

# Climate Change

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### Section 1: Why Does Climate Change Matter?

Temperature is a critical environmental variable that profoundly affects life processes.

- Temperature is Critical
- Temperature Drives Performance Across Biological Scales
- Section Summary
- Ask Your Instructor

### Section 2: Detecting Climate Change

Detecting trends in noisy data. Climate versus weather. Recent data including increased surface temperature, decreased extent of snow and ice, and sea-level rise all indicate that the Earth's climate is warming.

- Earth's Dynamic Climate
- Climate vs. Weather
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- Is Earth's Climate Warming?
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- What Do Other Components of the Climate System Show?
- A Coherent Picture of Climate Change
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### Section 3: Earth's Climate and Climate Models

A simple model can predict a planet's mean surface temperature using solar output, distance from the Sun, planetary albedo, and greenhouse gases. More sophisticated models are needed to predict regional climate patterns.

- Climate Models: Why and How
- Modeling Temperature: Irradiation
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### Section 4: Humans and Climate Change

Humans and Climate Change. Attribution. Available evidence indicates greenhouse gas emission and other human actions have altered Earth's climate. Climate change will affect people directly and indirectly.

- Attribution of Recent Climate Change
- How Do Natural Forcings Affect Climate?
- How Do Anthropogenic Forcings Affect Climate?

- Why Is Earth's Climate Warming?
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### **Section 5: Biological Consequences of Climate Change**

Warmer temperatures can affect a species' phenology, growth rate, performance, and overall fitness.

While some species can tolerate these impacts, many species will respond to climate change by shifting their ranges poleward or uphill, by evolving adaptations to the altered climate, or by going extinct.

- Climate Change Poses Grave Threats for Many Species
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