Advanced Higher Biology Project Ideas For Students

Checkout advanced higher biology project ideas:

Cell Biology and Microscopy Projects

1. Watch plant cells change when you put them in salt water and in fresh water.
2. Compare animal cells and plant cells under a microscope to see their parts.
3. Study how yeast cells grow faster in warm places than in cold places.
4. Look at mouth bacteria under a microscope to see how they move.
5. Test which home cleaners kill the most germs on counters and doorknobs.
6. Watch onion cells under a microscope after you add food coloring.
7. Study how paramecia swim and change when you add salt to their water.
8. Compare red blood cells from fish and birds to see their shapes.
9. Watch plant cells make starch by testing leaves with iodine before and after.
10. Study how mold grows on different breads in warm and cold spots.
11. Look at pollen from different flowers to see their shapes and colors.
12. Test how long bacteria live on wood, plastic, and metal surfaces.
13. Watch algae cells move toward light and away from dark places in water.
14. Count tiny organisms in pond water to see how many types live there.
15. Compare how fast bacteria grow in warm milk and in cold milk.
16. Look at root tip cells of plants to see how they divide and grow.
17. Watch white blood cells attack germs under a microscope safely.
18. Test if honey or garlic can stop bacteria from growing.
19. Watch plant stomata open and close when you change light around them.
20. Compare cheek cells and leaf cells under a microscope to see their shapes.

21. Look at butterfly wing scales under a strong lens to see their colors.
22. Test how different water temperatures change how tiny pond organisms move.
23. Study how plant cells store energy by looking for starch in potato bits.
24. Watch bacteria form chains and groups when they grow on agar plates.
25. Compare cell walls of celery, lettuce, and tree bark under a microscope.
26. Study how amoebas eat by surrounding their food completely.
27. Watch pollen tubes grow when pollen lands on the right flower part.
28. Test which household items have the most bacteria each day.
29. Watch plant cells change color when you add different chemical dyes.
30. Study how pond microorganisms swim in drops of water and their paths.
31. Look at crystals inside plant cells when they store minerals.
32. Test how UV light changes bacterial growth compared to normal light.
33. Compare muscle cells and nerve cells under a microscope to see their jobs.
34. Watch plant cells fix themselves after you gently harm a leaf.
35. Look at diatom patterns under a microscope to see their glass walls.
36. Test how salt level changes red blood cell size and shape.
37. Study how bacteria talk using chemicals they send into water.
38. Watch plant cells move food and water from roots to leaves.
39. Look at how different antibiotics change bacterial growth on plates.
40. Study the life cycle of bread mold by watching its spore growth.

Genetics and DNA Projects

41. Extract DNA from strawberries using soap and rubbing alcohol at home.
42. Study how traits like eye color move from parents to children.

43. Compare DNA you see from bananas, kiwis, and oranges under a microscope.
44. Look at how identical twins have the same DNA but still look different.
45. Study how flower color in plants comes from different genes.
46. Test if traits like tongue rolling stay in families or not.
47. Compare male and female chromosomes using ready slides from a store.
48. Study how breeding beans of different colors makes new colors in kids.
49. Look at fruit flies with mutations to see new wing shapes.
50. Test if plants from the same parent have the same leaf shapes.
51. Study how crossing corn kernels of different colors shows dominant and recessive traits.
52. Compare DNA you get from fresh fruit versus frozen fruit.
53. Look at family trees to track genetic disorders from grandparents to kids.
54. Study how breeders mix parents to make new flower colors.
55. Test if family members share similar fingerprint patterns.
56. Compare DNA amount from leaves, flowers, and stems of plants.
57. Study how some traits skip a generation by looking at families.
58. Look at how engineers change plant genes to resist diseases.
59. Test if identical twins have the same fingerprints even with the same DNA.
60. Study how chromosomes pair up during cell division to pass traits.
61. Compare traits that one gene controls by crossing different plants.
62. Look at how genetic counselors help families see disease risks.
63. Study how cloning makes plants that are the same as the parent.
64. Test if some traits happen more in certain groups of people.
65. Compare dog breed traits from selective breeding over many years.

