

Course introduction

Introduction

Thinking conceptually

The cell theory

Doing biology

Outline

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Ground rules

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Example: cards and drinks

Logical inference

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Experiments

Observational studies

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Algebra

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Hockey



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Cards



Deductive thinking (preview)

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Why are simple things difficult?

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All living organisms are composed of cells

- ▶ A **cell** is a highly organized compartment bounded by a membrane

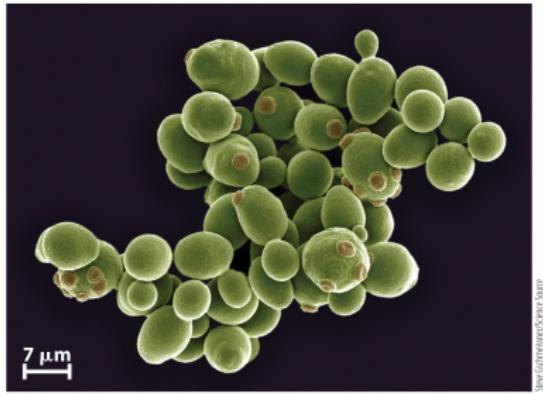


Figure 1.16b
Biology: How Life Works
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All living organisms are composed of cells

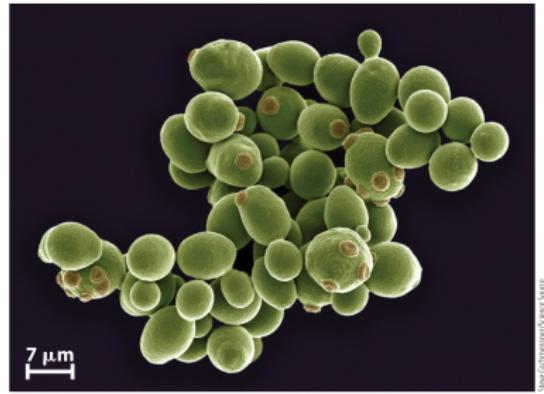


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- ▶ **Genes made of DNA**

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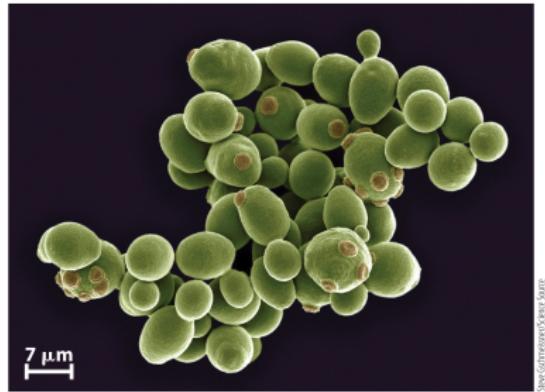


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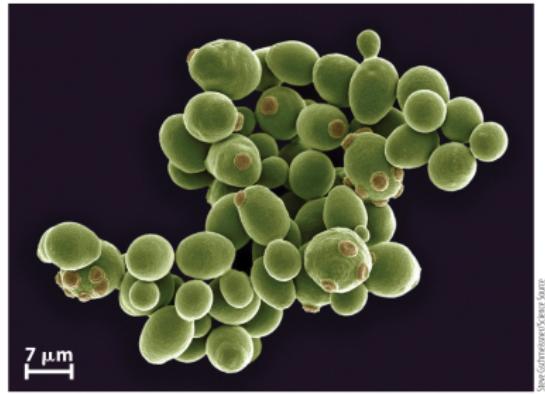
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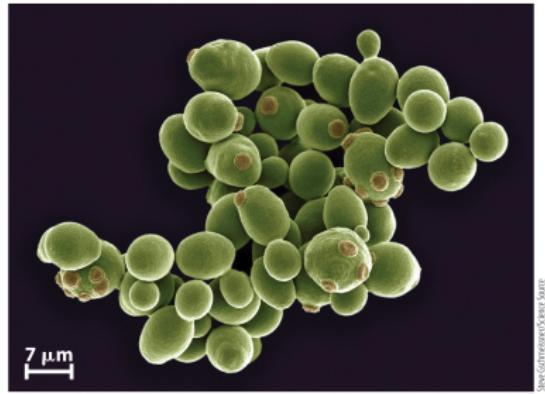


