

## TABLE OF CONTENT

	Page Number
<b>DEDICATED PAGE</b>	<b>i</b>
<b>ORIGINAL STATEMENT PAGE</b>	<b>ii</b>
<b>THESIS PUBLICATION APPROVAL PAGE</b>	<b>iii</b>
<b>BIOGRAPHY</b>	<b>iv</b>
<b>ABSTRACT</b>	<b>v</b>
<b>PREFACE</b>	<b>vi</b>
<b>TABLE OF CONTENT</b>	<b>viii</b>
<b>LIST OF FIGURE</b>	<b>xi</b>
<b>LIST OF TABLE</b>	<b>xii</b>
<b>LIST OF APPENDICES</b>	
<b>CHAPTER I INTRODUCTION</b>	<b>1</b>
1.1 Background	1
1.2 Problem Identification	3
1.3 Problem Limitations	4
1.4 Problem Formulation	4
1.5 Objectives	4
1.6 Benefits of Research	5
1.7 Operational Defenition	5
<b>CHAPTER II LITERATURE REVIEW</b>	<b>6</b>

2.1	Territorial Framework	6
2.1.1	Understanding of Development Research	6
2.1.2	Purpose of Development Research	8
2.1.3	Steps of Development Research	8
2.1.4	Development Research Model in Education	9
2.2	Test	10
2.2.1	Defenition of test	10
2.2.2	Selected-Response Tests	10
2.3	Diagnostic Test	11
2.3.1	Definition of Diagnostic Tests	11
2.3.2	Scope of Diagnostic Tests	12
2.3.3	Purpose of Diagnostic Tests	12
2.3.4	Characteristics of Diagnostic Tests	13
2.3.5	Kinds of Diagnostic Tests	13
2.3.6	Steps for Developing a Diagnostic Test	14
2.4	Knowledge Dimension	16
2.5	Subject	17
2.5.1	Waves	17
2.5.2	Sound Wave	21
2.6	Relevant Research Studies	25
2.7	Thinking Framework	27
2.8	Hypothesis	29
<b>CHAPTER III RESEARCH METHOD</b>		<b>30</b>
3.1	Location and Time of Research	30
3.2	Participants of Research	30
3.3	Variable of Research	30
3.4	Type of Research	30
3.5	Procedure of Research	31

3.6	Instrument of Research	31
3.7	Data Collection Technique	32
3.8	Data Analysis Technique	33
<b>CHAPTER IV THE RESULTS OF THE RESEARCH AND DISCUSSION</b>		<b>43</b>
4.1	The Results of The Research	43
4.1.1	Need Analysis	43
4.1.2	Planning	44
4.1.3	Developing Preliminary Form of Product	44
4.1.4	Preliminary Field Testing	76
4.1.5	Revising main product	77
4.1.6	Main Field Testing	77
4.2	Discussion	87
<b>CHAPTER V CONCLUSION AND SUGGESTION</b>		<b>90</b>
5.1	Conclusion	90
5.2	Suggestion	91
<b>REFERENCES</b>		<b>92</b>
<b>APPENDICES</b>		<b>95</b>



## LIST OF FIGURE

	Page Number
Figure 2.1. Steps in Developing Research	7
Figure 2.2. Transverse Wave	15
Figure 2.3. Longitudinal Wave	16
Figure 2.4. Wavelength Expression	16
Figure 2.5. The Wave Traveling in the Direction Position	18
Figure 2.6. Standing Wave Pattern for Open Tubes at Both Ends	20
Figure 2.7. Standing Wave Pattern on a Close Tube	21
Figure 2.8. Schematic Framework	25
Figure 3.1. Procedure of Research	28

UNIVERSITAS NEGERI MEDAN  
UNIMED

THE  
*Character Building*  
UNIVERSITY

## LIST OF TABLES

	Page Number
Table 2.1. Relevant Research Studies	22
Table 3.1. Validation of Test Instrument	30
Table 3.2. Validation Criteria	31
Table 3.3. The Range of CVR and CVI	33
Table 3.4. Question Reliability Criteria	34
Table 3.5. Difficulty Level Criteria	35
Table 3.6. Distinguishing Power Criteria	35
Table 3.7. The Effectiveness of the Distracting Index Criteria	36
Table 4.1. Validator Assessment	42
Table 4.2. Revisions Based on Validator Inputs and Suggestions	42
Table 4.3. Validation of CVR and CVI Contents	71
Table 4.4. Results of the Validity Analysis of the Diagnostic Test	77
Table 4.5. Reliability Analysis Results of Diagnostic Test	78
Table 4.6. Distinguishing Power Analysis Results for Diagnostic Tests	78
Table 4.7. Results of Difficulty Level Analysis of Diagnostic Tests	79
Table 4.8. Results Effectiveness of the Distracting Index	80
Table 4.9. Percentage Level of Students' Concept Understanding	82

## LIST OF APPENDICES

	Page Number
Appendix 1 DIAGNOSTIC TEST INSTRUMENT DESIGN	95
Appendix 2 EXPERT VALIDATION SHEET	125
Appendix 3 The Instrument that Used on Preliminary Field Testing	128
Appendix 4 Analysis Table of Validity and Reliability on Preliminary Field Testing	137
Appendix 5 The Instrument that Field Testing	138
Appendix 6 Table of Validity and Reliability Field Testing	146
Appendix 7 Analysis Table of Difficulty Level Field Testing	147
Appendix 8 Analysis Table of Distinguishing Power	148

THE  
*Character Building*  
UNIVERSITY