**Review Worksheet: Heterozygote Advantage Name: ……………………………………………………………..**

*Do these questions, using your learning resources. Look at the “marks” to give you an idea of the level of detail required in the response (formative only – does not count towards your grade). At the end, mark your work, correct it, and fill in the reflection section. Questions marked \* require you to use reasoning, inferring and application of knowledge, or perhaps extra research to get the answer. It won’t be right there in the text.*

1: Fill in the table below to provide information about heterozygote advantage for the following diseases.

(38 marks)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Disease Name** | **Cause and inheritance** | **Symptoms** | **Selective Agent for Heterozygote Advantage** | **Genotype advantage when agent present and why** | **Effect on allele frequency when agent present** | **Effect on allele frequency when agent absent** |
| Sickle Cell Anaemia |  | **Dominant (no faulty alleles)***:*  **Heterozygous (one faulty allele)**  **Recessive (two faulty alleles)** |  |  |  |  |
| Alpha Thalassemia |  | **Dominant (no faulty alleles):**  **Heterozygous (one faulty allele):**  **Recessive (two faulty alleles)** |  |  |  |  |
| Tay-Sachs Disease |  | **Dominant (no faulty alleles):**  **Heterozygous (one faulty allele)**  **Recessive (two faulty alleles)** |  |  |  |  |

2: Ashkenazi Jewish people have a higher allele frequency for Tay-Sachs disease. In part this may be because during World War II they were placed in ghettos and concentration camps with cramped conditions and a high prevalence of tuberculosis, so that the allele rose in the population due to heterozygote advantage.

What other reasons may have caused increased allele frequency for Tay-Sachs disease in Ashkenazi Jews during the second world war, and why is the allele frequency still higher in this population today?\*

(6 marks)

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3: Alleles for beta thalassemia are more frequent around the Mediterranean, but there is no evidence that heterozygote advantage is occurring. Suggest another reason why the allele frequency for beta thalassemia may have remained high.\*

(6 marks)

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4: Describe how steroid hormones have their effect on the target cell.

(7 marks)

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Go back and mark your work using the marking key provided. What score did you get? /69

*I included enough detail in my answers.*



*I was able to find information in the text/powerpoint presentation.*

*I was able to reason and infer where the information wasn’t directly in the text (questions with \*).*

*I marked my work and wrote down any answers where I missed marks.*