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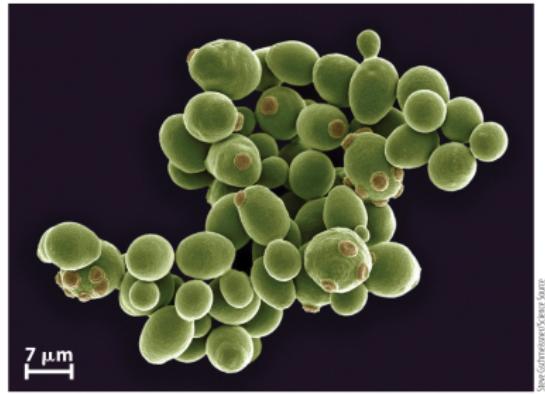


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Cells (outside)

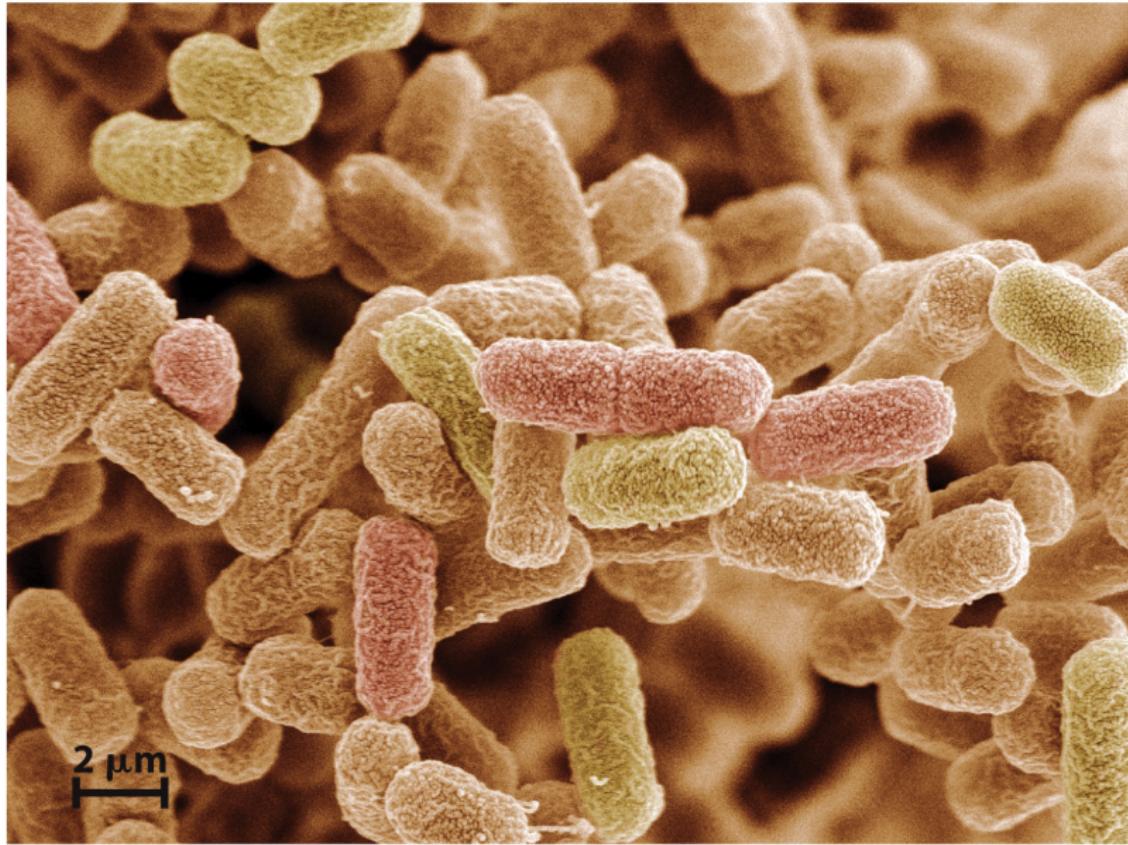


Figure 1.9a
Biology: How Life Works

Steve Gschmeissner/Science Source



Cells (outside)



Figure 1.9d

Biology: How Life Works

Cells (outside)

