AP Environmental Science

Syllabus Checklist · 大纲自查表

Tick one box per statement: ☐ not yet ☐ nearly ☐ confident. 每条打一个勾：尚未掌握 / 快会了 / 有把握。

1. The Living World: Ecosystems 生物世界：生态系统

1.1 Introduction to Ecosystems 生态系统导论

☐☐☐ Explain how the availability of resources influences species interactions.

1.2 Terrestrial Biomes 陆地生物群系

☐☐☐ Describe the global distribution and principal environmental aspects of terrestrial biomes.

1.3 Aquatic Biomes 水生生物群系

☐☐☐ Describe the global distribution and principal environmental aspects of aquatic biomes.

1.4 The Carbon Cycle 碳循环

☐☐☐ Explain the steps and reservoir interactions in the carbon cycle.

1.5 The Nitrogen Cycle 氮循环

☐☐☐ Explain the steps and reservoir interactions in the nitrogen cycle.

1.6 The Phosphorus Cycle 磷循环

☐☐☐ Explain the steps and reservoir interactions in the phosphorus cycle.

1.7 The Hydrologic (Water) Cycle 水循环

☐☐☐ Explain the steps and reservoir interactions in the hydrologic cycle.

1.8 Primary Productivity 初级生产力

☐☐☐ Explain how solar energy is acquired and transferred by living organisms.

1.9 Trophic Levels 营养级

☐☐☐ Explain how energy flows and matter cycles through trophic levels.

1.10 Energy Flow and the 10% Rule 能量流动与 10% 定律

☐☐☐ Determine how the energy decreases as it flows through ecosystems.

1.11 Food Chains and Food Webs 食物链与食物网

☐☐☐ Describe food chains and food webs, and their constituent members by trophic level.

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2. The Living World: Biodiversity 生物世界：生物多样性

2.1 Introduction to Biodiversity 生物多样性导论

☐☐☐ Explain levels of biodiversity and their importance to ecosystems.

2.2 Ecosystem Services 生态系统服务

☐☐☐ Describe ecosystem services.
☐☐☐ Describe the results of human disruptions to ecosystem services.

2.3 Island Biogeography 岛屿生物地理学

☐☐☐ Describe island biogeography.
☐☐☐ Describe the role of island biogeography in evolution.

2.4 Ecological Tolerance 生态耐受性

☐☐☐ Describe ecological tolerance.

2.5 Natural Disruptions to Ecosystems 生态系统的自然干扰

☐☐☐ Explain how natural disruptions, both short- and long-term, impact an ecosystem.

2.6 Adaptations 适应

☐☐☐ Describe how organisms adapt to their environment.

2.7 Ecological Succession 生态演替

☐☐☐ Describe ecological succession.
☐☐☐ Describe the effect of ecological succession on ecosystems.

3. Populations 种群

3.1 Generalist and Specialist Species 广适性物种与特化物种

☐☐☐ Identify differences between generalist and specialist species.

3.2 K-Selected and r-Selected Species K 对策物种与 r 对策物种

☐☐☐ Identify differences between K- and r-selected species.

3.3 Survivorship Curves 存活曲线

☐☐☐ Explain survivorship curves.

3.4 Carrying Capacity 环境容纳量

☐☐☐ Describe carrying capacity.
☐☐☐ Describe the impact of carrying capacity on ecosystems.

3.5 Population Growth and Resource Availability 种群增长与资源可获得性

☐☐☐ Explain how resource availability affects population growth.

3.6 Age Structure Diagrams 年龄结构图

☐☐☐ Explain age structure diagrams.

3.7 Total Fertility Rate 总和生育率

☐☐☐ Explain factors that affect total fertility rate in human populations.

3.8 Human Population Dynamics 人口动态

☐☐☐ Explain how human populations experience growth and decline.

3.9 Demographic Transition 人口转变

☐☐☐ Define the demographic transition.

4. Earth Systems and Resources 地球系统与资源

4.1 Plate Tectonics 板块构造

☐☐☐ Describe the geological changes and events that occur at convergent, divergent, and transform plate boundaries.

4.2 Soil Formation and Erosion 土壤形成与侵蚀

☐☐☐ Describe the characteristics and formation of soil.

4.3 Soil Composition and Properties 土壤组成与性质

☐☐☐ Describe similarities and differences between properties of different soil types.

4.4 Earth's Atmosphere 地球大气层

☐☐☐ Describe the structure and composition of the Earth's atmosphere.

4.5 Global Wind Patterns 全球风带

☐☐☐ Explain how environmental factors can result in atmospheric circulation.

4.6 Watersheds 流域

☐☐☐ Describe the characteristics of a watershed.

4.7 Solar Radiation and Earth's Seasons 太阳辐射与地球的季节

☐☐☐ Explain how the sun's energy affects the Earth's surface.

4.8 Earth's Geography and Climate 地球的地理与气候

☐☐☐ Describe how the Earth's geography affects weather and climate.

4.9 El Nino and La Nina 厄尔尼诺与拉尼娜

☐☐☐ Describe the environmental changes and effects that result from El Niño or La Niña events (El Niño–Southern Oscillation).

