

TABLE OF CONTENTS

APPROVAL SHEET	<i>i</i>
ORIGINALITY STATEMENT	<i>ii</i>
AGREEMENT PAGE FOR PUBLICATION	<i>iii</i>
BIOGRAPHY	<i>iv</i>
ABSTRACT	<i>v</i>
PREFACE	<i>vi</i>
TABLE OF CONTENTS	<i>viii</i>
LIST OF FIGURES	<i>x</i>
LIST OF TABLES	<i>xi</i>
LIST OF APPENDIX	<i>xii</i>
CHAPTER I INTRODUCTION	1
1.1. Background Problem.....	1
1.2. Problem Identification.....	3
1.3. Scope of Research.....	4
1.4. Scope of Problem	4
1.5. Problem Formulation	4
1.6. Research Purpose	5
1.7. Research Benefits.....	5
CHAPTER II LITERATURE REVIEW	7
2.1. Research and Development.....	7
2.2. 4-D Development Model.....	8
2.3. Student Worksheet	10
2.3.1. Definition of Student Worksheet.....	10
2.3.2. Function of Student Worksheet.....	11
2.3.3. Preparation Steps of Student Worksheets	11
2.3.4. Advantages and Disadvantages of Student Worksheets.....	12
2.4. Learning Cycle 7-E Model.....	13
2.4.1. Learning Cycle 7-E Model Definition	13
2.4.2. Learning Cycle 7-E Model Purpose	14
2.4.3. Learning Cycle 7-E Model Benefit	14
2.4.4. Stages in Learning Cycle 7-E.....	15

2.4.5. Advantages and Disadvantages of the 7-E Learning Cycle Model.....	16
2.5. Student Worksheets Oriented Learning Cycle 7-E Model.....	17
2.6. Critical Thinking Skills.....	18
2.7. Reaction Rates.....	20
2.7.1. Reaction Rates Definition.....	20
2.7.2. Factors Affecting Reaction Rates.....	23
2.7.3. Collision Theory.....	24
2.7.4. Reaction Order.....	26
2.8. Thinking Framework.....	28
CHAPTER III RESEARCH METHODOLOGY	31
3.1. Research Location and Time.....	31
3.2. Research Subjects and Objects.....	31
3.3. Research Design.....	31
3.4. Operational Definition.....	31
3.5. Research Instrument.....	32
3.6. Data Collection Technique.....	34
3.7. Research Procedure.....	35
3.8. Data Analysis.....	37
CHAPTER IV RESULT AND DISCUSSION	43
4.1. Result of Research.....	43
4.1.1. Results of the Define Stage.....	43
4.1.2. Result of the Design Stage.....	45
4.1.3. Results of the Develop Stage.....	47
4.1.4. Results of the Dissemination Stage.....	53
4.2. Discussion.....	57
CHAPTER V CONCLUSIONS AND SUGGESTIONS	62
5.1. Conclusions.....	62
5.2. Suggestions.....	62
BIBLIOGRAPHY	64
APPENDIX.....	71