Chapter 1: Biotechnology Industry

1.1 What Is Biotechnology?
- The Biotechnology Toolkit

1.2 Who Uses Biotechnology?
- Life Science Research
  - -Omis and Systems Biology
- Healthcare
  - Drug Discovery, Development, and Testing
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  - Personalized Medicine
  - Clinical Diagnostics
- Agriculture
- Food
- Industrial Manufacturing
- Biofuels
- Mining
- Pollution Monitoring and Waste Management
- Conservation
- Biodefense
- Forensics
- Human Origins
- Nanotechnology

1.3 The Biotechnology Industry
- What Is a Biotechnology Company?
- Biotechnology Product Development
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- Patents

1.4 Governmental Regulation of Biotechnology
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- Regulation of Products in Healthcare
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- Regulation of Human Research
- Regulation of Waste Disposal
- Regulation of Nanotechnology
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1.5 Industry Practices
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1.6 Biotechnology Company Structure

1.7 Careers in Biotechnology
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  - Quality Assurance Technician
  - Research Associate
  - Research and Development Scientist
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  - Engineer
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Chapter 1 Vignettes
Bioethics — Biotechnology: Good or Bad?
Biotech in the Real World — Affecting Government Policy
Biotech in the Real World — Bio-Rad: Then and Now
Careers in Biotech — Timothy Balmorez, Chemist, Bio-Rad Laboratories, Inc.
How To… Write an SOP

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- Biological Safety
- General Laboratory Safety
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- Components of a Laboratory Notebook Entry
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  - Vacuum-Assisted Pipettes
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- Measuring Mass
  - Balances
- Measuring Temperature
  - Thermometers
- Measuring pH
  - pH Meters
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- Washing Glassware
- Disinfecting and Sterilizing
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- Scientific Notation
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2.5 Preparing Solutions
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  - Percentages, Ratios, and Proportions
  - Diluting Percent Solutions
- Using Stock Solutions Given in Terms of “x”
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  - The Mole
  - Molarity
  - Making Molar Solutions
    a. Proportional Method
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- Making Compound Molar Solutions
- Diluting Molar Solutions
- Preparing Small Volume Dilutions
- Normality

Chapter 2 Vignettes

**Bioethics — Waste Disposal**

**Biotech in the Real World — Who Invented Claritin? How Laboratory Notebooks Played Their Part**

**Careers in Biotech — Joshua Moore, Bio-Containment Protocol Support Supervisor, U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID)**

**How To… Use an Adjustable-Volume Micropipet**

Chapter 2 Activities

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2.C Kool-Aid Column Chromatography
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- Bacterial Environments

3.3 Uses of Bacteria in Biotechnology
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3.4 Culturing Bacteria in the Laboratory
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3.5 Microbiological Techniques
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3.8 Eukaryotic Cell Culture
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Bioethics — Should Human Embryos Be Used for Research?

Biotech in the Real World — Artificial Life!

Careers in Biotech — Katie Dalpozzo, Laboratory Research Associate, Bavarian Nordic

How To... Use Aseptic Technique to Transfer Bacteria

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Bioethics — Personal Genetic Information

Biotech in the Real World — Fighting Crime with DNA

Careers in Biotech — Elisa Ciullo, Sr. Supervisor, Clinical Filing Operations, Genentech

How To... Set Up a Restriction Digest

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Bioethics — A World without Antibiotics?

Biotech in the Real World — Biotech on the Pharm

Careers in Biotech — Denise Gangadharan, PhD, Associate Director for Science, Centers for Disease Control and Prevention

How To... Transform E. coli Using Electroporation

How To... Use a Microcentrifuge

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Bioethics — Forensic DNA Databases — Is Your Privacy Protected?

Biotech in the Real World — A Universe of Viruses

Careers in Biotech — Dora Barbosa, Research Associate, University of California San Francisco

How To... Program a Thermal Cycler

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7.6 Protein Production in Industry
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Bioethics — Editing Genes to Cure Disease
Biotech in the Real World — Vaccines in Bananas
Careers in Biotech — Scott Chilton, Marketing Manager, Maravi Life Sciences

How To... Set Up a Vertical Electrophoresis System

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Chapter 8 Vignettes
Bioethics — Testing for HIV Status at Home
Biotech in the Real World — Using Immunodetection to Save the Panda

Biotech in the Real World — Car T Cell Therapy — A New Horizon in Cancer Treatment

Careers in Biotech — Sophy Wong, MD, Associate Clinical Professor of Medicine, University of California San Francisco, CA; Medical Director for HIV ACCESS and AETC

How To... Select an Antibody

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Biotech in the Real World — Regeneron Science Talent Search
Careers in Biotech — Sunny Choe, PhD, Senior Medical Scientist, Gilead Sciences, Inc.
How To... Read a Journal Article

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