Name:

Abstract

[Write a short paragraph to explain the goals and results of the project - no more than 5 sentences]

Background

[3-4 paragraphs: Explain the purpose and goals of MRE design. Research and explain the chemical reactions of MREs. Provide data on the health effects of the chemical components of MREs and analyze the safety of these chemicals. Describe the environmental impact of these chemicals. Describe applications of the MRE design in serving malnourished countries. VIDEO]

Procedure

[Write a detailed procedure that explains each experiment in detail. See procedure example.]

Data & Analysis

Data Table 1 -- Comparison of different salts

Salt	NaCl	$CaCl_2$	$NaC_2H_3O_2$	Na_2CO_3
mass of salt (g)				
Volume water (mL)				
Initial Temperature				
Final temperature				

Calculation of the molar enthalpy (ΔH) of the reaction (VIDEO)

Salt	NaCl	$CaCl_2$	$NaC_2H_3O_2$	Na_2CO_3
Mass of water (g)				
ΔT				
Q (heat change)				
n (moles of salt)				
ΔH (Q/n)				

Explanation (show work and/or explain the calculations for one of the salts):

Calculations for determining optimum heat for an MRE (VIDEO)

	Data & Calculations
Mass of food + MRE pack	
Initial temperature	
Desired food temperature	
Specific heat*	
Heat needed	

*Assume the specific heat is the same as water

Explanation (show work and/or explain the calculations for determining the optimum heat for the calorimeter):

Data Table 2 -- Cost & Environmental Impact Comparison

Salt	NaCl	$CaCl_2$	$NaC_2H_3O_2$	Na_2CO_3
Cost per ton (including source)				
Environmental impact information (including source)				

Explanation on the selection of the best salt from the data above:

Calculation of the amount of salt needed in given water to produce optimum heat (VIDEO).

Data Table 3 -- Testing concentration vs. time

	Temperature (°C) of varying concentrations of _____(←Formula of chosen salt)		
mass (g) →			
Volume water (mL) →			
Concentration (mass %)			
Time (s)	**Record temperature below**		
0			
10			
20			
30			
40			
50			
60			
70			
80			
90			
100			
110			
120			

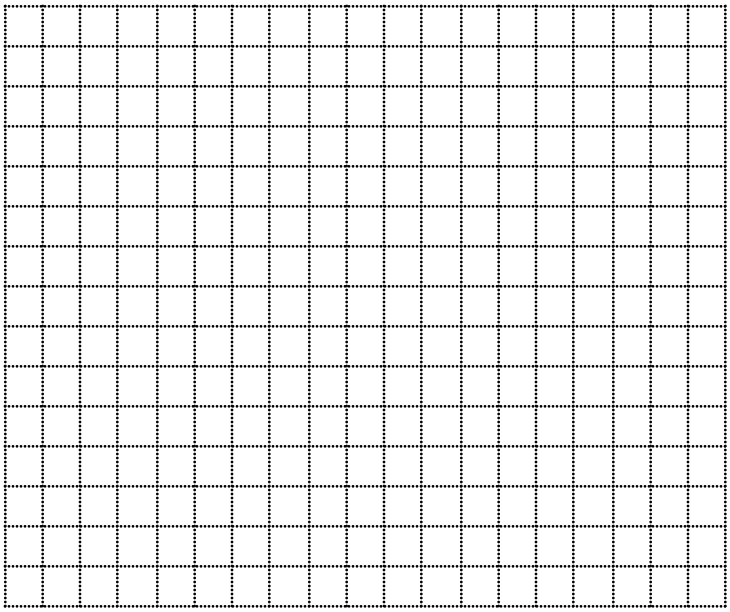
- **Explanation on the selection of the best concentration/amount of the selected salt from the data above and previous calculations:**

- **Explanation on the expected cost per MRE.**

- **Explanation on the environmental impact and how this impact can be reduced.**

Graph

[Graph the temperature (y-axis) vs. the time (x-axis) for data table 3. VIDEO]



Conclusion

[CER sentence frames]

- [Claim: what is the best formula (type of salt, amount of salt, amount of water)]:

- [Evidence: List specific evidence from analysis to support the claim above]:

- [Reasoning: Explain how the evidence supports the claim]:

Works Cited

[MLA style citations]