Genetics CWA

The Genetics CWA is designed to be an open argument. The overarching question is: What should Suzanne do? Should she be tested? The following handouts are included:

- Prompt: Genetics CERR
- Alzheimer's Case Study: http://sciencecases.lib.buffalo.edu/cs/collection/detail.asp?case_id=277&id=277
- Rubric
- Sample Student Response

Students should be provided the "Genetics CERR" handout. This handout includes the prompt, data, and a response section. In addition to providing a specific CERR rubric that corresponds to this topic, a sample student response is included.

Genetics CERR

Read the scenario below about a woman faced with decision about whether to get genetic testing.

Living With Her Genes: Early Onset Familial Alzheimer's Disease!"

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Adapted From: sciencecases.lib.buffalo.edu:
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Part I - Confronting the Future

Suzanne, a woman in her early 30s, has learned the devastating news that her 38-year-old sister, Karen, has been diagnosed with early-onset familial Alzheimer's disease (EOFAD) through the use of a genetic screen. Karen started experiencing symptoms such as progressive memory loss, confusion, poor judgment, and language problems in her late 30s. Karen is no longer able to care for her two children and is in a nursing home, where she may live another 10 or more years, although her state will deteriorate with time. This is similar to what Suzanne's dad experienced before he died of EOFAD complications when he was just 42. Furthermore, one of her dad's parents (his mother) also had EOFAD. Suzanne's mother did not have EOFAD. Suzanne is distraught, both by the thought of losing her sister and by the fact that she may be carrying the gene for this disease herself. Since she is a genetic counselor, she understands the pattern of inheritance of the gene for this autosomal dominant hereditary disease, and its implications for her own life.

Scientists working on the Human Genome Project have identified three gene mutations responsible for EOFAD. Clinical testing for these mutations is available, and tests on Karen revealed that she has one of these mutations, called APP. APP is a dominant gene. This is a relatively rare mutation, affecting only 5% of people diagnosed with EOFAD.

She and her husband, David, are struggling with the decision of whether Suzanne should be tested, since they know that no effective treatment or cure for EOFAD exists and the probability of having inherited the gene and remaining unaffected is very small. In addition, there are implications for insurance coverage, potential discrimination by employers, and the likelihood that family and social interactions will change. And, if Suzanne carries the gene, if she had children, they could potentially inherit it. Suzanne and David have been considering having a child of their own.

Question: Should Suzanne be tested for APP?

Make a claim and support it with evidence and reasoning. Your reasoning should include biological concepts you have learned as well as other ethical conisderations. There is no right answer; what matters is how you justify your choice.

Don't Forget to...

Plan your writing using an outline, web or graphic organizer. As you write each draft of your assignment, it's important to use what you know as a writer to communicate your ideas effectively.

- ✓ Provide a clear claim that answers the question.
- ✓ Include evidence using data from class activities, experiments and other resources.
- ✓ Include reasoning to show how your evidence supports your claim.
- ✓ Use vocabulary that you have learned in science class.
- ✓ Correct grammar, punctuation, and spelling errors.

Claim: Write a statement that answers the question above.

Evidence: State the evidence including relevant data about EOFAD for Suzanne's family.

Reasoning: Explain why the evidence supports the claim. Your reasoning should include biological concepts you have learned as well as ethical conisderations.

Rebuttal: Address an argument that someone who disagrees with you might make. Don't forget to argue why your claim is stronger.