66. Study how genetic tests help doctors find diseases early.
67. Look at traits that help some plants live in certain places.
68. Test if seed-grown plants have more variety than cloned ones.
69. Study how markers in DNA help track animal movement over time.
70. Compare wild plant diversity and farm plant diversity using DNA tests.
71. Look at how gene therapy might fix diseases in people's cells.
72. Study how engineers make crops grow in tough weather conditions.
73. Test if certain gene mixes help plants resist bugs naturally.
74. Compare chromosomes of related species to see how they changed.
75. Study how a small population drop makes species lose diversity.
76. Look at how doctors use personal DNA to choose the best treatment.
77. Test if more variety in plant genes helps them survive changes.
78. Study how computer gene models help solve biology problems.
79. Compare human DNA and chimpanzee DNA to see how similar they are.
80. Look at how changing genes helps make medicines that save lives.

Ecology and Environmental Biology Projects

81. Study how pollution in your area changes plant growth.
82. Test which plants grow best in soils with different pH levels.
83. Compare how many species live in dirty places versus clean ones.
84. Study how climate change shifts flower bloom and bird migration times.
85. Test if organic farms have more wildlife than normal farms do.
86. Compare water quality in local streams by checking oxygen levels.
87. Study how building cities changes the animals that live there.

88. Test which local plants make good gardens for wildlife.

89. Compare old forests and young forests for how many species live there.

90. Study how invasive species change the balance of new ecosystems.

91. Test if composting cuts waste and makes good soil for plants.

92. Compare different fertilizers to see their effect on plants and water.

93. Study how food webs link species in your local area.

94. Test if green roofs cool buildings and help city wildlife.

95. Compare carbon footprints of cars, bikes, buses, and walking.

96. Study how wetlands clean water and give homes to many animals.

97. Test if solar panels hurt or help local wildlife.

98. Compare coral reef health where people visit a lot versus less.

99. Study how forest fires change ecosystems and which plants come back first.

100. Test if recycling food waste makes less methane than landfills.

101. Compare air quality in neighborhoods and how it affects plants.

102. Study how broken habitats change animal moving and breeding.

103. Test if city noise changes bird songs and how they call each other.

104. Compare ways to save species and see which works best.

105. Study how seasons change animal behavior and life steps.

106. Test if rain gardens stop flooding and clean storm water.

107. Compare packaging types to see their effect on local nature.

108. Study predator and prey links to see how nature stays in balance.

109. Test if butterfly gardens with local plants help more pollinators than non-local plants.

110. Compare energy use of different house designs and their impact on nature.

111. Study how tiny plastics harm sea life and food chains in oceans.

112. Test if community gardens clean city air and give fresh food.

113. Compare how much water different farm watering methods use in dry places.

114. Study how light at night changes animal night habits and health.

115. Test if local native yards need less water and help wildlife more than lawns.

116. Compare wind farms and solar farms for their effect on nature.

117. Study how ocean acid makes it hard for shells and coral to grow.

118. Test if electric or shared transport cuts city pollution and helps health.

119. Compare diets like meat, vegan, and mixed for their land and water use.

120. Study how citizen science helps track environmental changes and animal numbers.

Human Biology and Health Projects

121. Test how running, biking, and dancing change heart rate and rest time.

122. Study which foods give more energy for sports and school work.

123. Compare how sleeping on back, side, or stomach changes sleep quality and morning wakefulness.

124. Test if quiet sitting and deep breaths cut stress and help focus.

125. Study how too much screen time changes eye health and sleep for all ages.

126. Compare vitamins and nutrients in fresh foods and in packaged foods.

127. Test if music choices help you focus and learn better.

128. Study how not drinking enough water changes how your body and brain work.

129. Compare hand-washing steps to see which removes the most germs.

130. Test if standing desks help keep your back straight and cut pain compared to sitting.

131. Study how bright or dim lights change mood and work quality.

132. Compare steaming, baking, and frying to see which keeps more nutrients.

133. Test if regular stretching makes you more flexible and less likely to hurt yourself.

134. Study how caffeine in drinks changes reaction time at different hours.

135. Compare vitamins from fruits and veggies and from pills for immune health.

136. Test if laughing exercises really make you feel happier and lower stress.

137. Study how slow, fast, and deep breaths change oxygen levels and sports performance.

138. Compare sunlight and lamp light for how well they make vitamin D.

139. Test if yogurt and pickles with probiotics help digestion and immunity.

140. Study how going to bed and waking at the same times helps memory and school work.

141. Compare fats from nuts, oils, and snacks to see which is best for your heart.

142. Test if smells from oils help lower stress and help your brain work.

143. Study how you sit at computers changes neck and shoulder aches.

144. Compare ways to calm down, like talking, meditating, or drawing for health and happiness.

