

# Final Developer Instructions for ENDAGAME

ENDAGAME (Engaging Nanoscale DNA and Genetically Modified Organisms Applications through Mobile Education) is an interactive web-based educational game designed to teach high school students about DNA, genetics, and genetic engineering in a single engaging session. The game integrates lessons, interactive drills, a 3D gene editor, and pre/post-assessments to ensure measurable learning improvements.

Important Note: The full lesson plan, Pretest, and Posttest (with answer keys) are provided in the accompanying PDF titled 'ENDAGAME\_PrePostTest\_Choices.pdf'. These must serve as the educational backbone of the game. The pretest gauges initial understanding, the lessons build knowledge through interactive activities, and the posttest measures improvement.

## Developer Instructions

1. User Login: Allow players to log in using just name and email.
2. Pretest: Present the 20-item pretest (from PDF) before lessons start. Questions must be multiple-choice and scored automatically.
3. Lessons: Implement 5 lesson tabs covering DNA basics to genetic engineering. Each lesson should include interactive drills (e.g., drag-and-drop DNA building, codon matching, mutation simulations).
4. Gene Editor: Create a simple 3D gene editing tool with intuitive graphics, so even beginners understand basic DNA modifications.
5. Gamification: Assign points for completing lessons, drills, and tests. Show cumulative score and feedback after each task.
6. Posttest: Present the 20-item posttest (from PDF, rephrased questions with choices). Auto-score and compare with pretest.
7. Leaderboard: Display a leaderboard ranking all users by total score to encourage competition.
8. Data: Store user names, emails, scores, and progress locally or via a database for tracking.
9. Engagement: Use animations, sounds, and progress bars to prevent boredom. Each lesson must feel dynamic and interactive.
10. Accessibility: Ensure the site is responsive, mobile-friendly, and easy to navigate.

Deliverables: The final game must integrate the lesson plan and assessments provided in the PDF. Ensure that after gameplay, learners show clear score improvement from pretest to posttest, indicating that ENDAGAME successfully addressed learning gaps.