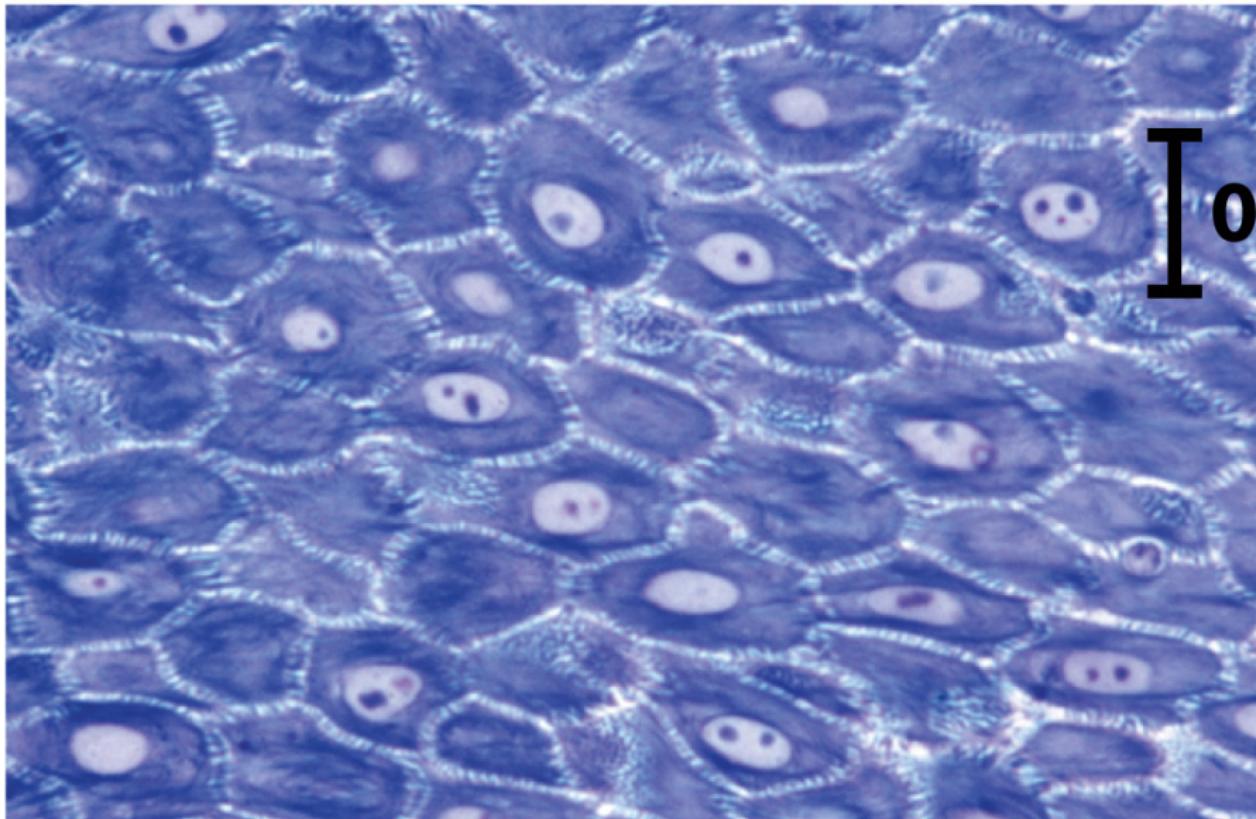


Figure 1.10a
Biology: How Life Works

Where do cells come from?

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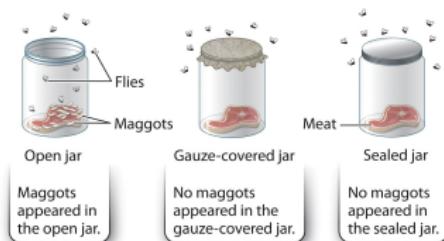


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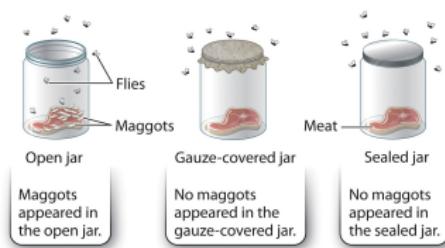


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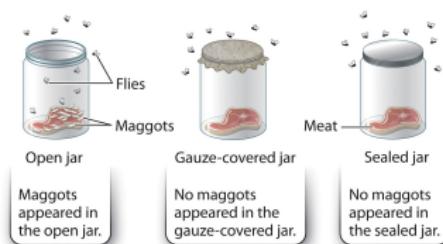