145. Test if colors around you change how you feel and act in rooms.

146. Study how drinking water helps kidneys work and keeps your body doing well.

147. Compare walking, running, and biking for heart fitness.

148. Test if sitting quietly and focusing your mind helps you worry less and work better.

149. Study how eating at different times affects your body’s energy and metabolism.

150. Compare honey, herbs, and medicine to see which helps a sore throat best.

151. Test if seeing friends and family makes people feel better and live longer.

152. Study how hot or cold rooms change comfort and work how well you do tasks.

153. Compare tap water, filtered water, and bottled water for health effects.

154. Test if going outside in parks helps you feel calmer and cut stress.

155. Study how shoe types change your foot health and posture when you walk.

156. Compare how well your body uses vitamins from food or from pills.

157. Test if background noise helps or hurts your focus when you study.

158. Study how washing, drying, and moisturizing your skin changes its health.

159. Compare yogurt, kimchi, and kefir for how they help your digestion and health.

160. Test if checking your health often helps you make better choices and stay well.

Plant Biology and Botany Projects

161. Study how red, blue, and green light change plant growth and flowering in a grow box.

162. Test if plants send signals through their roots to talk to each other.

163. Compare clay, sand, and potting soil to see how veggies taste and get minerals.

164. Study how plants bend when you touch or shake them.

165. Test if planting tomatoes and beans together helps them grow better than alone.

166. Compare drip, sprinkle, and hand watering to see which saves the most water.

167. Study how cacti, ferns, and daisies change their leaves in dry or wet weather.

168. Test if playing music or sounds helps plants grow faster or stronger.

169. Compare vitamins in plants grown in compost soil versus chemical fertilizer soils.

170. Study how roots find water in sand, clay, and potting soils.

171. Test if wood chips, straw, or pebbles on soil keep plants moist differently.

172. Compare cutting off dead branches and leaving them on to see fruit yield and plant health.

173. Study how plants use smells or sticky hairs to keep bugs away.

174. Test if towers of plants make more food in a small space than a flat garden.

175. Compare seed sprouting when you store seeds in a jar, fridge, or paper bag.

176. Study how chemical, organic, and no fertilizer change plant and soil health.

177. Test if cuttings or seeds make stronger new plants.

178. Compare tough native shrubs and new garden flowers for surviving dry spells.

179. Study how sunflowers follow the sun by checking leaf angles each hour.

180. Test if planting corn, beans, and squash together makes soil better and fewer bugs.

181. Compare roots of grasses, shrubs, and trees for how they stop soil washing away.

182. Study how plants grow differently in spring, summer, fall, and winter lights and temperatures.

183. Test if good soil bacteria help roots take up food better than clean soil.

184. Compare vitamins in veggies picked young, mid-grow, and fully grown.

185. Study how plants heal after you cut off a leaf or stem.

186. Test if small pots or big pots help roots grow faster and plants do better.

187. Compare how bees, butterflies, and flies pollinate flowers of different shapes and smells.

188. Study how plants keep food and fuel in leaves, stems, or roots.

189. Test if water without soil uses less water to grow lettuce than soil gardens.

190. Compare plant growth in greenhouses with heaters, coolers, or open air.

191. Study how plants make their own bug spray chemicals to stay safe.

192. Test if shallow or deep planting changes how seeds sprout and grow young plants.

193. Compare how much oxygen ferns, mosses, and grasses make in light.

194. Study how flowers open when pollinators come out each day.

195. Test if compost piles or store fertilizer feed plants better over months.

196. Compare frost-hardy and frost-soft plants for winter survival tricks.
197. Study how plants spread seeds by wind, water, or animals.
198. Test if ladybugs or lacewings in a garden eat more pests and help plants.
199. Compare mint, basil, and rosemary for their health benefits and useful oils.
200. Study how plants keep enough water and sunlight to live without drying out.

Animal Behavior and Zoology Projects

201. Study how chameleons, moths, and deer hide from enemies by their colors.
202. Test if dogs and cats learn to hear their names and do simple tasks.
203. Compare ants that farm fungi and ants that hunt for food to see their groups.
204. Study how birds use the sun, stars, and Earth's magnet to fly long distances.
205. Test if fish, birds, and lizards like certain colors in their food and homes.
206. Compare how crows, raccoons, and octopuses solve food puzzles.
207. Study how monkeys, whales, and bees talk using sounds and smells.
208. Test if parrots and rats can learn to count treats you give them.
209. Compare how lions, bats, and turtles rest and sleep in their homes.
210. Study how squirrels and bears change their habits when food is scarce or cold.
211. Test if dolphins and elephants recognize themselves in mirrors.
212. Compare how wolves, owls, and spiders catch their prey.
213. Study how baby animals learn from mom or the group.
214. Test if dogs, cats, and monkeys show happy or sad feelings you can see.
215. Compare how dolphins, elephants, and rats remember things over days.
216. Study tool use by crows, chimpanzees, and otters to get food or build homes.
217. Test if horses and dolphins can learn tasks to help people.