Genetics CERR Rubric

	Exemplary	Proficient	Needs Improvement	Critical Area
Claim:	☐ Accurately states whether or not Suzanne should be tested based on his/her analysis of the evidence, using precise language that corresponds to the question ☐ Written in complete, easy to understand sentence(s)	☐ Accurately whether or not Suzanne should be tested, using language that generally corresponds to the question ☐ Written in complete, easy to understand sentence(s)	☐ Answers the question but uses vague or unclear language. ☐ Inaccurately or incompletely answers the question, and/or ☐ Not written in complete, easy to understand sentence(s)	☐ Does not make a claim, or makes a completely inaccurate claim.
Evidence: **weighted x 2**	☐ Provides specific, appropriate, and ample evidence that supports claim, including: ☐ Phenotypic pattern of EOFAD in Suzanne's family ☐ Suzanne's risk of having allele's for EOFAD ☐ Risk for Suzanne's children to have EOFAD	☐ Provides specific, appropriate, and sufficient evidence that supports claim. May include some inappropriate evidence ☐ Phenotypic pattern of EOFAD in Suzanne's family ☐ Suzanne's risk of having allele's for EOFAD ☐ Risk for Suzanne's children to have EOFAD	☐ Provides appropriate, but insufficient or unclear evidence to support claim. May include some inappropriate evidence ☐ Addresses 1-2 of bullet points from Exemplary	☐ Does not provide evidence, or only provides inappropriate evidence (evidence that does not support claim)
Reasoning: **weighted x 2**	☐ Correctly and clearly connects the evidence to the claim, showing how it supports whether or not Suzanne should be tested ☐ Identifies and applies scientific concepts about dominance ☐ Discusses ethical analysis, considering Suzanne's children and quality of life ☐ Applies concepts that go beyond the prompt, as appropriate	☐ Correctly and adequately connects the evidence to the claim, showing how it supports whether or not Suzanne should be tested ☐ Identifies and applies scientific concepts about dominance ☐ Discusses one ethical issue concerning Suzanne's decision	☐ Correctly connects the evidence to the claim, but leaves out important details, and/or ☐ Partially identifies and applies genetics concepts and/or ☐ Does not apply ethical analysis ☐ Restates the evidence without connecting it to the claim	☐ Does not provide reasoning, or only provides reasoning that does not connect evidence to the claim, and/or ☐ Provides an incomplete generalization, or does not apply appropriate scientific concepts
Rebuttal:	☐ Correctly identifies the opposite choice as a counter-argument to the claim. ☐ Explains, in your own words, why your claim is a better claim,	☐ Correctly identifies the opposite choice as a counter-argument ☐ Explains, mostly in your own words, why your claim is a better claim than the counter-argument using some evidence	☐ Identifies the other choice as a possible counter-argument, but includes evidence but not reasoning or reasoning but not evidence to show why your claim is better than the	☐ Does not identify appropriate counter arguments, and/or ☐ Does not provide sufficient evidence to address counter arguments, or provides more support for the counter-

	☐ Gives evidence and reasoning why someone might make opposite claim ☐ Explains, in your own words, why your claim is a better claim, using evidence and reasoning	and incomplete reasoning	counter-argument	argument then the original claim
Writing: *Use appropriate structure, grammar, and mechanics to communicate your argument.*	☐ Writing contains no grammatical or spelling errors ☐ Writing is clear, concise, and persuasive	☐ Writing contains very few grammatical or spelling errors ☐ Writing is clear, mostly concise, and well developed	☐ Writing is fairly clear, with some grammatical or spelling errors ☐ Writing could be more concise	☐ Writing is difficult to follow, with many grammatical errors and no clear structure ☐ Writing is either too wordy or too incomplete

Genetics CERR Sample Response: Yes

Claim:

Yes, Suzanne should get tested because of the implications for her children.

Evidence:

Suzanne's mother did not have EOFAD, therefore she could not have passed on a disease allele to Suzanne. Suzanne's dad had EOFAD. Consequently, she has a 50% chance of getting EOFAD. If Suzanne has the allele for EOFAD, her children have a 50% chance of having the disease.

Reasoning:

The reason Suzanne has a 50% chance of getting the disease is because EOFAD is dominant. For a dominant gene, an individual only needs to have one copy (or one allele) to have the disorder. Since Suzanne's mother did not have EOFAD, this means she did not have an allele to pass on to Suzanne. On the other hand, since Suzanne's dad did have EOFAD, that means he had one allele, which Suzanne has a 50% change of receiving.

Since Suzanne has a 50% chance of having EOFAD and of passing it on to potential children, she should get tested. Suzanne and her husband should know whether Suzanne has a chance of passing on this disorder to their children since it is a dominant disorder. The degenerative nature of the disorder and impact on family members for care, etc. are important considerations. In addition to the possibility of passing on the disorder, Suzanne and her husband should think about the impact on potential children of having a parent who may develop the disorder, need care, lose the ability to recognize her children, and probably die prematurely. Although EOFAD is more genetically determined than regular Alzehimer's and many diseases, knowing Suzanne's risk may help her and her husband make life decisions as well as explore research, etc. It is possible that research will help to develop treatments or preventative measures before Suzanne is affected. Early detection or preventive measures could possibly help at that point.

Rebuttal:

Some ethicists and medical professionals might argue that Suzanne should not get tested since knowing whether or not she is at risk will not change her life outcomes, as treatments are currently unavailable. Having the information might also influence insurance companies to charge more or violate privacy in sharing her information. Suzanne and her husband should not be the judge of who should live/come into existence or judge that the life of someone who will develop EOFAD is not worth living. Despite these difficult issues to consider, Suzanne has an obligation to be tested and find out her risk because of the impact on potential children. Her husband should, at the very least, have the information as they make this decision about possibilities for another's life.