

# Contents

<i>Preface</i>	ix
1. Prelude	1
2. The Scientific Method	3
2.1 Edwin Smith papyrus	3
2.2 Greek philosophy (4 <sup>th</sup> century BC)	4
2.3 Islamic philosophy (8 <sup>th</sup> century AD–15 <sup>th</sup> century AD)	6
2.4 European Science (12 <sup>th</sup> century AD–16 <sup>th</sup> century AD)	7
2.5 Scientific Revolution (1543 AD–18 <sup>th</sup> century AD)	9
2.6 Humanism and Empiricism	13
2.7 The Scientific Method	15
2.8 Application of the Scientific Method to Everyday Problem	16
3. Observation	17
3.1 External information	21

3.1.1	Missed information	21
3.1.2	Misinformation	22
3.1.3	Hidden information	27
3.1.4	No information	32
3.1.5	Unaware information	35
3.1.6	Evidence-based information	37
3.2	Internal information	37
3.2.1	Self-denied information	38
3.2.2	Biased information	39
3.2.3	Unexploited information	40
3.2.4	Peripheral information	42
4.	Hypothesis	45
4.1	Abduction	55
4.2	Wild conjectures	57
4.3	Albert Einstein	61
5.	Experiment	65
5.1	Experiment versus hypothesis	79
5.2	Platonic, Aristotelian, Baconian, and Galilean methodology	81
6.	Recognition	83
6.1	John Nash	92
7.	Problem Situation and Problem Definition	97
7.1	Perspectives on different levels	97
7.2	Perspectives on the same level	98
8.	Induction and Deduction	107
8.1	Induction	107
8.2	Deduction	110
9.	Alternative Solutions	119
9.1	Lotion bottle with a pump dispenser	137

10. Relation	139
10.1 Creativity	149
10.1.1 Ordinary thinking	150
10.1.2 Creative thinking	151
10.1.2.1 Knowledge	151
10.1.2.2 Insight	152
10.1.2.3 Unconscious mind	153
10.1.3 Double helix	154
10.1.3.1 Genetic material	154
10.1.3.2 Watson and Crick at Cavendish Laboratory, Cambridge	155
10.1.3.3 Rosalind Franklin at King's College, London	158
10.1.3.4 The triple helix model	159
10.1.3.5 The double helix model	161
10.1.4 Creative thinking and Ordinary thinking	164
10.2 Scientific Research and Scientific Method	165
10.3 Can we be more creative?	166
11. Mathematics	169
12. Probable Value	195
13. Epilogue	209
<i>Bibliography</i>	213
<i>Index</i>	219