218. Compare how bears, lions, and beavers guard their areas.

219. Study how elephants and birds teach their young to find food and stay safe.

220. Test if pigeons and rats link sounds or lights with treats or mild surprises.

221. Compare how peacocks, deer, and frogs show off to find mates.

222. Study how foxes and rabbits change when other species share their space.

223. Test if cats and chickens pick certain nesting spots and materials.

224. Compare decision making in wolves, dolphins, and ants when food is scarce.

225. Study how bats, owls, and moles use their senses to move at night.

226. Test if pigs and mice learn by watching other animals do tasks.

227. Compare how puppies, kittens, and chicks play to learn skills.

228. Study how raccoons and pigeons change when people move into their areas.

229. Test if dogs and dolphins form friendships with other species or with people.

230. Compare how cows, birds, and fish find and eat their food.

231. Study how apes and cats use body moves to talk to each other.

232. Test if mice and fish act stressed in hard situations and how they calm down.

233. Compare how kangaroos, penguins, and wolves care for their young.

234. Study how monkeys and hyenas rank who is boss in their groups.

235. Test if parrots and bees learn to tell different colors or shapes apart.

236. Compare escape moves of rabbits, deer, and fish when a predator comes.

237. Study how beavers and birds change their homes to suit themselves.

238. Test if elephants and geese mourn when they lose friends or babies.

239. Compare how bears, squirrels, and turtles change for winter or mating seasons.

240. Study how wolves and cats mark their areas with smells to say who they are.

Biotechnology and Applied Biology Projects

241. Test if vinegar, spice oils, or salt keep food fresh like store preservatives.

242. Study how yeast and bacteria turn milk into yogurt and dough into bread.

243. Compare using bugs and using sprays to keep garden pests away.

244. Test if helpful bacteria can clean up oil spills in water.

245. Study how tiny gene tags help scientists spot different animals or plants.

246. Compare making biofuel from corn, algae, and waste to see which gives more energy.

247. Test if plants changed in labs can make medicine to help people.

248. Study how growing plant cells in jars can save rare plants from dying out.

249. Compare boosting food nutrients by crossbreeding versus by changing genes.

250. Test if filters with living bugs clean water better than normal filters.

251. Study how lab-made materials can be strong and kinder to Earth.

252. Compare yogurts with different probiotics to see which help digestion best.

253. Test if algae made in labs can give us fuel and food faster than crops.

254. Study how DNA barcodes help find bad food or wrong species in products.

255. Compare ways of growing tissues in labs to make new body parts.

256. Test if living cell sensors spot poisons more accurately than machines.

257. Study how making vaccines with biotech stops diseases worldwide.

258. Compare plastic made from plants and from oil to see which harms Earth less.

259. Test if tiny lab bugs can make vitamins better than factory methods.

260. Study how biotech tools help farmers grow more food using less land and water.

Advanced Higher Biology Project Ideas Enzymes

1. Try changing the temperature to see how fast the catalase enzyme breaks down hydrogen peroxide safely.

2. Check if different pH levels make the amylase enzyme work faster or slower when breaking down starch.

3. Look at how the pepsin enzyme works better in acid or in plain water.

4. Add different amounts of salt to see if trypsin still breaks down protein well.

5. Test how ripe fruit changes how well pectinase breaks down fruit cell walls.

6. See if fresh pineapple juice or canned juice has more enzyme activity using a test with gelatin.

7. Freeze and thaw an enzyme to find out if it still works the same or gets damaged.

8. Add heavy metals to enzymes to see if they stop working like they should.

