

C O N T E N T S .

Acknowledgement	oo	oo	oo	oo	oo	i
Contents	oo	oo	oo	oo	oo	ii
List of Tables	oo	oo	oo	oo	oo	v
List of Graphs	oo	oo	oo	oo	oo	vii
List of Diagrams and Charts	oo	oo	oo	oo	oo	viii
CHAPTER I: INTRODUCTION	oo	oo	oo	oo	oo	1-18
1.1 Learning Theories	oo	oo	oo	oo	oo	2
1.2 Intellectual Development	oo	oo	oo	oo	oo	4
1.3 Instructional Design	oo	oo	oo	oo	oo	9
1.4 Science Instruction	oo	oo	oo	oo	oo	12
1.5 Title of the Investigation	oo	oo	oo	oo	oo	14
1.6 Objectives of the Study	oo	oo	oo	oo	oo	14
1.7 Hypotheses	oo	oo	oo	oo	oo	15
1.8 Conclusion	oo	oo	oo	oo	oo	17
CHAPTER II: RELATED LITERATURE	oo	oo	oo	oo	oo	19-96
2.1 Introduction	oo	oo	oo	oo	oo	19
2.2 Contributions from General Theories	oo	oo	oo	oo	oo	20
2.3 Recent Contributions from Theories of Instruction	oo	oo	oo	oo	oo	28
2.4 An Overview of Gagne's Conditions of Learning	oo	oo	oo	oo	oo	42
2.4.1 Gagne's Theoretical Position	oo	oo	oo	oo	oo	43
2.4.2 Learned Capabilities	oo	oo	oo	oo	oo	47
2.4.3 Intellectual Skills	oo	oo	oo	oo	oo	54
2.4.4 Task Analysis	oo	oo	oo	oo	oo	70
2.4.5 Learning Hierarchies	oo	oo	oo	oo	oo	73
2.4.6 Gagne and Science Processes	oo	oo	oo	oo	oo	77
2.4.7 Philosophical Basis of Gagne's Views of Science Processes	oo	oo	oo	oo	oo	79
2.5 Instructional Design	oo	oo	oo	oo	oo	81
2.6 Conclusion	oo	oo	oo	oo	oo	96

CHAPTER III: SCIENCE INSTRUCTION RESEARCH IN INDIA	97-110
3.1 Introduction 	97
3.2 Reported Researches 	99
3.3 Conclusion 	110
CHAPTER IV: DEVELOPMENT OF INSTRUCTIONAL MATERIAL	111-158
4.1 Introduction 	111
4.2 Classroom Learning Material (CLM)	112
4.2.1 Selection of Topics ..	113
4.2.2 Formation of Sequences ..	114
4.2.3 Task Analysis 	115
4.2.4 Generation of Learning Hierarchies 	121
4.2.5 Development of Instructional Material Based on Learning Hierarchy 	126
4.2.6 Evaluation Questions ..	143
4.3 Home Assignment Material (HAM) ..	145
4.3.1 Self Learning Material (SLM)	146
4.3.2 Self Evaluation Material (SEM)	150
4.4 Assessment Material 	153
4.5 Initial Validation of the Material	156
CHAPTER V: THE EXPERIMENT 	159-241
5.1 Introduction 	159
5.2 Design 	161
5.3 Sample 	163
5.4 Treatment 	164
5.5 Data Collection 	174
5.6 Data Analysis 	175
5.6.1 Analysis of Individual Tests	176
5.6.2 Capability Level Analysis	212
5.6.3 Analysis of Covariance ..	227
5.7 Discussion 	233
5.8 Conclusion 	239

CHAPTER VI: LEARNING HIERARCHY	..	..	..	242-278
6.1 Introduction	..	..	..	242
6.2 Studies in Learning Hierarchies	..			244
6.3 The Purpose of the Study	..	..		253
6.4 Method	..	..	..	255
6.5 Data Analysis and Discussion	..			257
6.6 Conclusion	..	..	..	276
CHAPTER VII: COGNITIVE PREFERENCES	..	..		279-300
7.1 Introduction	..	..	..	279
7.2 Previous Studies	..	..	..	283
7.3 Purpose	..	..	..	286
7.4 Sample	..	..	..	288
7.5 Instrumentation	..	..	..	288
7.6 Procedure	..	..	..	294
7.7 Analysis of Results	..	..	..	294
7.8 Discussion and Conclusions	..	..		299
CHAPTER VIII: SUMMARY	..	..	..	301-321
8.1 Introduction	..	..	..	301
8.2 Objectives of the Study	..	..		306
8.3 Hypotheses	..	..	..	307
8.4 Plan and Procedure	..	..	..	309
8.4.1 Sample	..	..	..	309
8.4.2 Design	..	..	..	309
8.4.3 Development of Instructional Material	..	..	..	310
8.4.4 Treatment	..	..	..	313
8.4.5 Data Collection and Analysis				315
8.5 Major Finding	..	..	..	315
8.6 Educational Implications	..	..		317
8.7 Conclusion	..	..	..	319
REFERENCES	..	..	..	322-353
APPENDIX I	..	..	..	354-526
APPENDIX II	..	..	..	527-532