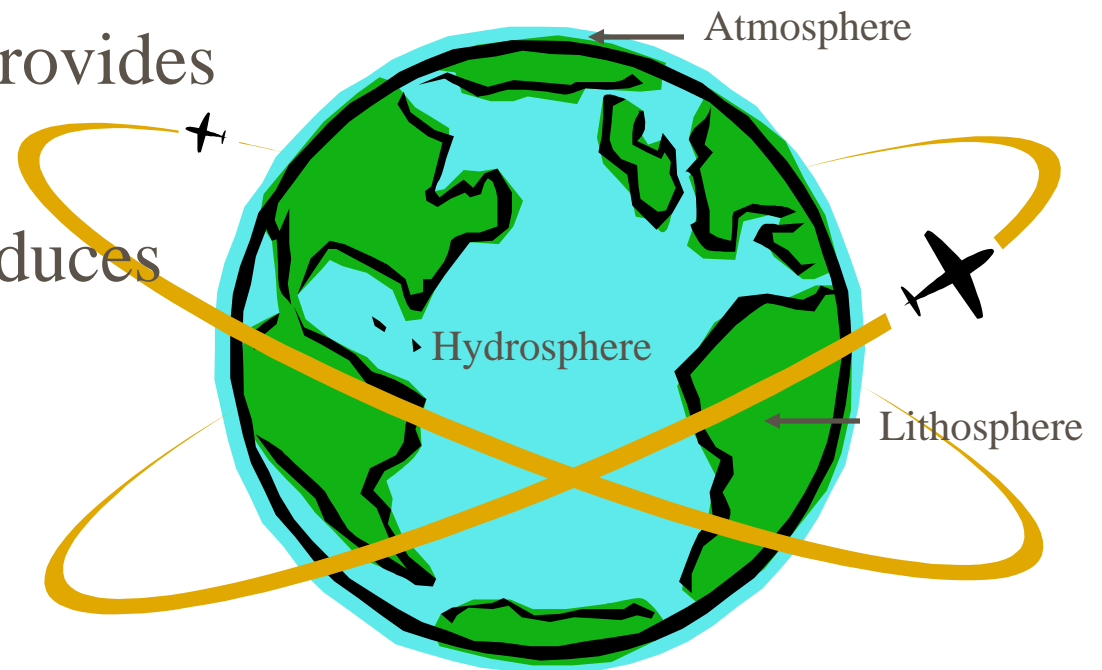


An aerial photograph of a vast, dense rainforest. The canopy is a rich, multi-layered green, with some taller trees standing out. The perspective is from a high angle, looking down and across the forest. At the bottom of the image, there is a solid green horizontal banner with the text "Rainforest Ecosystems" written in white, serif font.

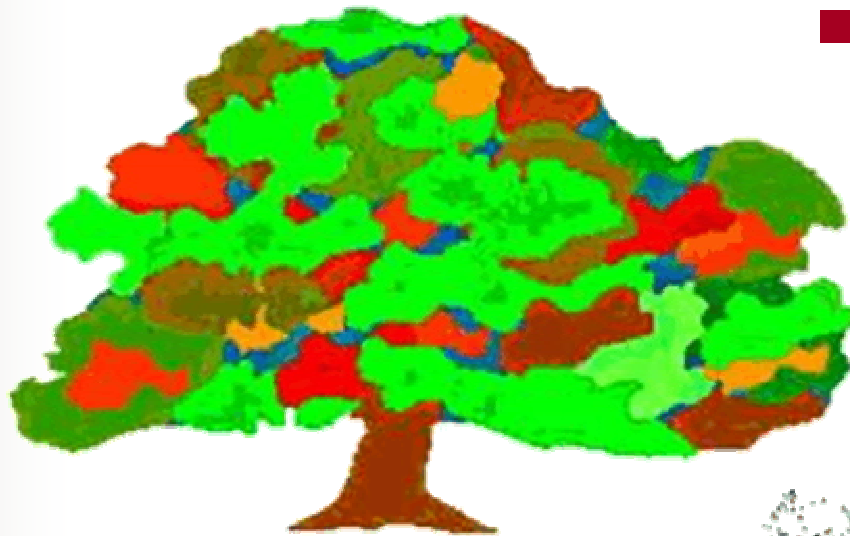
Rainforest Ecosystems

Ecosystems: A Brief Review

- Collection of interdependent parts
- Environment provides inputs
- Ecosystem produces outputs