9. Try different washing powders to find out which one works best at cleaning protein and starch stains.

10. Use different amounts of catalase and hydrogen peroxide to test if more enzyme makes the reaction faster.

11. Heat or add acid or base to an enzyme to see when it stops working (denatures).

12. Check if enzymes in different plant parts (leaves, stems, roots) work the same or not.

13. See if enzymes need helper molecules called cofactors or coenzymes to work properly.

14. Try adding special molecules that bind to enzymes and see how they change enzyme activity.

15. Look at how well enzymes from different animals break down food and compare them.

16. Stick enzymes to a solid object and see if they stay stable and can be reused.

17. Try to stop a reaction using its end product to see how feedback inhibition controls enzymes.

18. Compare different protease enzymes to see which one cuts protein chains in specific places.

19. See if natural foods with enzyme blockers slow down digestion and nutrient absorption.

20. Measure how fast an enzyme works using different amounts of substrate to learn about enzyme speed.

21. Compare enzymes from hot-loving bacteria and regular bacteria to see which ones handle heat better.

22. Watch how enzyme activity changes while seeds grow into plants.

23. Use chemicals that stop enzymes forever or for a short time to see how pathways change.

24. Try different carbohydrases and see which ones break down certain sugars or starches better.

25. Use the Bradford test and activity test to check if enzyme amount matches how active it is.

26. Look at where enzymes are inside a cell to see if their location affects how well they work.

27. Compare natural and man-made enzyme blockers used in making medicines.

28. Use different amounts of substrate to test if enzymes follow special patterns in speed changes.

29. See if enzymes work better or worse after they are changed by a process like phosphorylation.

30. Compare normal enzymes to changed ones made for factories to see which works faster or better.

31. Add cleaners or soaps to enzymes to see if they still work well or stop working.

32. Try different methods of cleaning and preparing enzymes to see how pure and strong they are.

33. Compare wet and freeze-dried enzymes to see which stores better at different temperatures.

34. Watch enzyme activity at different times of day to see if it follows a daily rhythm.

35. Change salt levels or liquid types to see how well enzymes stick to their substrates.

36. Try different testing methods to see which one best measures enzyme speed and results.

37. Add things that cause stress to cells and see how enzymes respond or get protected.

38. Change the environment like heat or cold and see if the cell makes more or fewer enzymes.

39. Compare how different enzyme types like oxidoreductases or transferases do their job in reactions.

40. Try fixing broken enzymes using refolding steps or helper proteins and check if they work again.

41. Use engineering methods to change enzymes and make them better for science or business.

42. Look at different ways to use enzymes in making food or products and compare their activity.

43. See if the type of fat in membranes changes how well membrane-bound enzymes work.

44. Study how enzymes pass signals by working one after the other in a chain of reactions.

45. Try different ways to keep enzymes strong for longer use in factories or labs.

46. Watch how enzyme activity changes when cells grow or turn into other cell types.

47. Study how enzyme shapes match their jobs using models and test results.

48. Compare how enzymes work with or without oxygen and see which pathways they use.

49. Shake or push on enzymes to see if they still work under force.

50. Look at how enzymes in peroxisomes help break down fats and do other special jobs.

51. Compare ways to send enzymes into the body for medical help and see which works best.

52. Study how big or small animals follow rules in how fast their enzymes work.