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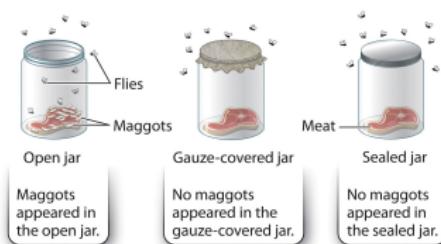


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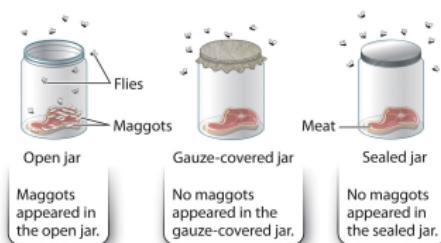


Figure 1.7
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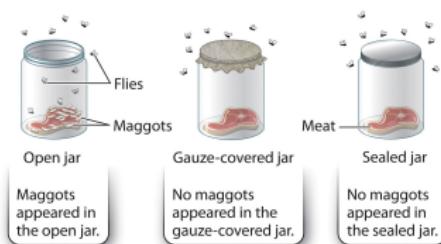


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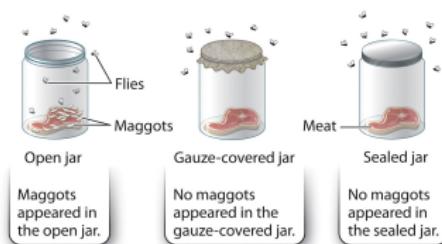


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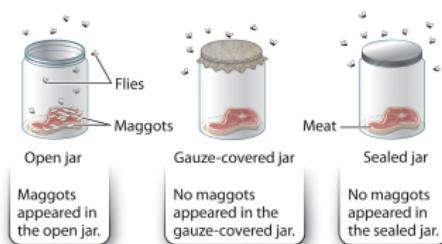


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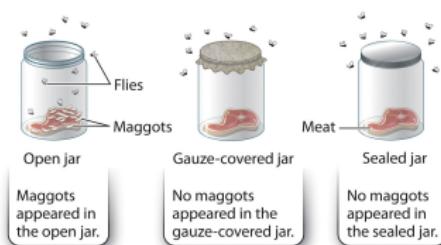


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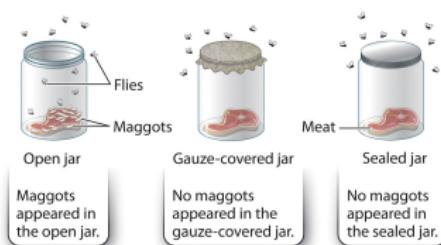


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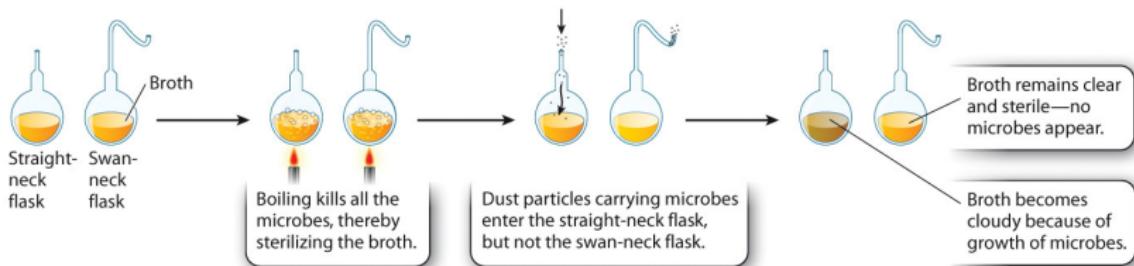


Figure 1.8
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Scientific inquiry (outside)