Inputs



- Abiotic Inputs
 - Energy
 - Inorganic matter
- Biotic Inputs
 - Organisms
 - Other ecosystems

Abiotic Inputs

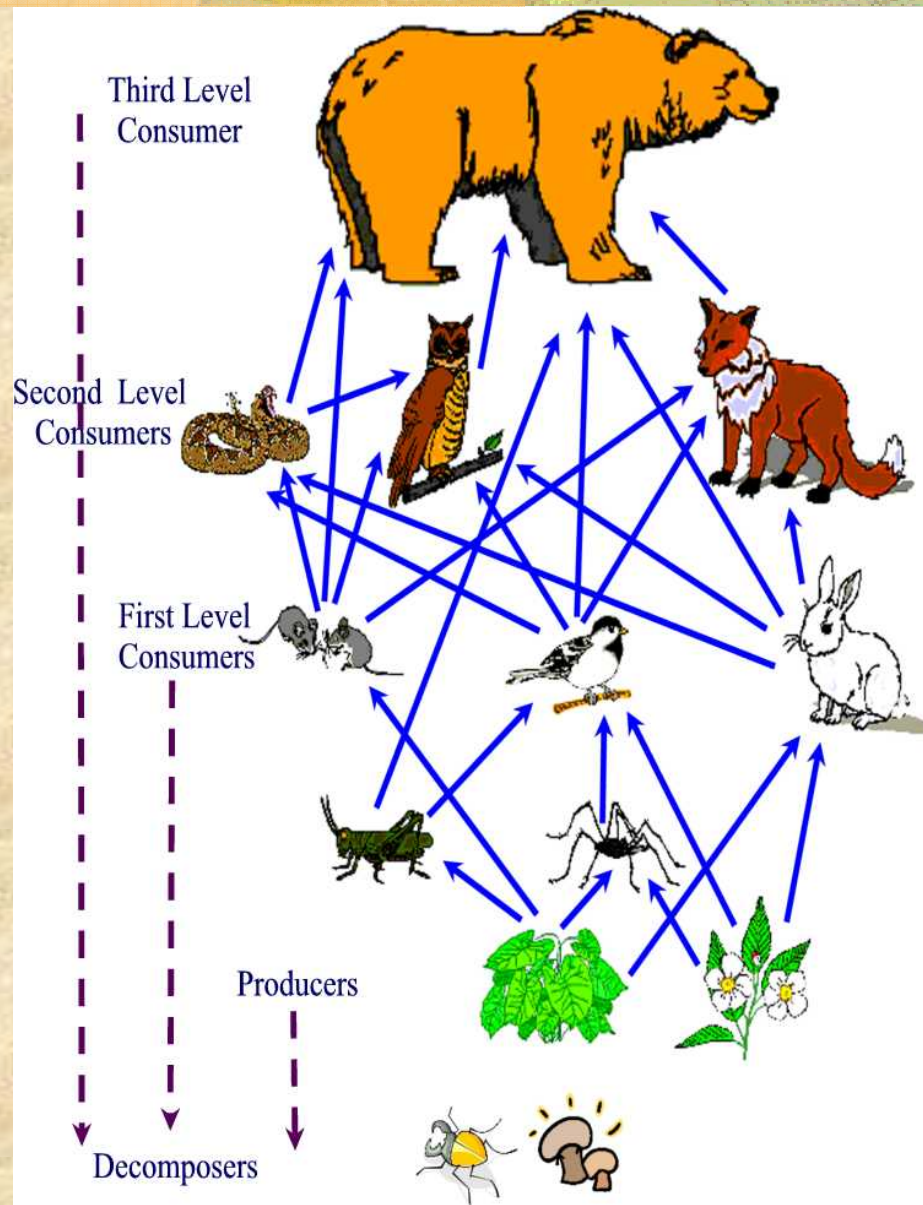
- Sunlight
- Water
- Mineral Nutrients
- Gasses



