



About This Guide

Integrated waste management refers to the complementary use of a variety of practices to safely and effectively handle municipal solid waste. These practices and associated policies are brought together in a logical framework known as an Integrated Solid Waste Management Programme (ISWMP). The ISWMP in Barbados is an infrastructural project critical to the social and economic development of Barbados.

The main objective of the ISWMP is to develop a modern, dependable and efficient waste management system which would be acceptable to all citizens, which would protect the environment, improve the standard of public health in Barbados and foster the participation of the private sector in a structured manner.

This guide contains a series of interdisciplinary activities and support materials that focus on the often-complicated scientific, technical, and policy issues related to solid waste management. It includes ready-to-use lesson plans, supplemental handouts and hands-on materials that teachers can use to engage their students in Solid Waste Management Education. Each lesson contains detailed procedures, wrap-up activities and ideas for extracurricular projects. It is designed to help students develop skills in critical thinking, problem solving, and decision-making. It also increases environmental awareness and encourages students to become empowered environmental citizens.

The Guide can be used as part of a larger curriculum, as stand-alone activities, or on an occasional basis to teach students about solid waste issues. The Correlation Matrix shows how each lesson and activity helps teachers to meet individual subject needs and national attainment targets. Lessons can also be adapted to individual teacher needs.

We hope that this guide will be beneficial in teachers' efforts to educate students about solid waste management. Additional information and resources can be obtained by contacting the Waste Management Information Centre at (246) 435-6244 or the Sewage and Solid Waste Project Unit at (246) 427-5910/11. Information is also available online at our website at www.solid.gov.bb.



Acknowledgements

The Sewerage and Solid Waste Project Unit of the Ministry of Health, Barbados and The Pan-American Health Organisation (CPC - Barbados) sincerely appreciates the valuable contributions of the following education and environmental professionals to the development of this Guide.

Jennifer Barker	Michael Lewis
Albert Bartlett	Leo Parris
Odessa Bowen	Harry Phillipeaux
Kerry Browne	Sandra Prescod
Linda-Joy Forde	Kenneth Reid
Anthony Foster	Carl Robin
Charmaine Foster	Rudolph Sandiford
Mark Green	Lorna Ward
Yvette Greenidge	Evan Wickham
Kevin Harewood	Maxine Williams
Diana Howell	Annette Wiltshire
Annette Jebodhsingh	Randolph Woodroffe

The author would also like to express his appreciation to Ms. Sandra Prescod and Mr. Ricardo Marshall of the Sewerage and Solid Waste Project Unit of the Ministry of Health, Barbados, for their tremendous assistance in providing information and reviewing drafts of this Guide. Research Assistant, Mr. Christopher Boyce, also made a valuable contribution to this document through the preparation of the case studies and the review of several internet-related resources. Special thanks are also expressed to Ms. Nebia Sammie and Mrs. Pamela Hunte who edited the final document.



Contents

Introduction ▶ 1

Instructional Goals ▶ 2

How to Use This Guide ▶ 2

PART 1 Curriculum Guide ▶ 5

Solid Waste Management Curriculum Framework ▶ 7

Format ▶ 8

Detailed Syllabus ▶ 9

Learning Strategies ▶ 20

Developing Higher Order Skills ▶ 22

Teaching Strategy ▶ 27

Using Rubrics in Assessment ▶ 37

PART 2 Teacher Guide ▶ 43

Module 1	Primer on Solid Waste Management
-----------------	---

Introduction ▶ 45

Module Content ▶ 45

1.1. A Brief History of Waste ▶ 46

1.2. Components of Solid Waste Stream ▶ 47

1.3. Municipal Solid Waste ▶ 48

1.4. Hazardous Waste ▶ 61

1.5. Infectious Waste ▶ 67

1.6. Solid Waste Management ▶ 68

1.7. Importance of Solid Waste Management ▶ 72

Module 2	Government Involvement in Solid Waste Management
-----------------	---

Introduction ▶ 73

Module Content ▶ 73

2.1 The Solid Waste Management Programme in Barbados ▶ 74

2.2 National Agencies Involved In The Regulation And Management Of Solid Waste ▶ 77

2.3 Legislation and Regulatory Framework ▶ 78

2.4 Economics of Solid Waste Management ▶ 78

2.5 Public/Private Involvement ▶ 81

2.6 Regional and International Perspectives of Solid Waste Management ▶ 81

Module 3	Integrated Solid Waste Management
-----------------	--

Introduction ▶ 84

Module Content ▶ 84

3.1 The Solid Waste Management Hierarchy ▶ 85

3.2 Source Reduction ▶ 87

3.3 Reuse ▶ 90

3.4 Recycling ▶ 91

3.5 Composting ▶ 94

3.6 Incineration with Energy Recovery ▶ 101

3.7 Waste Disposal ▶ 103

Module 4	Investigating Solid Waste Management
-----------------	---

Introduction ▶ 112

Module Content ▶ 112

4.1 Developing Research Skills ▶ 113

4.2 Developing Problem Solving and Decision Making Skills ▶ 121

4.3 Conducting a School-based Waste Audit ▶ 124

Module 5	Making a Difference
-----------------	----------------------------

Introduction ▶ **131**

Module Content ▶ **131**

5.1 Impact of Humans on the Environment ▶ **132**

5.2 Environmental Citizenship ▶ **133**

5.3 Youth Participation in Solid Waste Management ▶ **134**

5.4 Community Participation in Solid Waste Management ▶ **137**

5.5 Developing a Community-based Action Plan ▶ **141**

PART 3 Resource Guide ▶ **149**

Section 1	Curriculum Coverage
------------------	----------------------------

Ministry of Education, Barbados ▶ **164**

Caribbean Examinations Council, CSEC ▶ **169**

Caribbean Examinations Council, CAPE ▶ **175**

Section 2	Solid Waste Management Lesson Plans
------------------	--

Lesson Plans, Fact Sheets and Handouts ▶ **177**
(see detailed listing on page 179)

Section 3	Using Technology in Solid Waste Management Education
------------------	---

Introduction ▶ **389**

Educational Software ▶ **389**

Online Resources ▶ **390**

Section 4	Useful Contacts & Resources
------------------	--

Brochures ▶ **396**

Information on Barbados Integrates Solid Waste Management Programme ▶ **397**

Some Local Waste Reduction/Recycling initiatives ▶ **397**

Section 5	Glossary
------------------	-----------------

Solid Waste Management Terms ▶ **398**

Assessment Terms ▶ **407**