Preface

If the idols of scientists were piled on top of one another
in the manner of a totem pole the topmost
would be a grinning fetish called Measurement

Anthony Standen, Science is a Sacred Cow

Green chemistry is currently a field of great interest to many scientists, but is
sometimes perceived as one rooted in descriptive language built around reducing
waste and material recycling. This book seeks to outline a quantitative approach to
green chemistry, at a level easily understood by upper-level undergraduates. It is
written for students, and for university/college instructors seeking to “green” their
courses by framing discussion around four principal metrics. In doing this, one will
REAP the rewards of learning about Reaction mass efficiency, E factor, Atom
economy, and Process mass intensity as measurement tools toward a more sus-
tainable future.

These four metrics might be discussed within, for example, an organic synthesis
course for chemistry students, or as part of a “stand-alone” green chemistry offering
(the type of which is becoming more popular in education around the world). In
addition, time is taken to cover more qualitative methods toward green chemistry
assessment, and the notion of life cycle analysis. All of these concepts are presented
in the context of cutting-edge academic and industrial case studies that showcase
the state of the art. It is sincerely hoped that learning about these topics will
empower students to make informed decisions regarding greener technologies in
their future work.

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