Biotic Inputs

- Inactive or dead organic matter
- Dissolved organic matter
- Organically derived nutrients





Trophic Web

- Consumers
 - Heterotrophs (mostly animals)
 - Three levels
- Producers
 - Autotrophs (mostly plants)
 - Photosynthesis
- Decomposers (mostly bacteria and fungi)

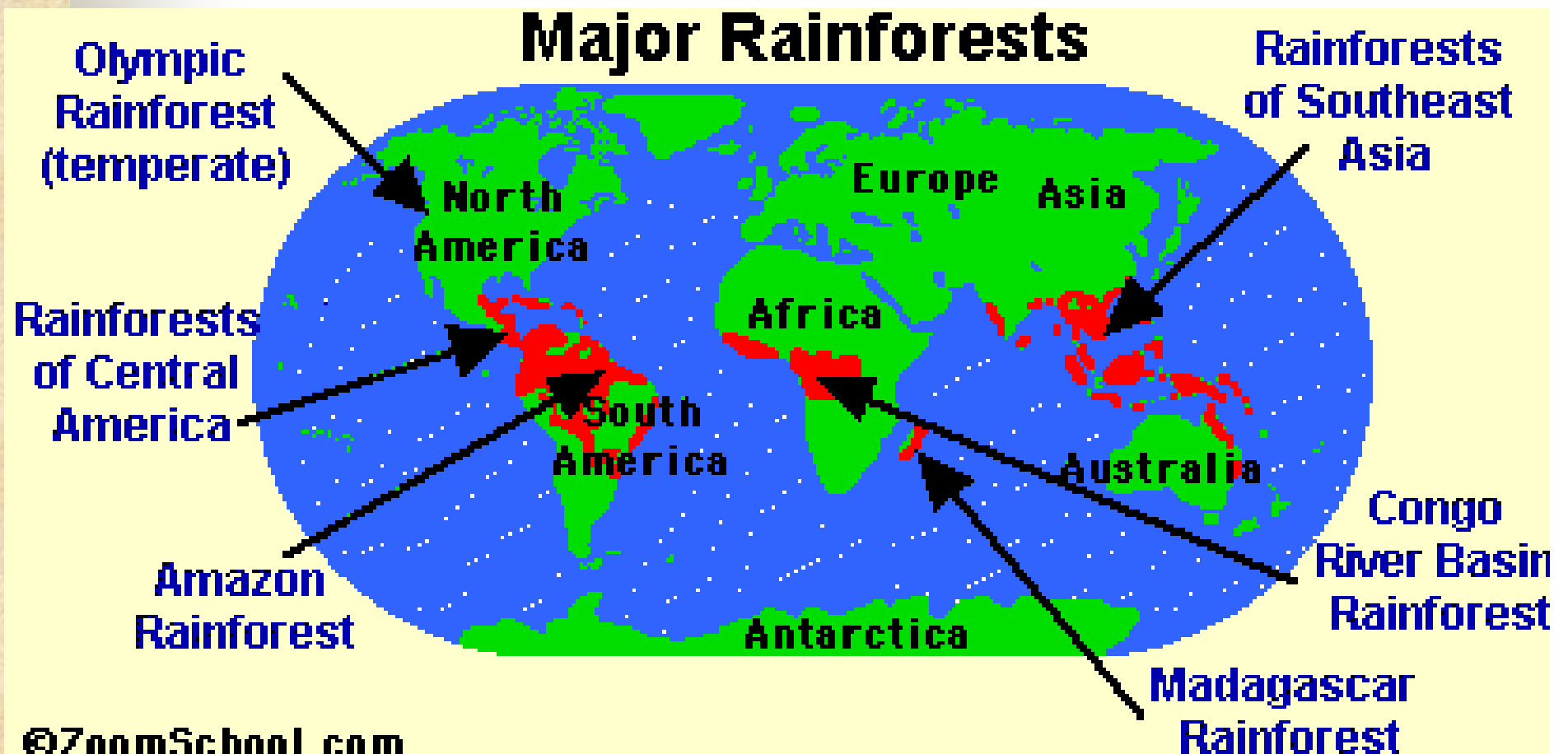
Terrigenous Decomposers



- Fungi
- Bacteria



Where are the rainforests?



What is a rainforest?



- Closed floral canopy
- High, constant temperature
- High, stable rainfall amounts

Physical Controls

- Temperature
- Altitude
- Rainfall
- Soil





Temperature and Altitude

- Average for tropical rainforest = 25° C (77° F)
 - Minimum = 18° C (64° F)
- Average difference throughout the year is usually less than 4° C
- True rainforests are usually found below 1000 m (3,280 ft.)



Rainfall

- Between 1.8 m (6 ft.) and 9.0 m (30 ft.) per year
- More than 100 mm (4 in) per month
- Dry periods are short and unpredictable
- Half of the precipitation comes from local evaporation
- Latin American rainforests receive about 4 m (13.3 ft.) per year

Soil

- Thin layer of humus
- Poor in nutrients
- Minerals leach out as result of rainfall



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Biotic Characteristics

- Forest Structure
- High biotic diversity and specialization



Multilayered Forest Structure



- Emergent layer
 - 35 to 80 m (115 to 234 ft.)
- Overstory layer
 - 20 to 50 m (65 to 165 ft.)
- Midstory layer 1
 - 5 to 30 m (16 to 99 ft.)
- Midstory layer 2
 - 5 m or less (under 16 ft.)
