity).<br>
136     ➤ Point your fingers in the direction of the magnetic field.<br>
137     ➤ Your palm will face the direction of the induced current (conventional current).
138   </p>
139   <a href=
140     "https://content.alefed.com/data/ccl/content/f4/6e/f8/1f/123000/source/LGEWQUPCE5NMUB
141     BKY73JBNSSU3Q_LIMEUYWBGXS4EJBUF2YTGBTVWLA/PH10_MLO_345_IMG_015a.jpg" target="_blank">
142     ➤ Click here to view Right-Hand Rule Picture
143   </a>
144 </section>
145
146 <section>
147   <h2>Real-Life Application: Microphones 🎧</h2>
148   <p>
149     Microphones work based on the principle of electromagnetic induction. In a typical
150     microphone, there is a diaphragm that vibrates in response to sound waves.
151     Attached to this diaphragm is a coil of wire that moves within a magnetic field.
152     As the coil moves, it cuts through the magnetic lines of force, inducing an
153     electric current.
154     This current is then sent to an amplifier, which converts the vibrations into an
155     audio signal. This is how sound is transformed into an electrical signal in
156     microphones.
157   </p>
158 </section>
159
160 <section>
161   <h2>Watch This Explainer Video 📺</h2>
162   <iframe width="560" height="315" src="https://www.youtube.com/embed/2tMRPuU78GA"
163     title="Electromagnetic Induction" frameborder="0" allow="accelerometer; autoplay;
164     clipboard-write; encrypted-media; gyroscope; picture-in-picture"
165     allowfullscreen></iframe>
166 </section>
167
168 <section class="quiz">
169   <h2>Quiz Time! 📝</h2>
170   <p>Let's test your understanding of electromagnetic induction!</p>
171   <form id="quizForm">
172     <label for="q1">1. Who discovered electromagnetic induction?</label><br>
173     <input type="radio" name="q1" value="Michael Faraday"> Michael Faraday<br>
174     <input type="radio" name="q1" value="Hans Oersted"> Hans Oersted<br><br>
175     <label for="q2">2. What is the principle behind microphones?</label><br>
176     <input type="radio" name="q2" value="Electromagnetic Induction"> Electromagnetic
177     Induction<br>
178     <input type="radio" name="q2" value="Electromagnetism"> Electromagnetism<br><br>
179     <label for="q3">3. What does EMF stand for?</label><br>
180     <input type="radio" name="q3" value="Electromagnetic Field"> Electromagnetic Field
181     <br>
182     <input type="radio" name="q3" value="Electromotive Force"> Electromotive Force
183     <br><br>
184     <button type="button" onclick="checkQuiz()">Submit</button>
185   </form>
186   <p id="quizResult"></p>
187 </section>

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179
180 <footer>
181     Created by Noor | Grade 10 | 2025
182 </footer>
183
184 <script>
185     function checkQuiz() {
186         var correctAnswers = 0;
187         var q1 = document.querySelector('input[name="q1"]:checked');
188         var q2 = document.querySelector('input[name="q2"]:checked');
189         var q3 = document.querySelector('input[name="q3"]:checked');
190
191         if (q1 && q1.value == "Michael Faraday") correctAnswers++;
192         if (q2 && q2.value == "Electromagnetic Induction") correctAnswers++;
193         if (q3 && q3.value == "Electromotive Force") correctAnswers++;
194
195         var result = document.getElementById("quizResult");
196         result.textContent = "You got " + correctAnswers + " out of 3 correct!";
197     }
198 </script>
199
200 </body>
201 </html>
202
```