Alternative Project Genetics
For students with a C- or lower in the 'product' part of the AP biology grade. Replaces one score, up to 25 points.

Q1: Do non-lethal dominant alleles result in a higher frequency of the dominant phenotype in a population?

Q2: Are linked genes more frequent in the population than recombinant genes?

Q3: Are X-linked traits more frequent in males?

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1. Project requirements:

- Choose a trait in a population represented by at least two alleles, and for which the gene/allele relationship is understood. Use published, professional sources (no Wikipedia) to research the trait, including the genes involved, their location in the genome, phenotypic expressions of the trait, and the estimated frequencies in the population (national, global, by sub group, etc.).

- Write conditional, justified hypotheses for one question above, specific to your trait.

- Complete field research by collecting a large body of data that you analyze and compare to your predictions and to the project question. Your analysis must include statistics: either chi-square or Hardy-Weinberg.

- Keep written records of all lab work: field notes, calculations, etc; turn in with paper.

- The final product is a lab report, in paper or digital presentation format. Begin with a background section explaining in detail the genetic nature of the trait researched. Follow with the usual elements of a lab write up – objective, hypotheses, research results in both table and graph forms (for entire sample and a sub-group), written & mathematical analyses, and conclusions.

2. Research specifics:

- Choose an irrelevant, and therefore non-controversial, trait.

- Collect a large sample (100+ people; 50+ animal). **Visually verify the trait in each case**.

- For each sample, collect additional data on subject age and gender, location and date of sample, and obtain a verifying signature. Record all in a data table in the field notebook.

- Remember to always POLITELY ASK prospective participants and to say THANK YOU to each person solicited.

- Do not plan to collect data on private property, like a shopping center, without getting permission in advance. This isn't necessary if you choose a public area, like a park.

- For safety, research that involves questioning subjects at a park, farmers market, etc., should not be done alone. Pair up with another student (with a different query) you or bring a family member or friend along.

- Preparing data tables ahead of time and using clipboards, a folding table, an explanatory sign, etc. will make the fieldwork easier.

- Do not have your parents conduct the research for you at their place of work.

- Use the data collected to calculate the frequency of each phenotype in the entire sample, as well as for at least one sub-group (i.e. gender, age group, etc.)

3. Traits:

- Dominant phenotype listed. Others possible with research/teachers approval

HUMAN	**CAT**
Tongue rolling	Curled ears
Chin cleft	Agouti (striped hair)
Polydactlyly (6+digits)	Polydactlyly (6+ digits)
Hitch-hikers thumb	Piebald (white-spotting)
Hanging earlobes	Short hair
Widows peak	
Mid-digit finger hair	
Red-green color-blindness	**DOG**
Linked freckles/hair color	Pointy ears
Linked hair/eye color	Agouti (striped hair)
Linked skin/hair color	
Rh blood group	
ABO blood group	

4. Timeline:

√ Decide/tell me: What, Where, When, and what 'Product' grade the work is replacing.

√ Evidence of data collection (tables) ***by Thursday 5/23***

√ Lab report & field notes due ***Final exam period***