- Understory layer
 - ground level and just above

Plant Examples

- Kapok tree
- Bromeliad
- Orchid
- Banana-type tree
- Palm tree
- Insectivorous plant
- Corpse lily





Various Plant Adaptations

- Dependent on trees for support
- Pioneer species are light dependent
- Microclimate influenced by foliage layering
- Light levels decrease as canopy density increases
- Pollination by fauna rather than wind
- Shallow roots -feeder roots are in the top 2 to 15 cm (1 to 7 in.) of humus

More Plant Adaptations



- Mineral nutrients are concentrated in plant tissues rather than in the soil
- Nutrient cycling is mainly through litterfall
- Turnover time for nutrients recycling is between 20 and 100 years.
- Symbiotic fungi in plant roots cycle nutrients from dead organic matter directly into the plant

Animal Examples



- 150 species of beetles
- Leaf-cutter ants, termites
- Anacondas
- Birds
- Bats
- Agoutis
- Tapirs
- Monkeys
- Three-toed sloth
- Jaguar

Animal Adaptations



- Most are nocturnal or crepuscular
- The sloth has algae in its fur
- Ecological niches
 - Above the canopy
 - Top of the canopy
 - Middle of the canopy
 - Below the canopy
- Large ground animals
- Small ground animals

Economic Value of Rainforests



- Hardwoods
- Minerals
- Petroleum
- Agricultural products
- Exotic animals
- Medicines

Environmental Value



- Absorb carbon dioxide
- Exude oxygen
- Cycle nitrogen and phosphorous
- Regulate temperature and precipitation
- Protect watersheds from erosion
- Harbor pollinators