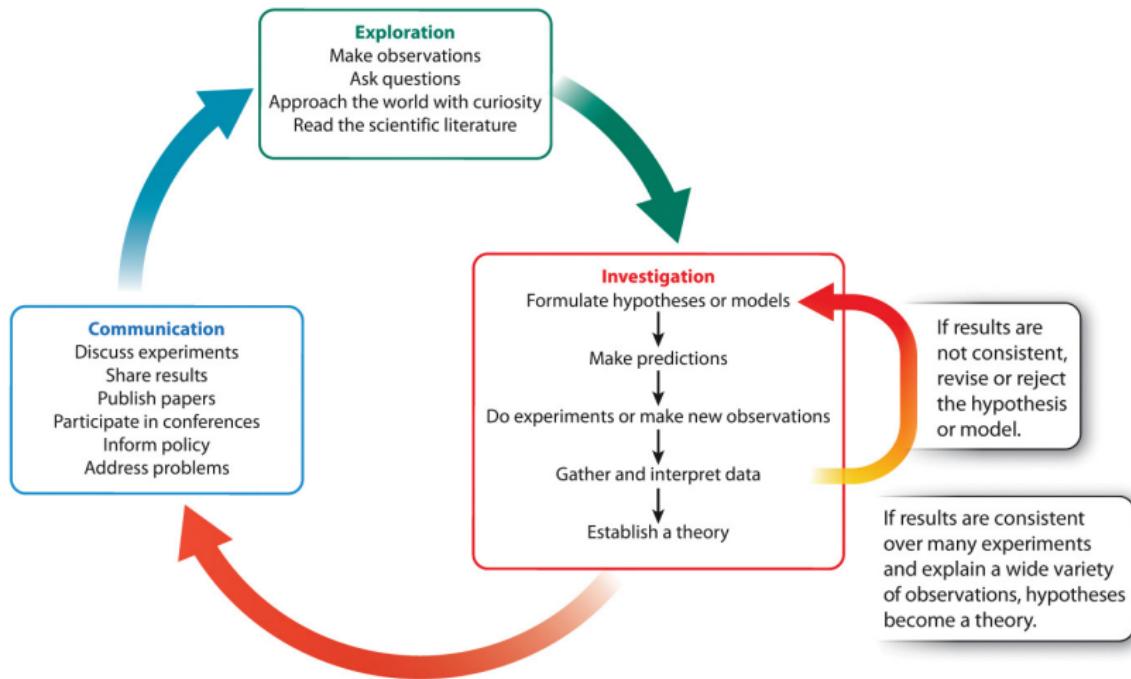


Figure 1.2

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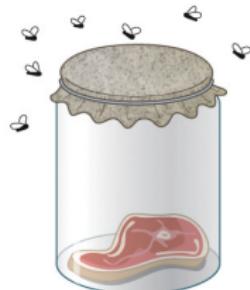
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Where do flies come from? (outside)



Open jar

Maggots
appeared in
the open jar.



Gauze-covered jar

No maggots
appeared in the
gauze-covered jar.



Sealed jar

No maggots
appeared in
the sealed jar.

Figure 1.7
Biology: How Life Works
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Where do microbes come from? (outside)

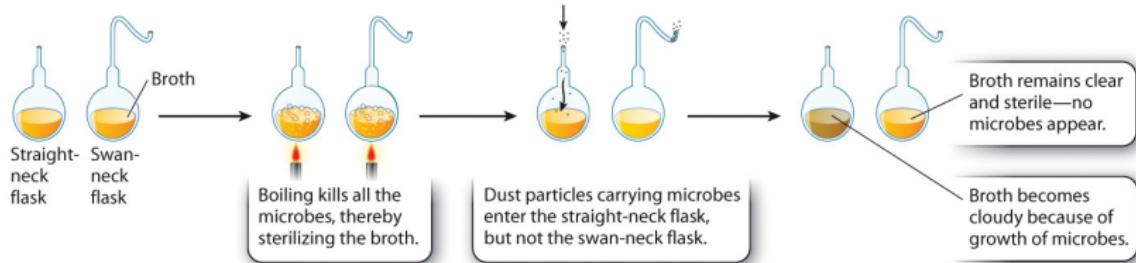


Figure 1.8
Biology: How Life Works
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Outline

Introduction

Ground rules

Thinking conceptually

Example: cards and drinks

Logical inference

The cell theory

Doing biology

Experiments

Observational studies

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- Look for ways to collect data that will support or challenge hypotheses

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Dinosaurs (outside)

At Gubbio, Italy, the recessed clay layer in the center of the photo (arrow) marks the end of the Cretaceous Period, when many species became extinct. As shown in the diagram on the right, this layer shows strong enrichment in iridium, rare in most rocks on Earth but relatively common in meteorites.