53. See how enzymes change over millions of years and how that helps them do their jobs better.

54. Check different body tissues to see how their enzyme jobs are special.
55. Study if enzymes work along with cell division and DNA copying.
56. Test how small molecules that control enzymes help keep cells balanced and full of energy.
57. Compare different ways to trap enzymes on solids for lab or industry use.
58. Watch how enzymes change in older animals and how that changes metabolism.
59. Study how enzymes with more than one part help each other bind and work better.
60. Compare enzymes in baby, young, and adult animals to see how activity changes.
61. Use lab tools to see if electromagnetic waves or radiation change how enzymes work.
62. Study how enzymes move around inside cells and stay in the right place.
63. Compare treatments that replace missing enzymes in people with enzyme problems.
64. Watch how enzyme work changes with the seasons in animals from different places.
65. Study how an enzyme’s shape-shifting helps it work better with its matching substrate.
66. Compare enzymes in healthy versus sick tissues to see if they can help doctors find diseases.
67. Use light to turn enzymes on or off and see how well this works.
68. Study how fast enzymes break down and how this controls their amount in the cell.
69. Try different ways to get enzymes out of plants or animals and see which one works best.
70. Test how deep-sea or high-up places with pressure affect enzyme speed.
71. Study how enzyme parts fit with their jobs and how that helps reactions happen.
72. Compare enzymes under stress like heat or harmful molecules and see how they hold up.
73. Change enzymes to make them work better using special lab evolution tools.

74. Look at how enzymes work together in pathways and control how fast or slow things move.

75. Try out different things that keep enzymes strong for long-term use.

76. See if enzymes help animals stay alive under stress by watching their speed and action.

77. Study how some enzymes can do more than one job and help many parts of metabolism.

78. Compare enzymes in full, empty, or exercising bodies and see how they change.

79. Study how the gut microbiome changes enzyme work in the body.

80. Look at how enzymes in special cell parts move things between steps in a pathway.

81. Try different ways to find new enzymes in nature and compare how well they work.

82. Check if more animals in one place change how enzymes work in their community.

83. Study how enzymes change shape when something binds far away to control activity.

84. Compare enzyme activity in different sicknesses to help doctors find better treatments.

85. Try using lab-built control systems to turn enzymes on and off for science uses.

86. See how enzyme changes from the past shape how cells build reaction networks.

87. Compare different tags that help find and purify enzymes in lab work.

88. Study how gene control changes enzymes by adding marks to DNA or changing structure.

89. See how some enzymes do more jobs than just speeding up reactions in the body.

90. Compare enzymes in animal or plant partners to see how they help each other live.

91. Use computers to guess how enzymes will work just from their protein code.

92. Look at how groups of enzymes pass stuff along without letting anything leak out.

93. Try different mixes of enzymes for farming and see which help crops grow or stay safe.

94. Watch if daily clocks in animals change how well enzymes work at different times.

95. Learn from nature’s enzymes to design new lab-made ones for making chemicals.

96. Compare enzymes in very hot, cold, salty, or dry places to see how they survive.

97. Use light-controlled switches to make enzymes work at the right time.

98. Study how many enzymes together do things that a single one can’t.

99. Compare mixes of enzymes that break down plants for fuel to see which ones are best.

100. Watch if each animal or plant has special enzyme patterns that help tell species apart.