Value to Indigenous People



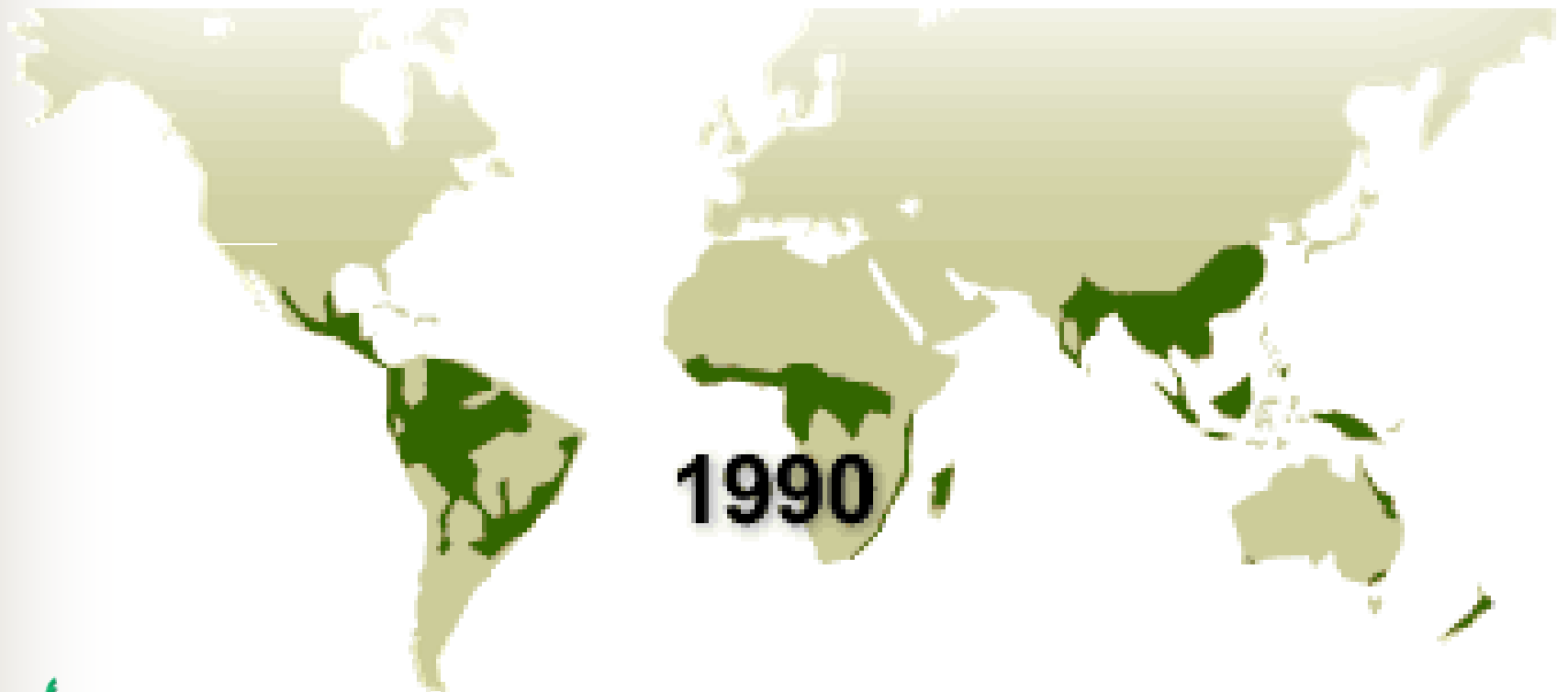
- Home to 1,000 different South American cultures
- Protected and isolated them from the colonists

Deforestation

- Logging
- Colonization
- Cattle ranching
- Agriculture




Each second, more than an acre disappears...



the
rainforest site

From <http://www.therainforestsites.com/cgi-bin/WebObjects/CTDSites>

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Rainforest is being lost at a decreasing rate, due to increased public awareness

- 1980s = 40 million acres/year
- 1990s = 35 million acres/year



Conservation

- National Parks
- Sustainable logging
- Sustainable forest products
- Ecotourism



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