Andrew Knoll, Harvard University

Figure 1.3 (Part 1a)
Biology: How Life Works
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Dinosaurs (outside)

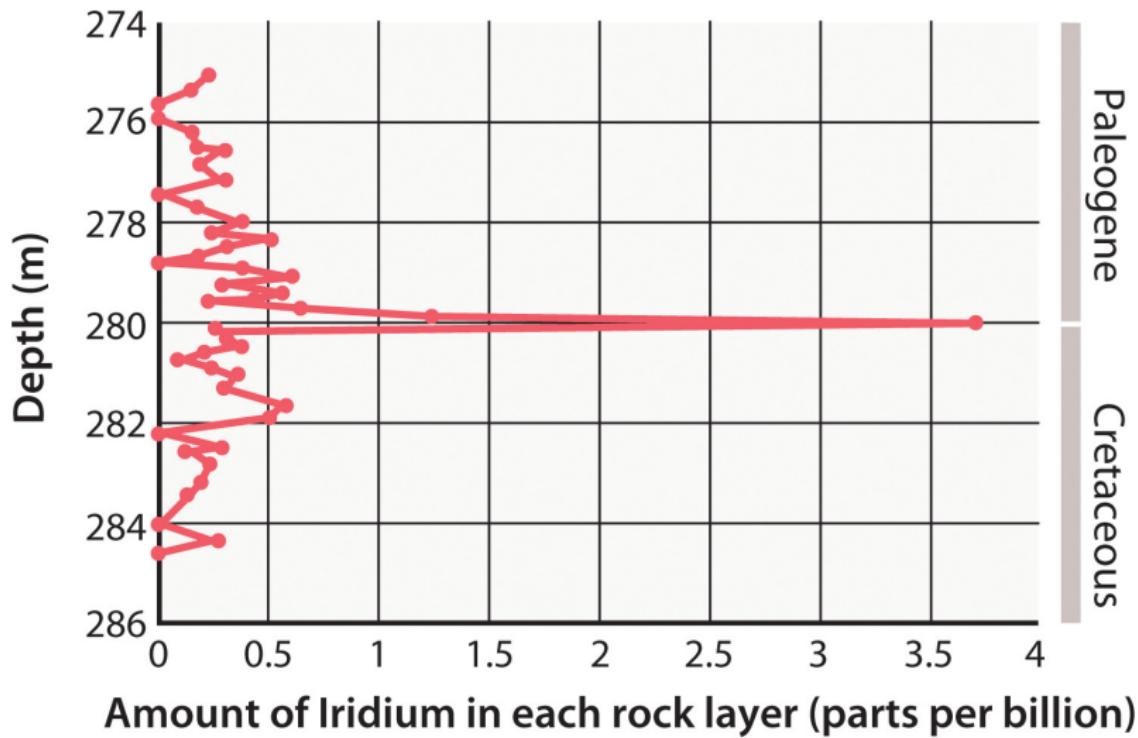
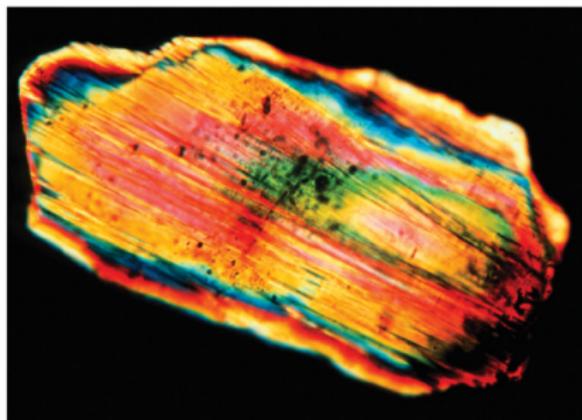


Figure 1.3 (Part 1b)
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Dinosaurs (outside)

Quartz crystals that form only at high temperature and pressure—conditions met by giant meteors as they crash into Earth—occur abundantly in rock layers dated to the time of the extinction.



Dr. David King/Science Source

Figure 1.3 (Part 2a)
Biology: How Life Works
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Dinosaurs (outside)

By 1990, geologists had located a crater of just the right size and age in the Yucatan Peninsula, Mexico (image to the right created by mapping subtle variations in Earth's gravitational field).



Figure 1.3 (Part 2b)
Biology: How Life Works
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