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5. Land and Water Use 土地与水资源利用

5.1 The Tragedy of the Commons 公地悲剧

☐☐☐ Explain the concept of the tragedy of the commons.

5.2 Clearcutting 皆伐

☐☐☐ Describe the effect of clearcutting on forests.

5.3 The Green Revolution 绿色革命

☐☐☐ Describe changes in agricultural practices.

5.4 Impacts of Agricultural Practices 农业实践的影响

☐☐☐ Describe agricultural practices that cause environmental damage.

5.5 Irrigation Methods 灌溉方法

☐☐☐ Describe different methods of irrigation.
☐☐☐ Describe the benefits and drawbacks of different methods of irrigation.

5.6 Pest Control Methods 病虫害防治方法

☐☐☐ Describe the benefits and drawbacks of different methods of pest control.

5.7 Meat Production Methods 肉类生产方法

☐☐☐ Identify different methods of meat production.
☐☐☐ Describe the benefits and drawbacks of different methods of meat production.

5.8 Impacts of Overfishing 过度捕捞的影响

☐☐☐ Describe causes of and problems related to overfishing.

5.9 Impacts of Mining 采矿的影响

☐☐☐ Describe natural resource extraction through mining.
☐☐☐ Describe ecological and economic impacts of natural resource extraction through mining.

5.10 Impacts of Urbanization 城市化的影响

☐☐☐ Describe the effects of urbanization on the environment.

5.11 Ecological Footprints 生态足迹

☐☐☐ Explain the variables measured in an ecological footprint.

5.12 Introduction to Sustainability 可持续性导论

☐☐☐ Explain the concept of sustainability.

5.13 Methods to Reduce Urban Runoff 减少城市径流的方法

☐☐☐ Describe methods for mitigating problems related to urban runoff.

5.14 Integrated Pest Management 病虫害综合治理

- ☐☐☐ Describe integrated pest management.
- ☐☐☐ Describe the benefits and drawbacks of integrated pest management (IPM).

5.15 Sustainable Agriculture 可持续农业

- ☐☐☐ Describe sustainable agricultural and food production practices.

5.16 Aquaculture 水产养殖

- ☐☐☐ Describe the benefits and drawbacks of aquaculture.

5.17 Sustainable Forestry 可持续林业

- ☐☐☐ Describe methods for mitigating human impact on forests.

6. Energy Resources and Consumption 能源资源与消耗

6.1 Renewable and Nonrenewable Resources 可再生与不可再生资源

- ☐☐☐ Identify differences between nonrenewable and renewable energy sources.

6.2 Global Energy Consumption 全球能源消耗

- ☐☐☐ Describe trends in energy consumption.

6.3 Fuel Types and Uses 燃料类型与用途

- ☐☐☐ Identify types of fuels and their uses.

6.4 Distribution of Natural Energy Resources 自然能源资源的分布

- ☐☐☐ Identify where natural energy resources occur.

6.5 Fossil Fuels 化石燃料

- ☐☐☐ Describe the use and methods of fossil fuels in power generation.
- ☐☐☐ Describe the effects of fossil fuels on the environment.

6.6 Nuclear Power 核能

- ☐☐☐ Describe the use of nuclear energy in power generation.
- ☐☐☐ Describe the effects of the use of nuclear energy on the environment.

6.7 Energy from Biomass 生物质能

- ☐☐☐ Describe the effects of the use of biomass in power generation on the environment.

6.8 Solar Energy 太阳能

- ☐☐☐ Describe the use of solar energy in power generation.
- ☐☐☐ Describe the effects of the use of solar energy in power generation on the environment.

6.9 Hydroelectric Power 水力发电

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- ☐☐☐ Describe the use of hydroelectricity in power generation.
- ☐☐☐ Describe the effects of the use of hydroelectricity in power generation on the environment.

6.10 Geothermal Energy 地热能

- ☐☐☐ Describe the use of geothermal energy in power generation.
- ☐☐☐ Describe the effects of the use of geothermal energy in power generation on the environment.

6.11 Hydrogen Fuel Cell 氢燃料电池

- ☐☐☐ Describe the use of hydrogen fuel cells in power generation.
- ☐☐☐ Describe the effects of the use of hydrogen fuel cells in power generation on the environment.

6.12 Wind Energy 风能

- ☐☐☐ Describe the use of wind energy in power generation.
- ☐☐☐ Describe the effects of the use of wind energy in power generation on the environment.

6.13 Energy Conservation 能源节约

- ☐☐☐ Describe methods for conserving energy.

7. Atmospheric Pollution 大气污染

7.1 Introduction to Air Pollution 空气污染导论

- ☐☐☐ Identify the sources and effects of air pollutants.

7.2 Photochemical Smog 光化学烟雾

- ☐☐☐ Explain the causes and effects of photochemical smog and methods to reduce it.

7.3 Thermal Inversion 逆温现象

- ☐☐☐ Describe thermal inversion and its relationship with pollution.

7.4 Atmospheric CO2 and Particulates 大气二氧化碳与颗粒物

- ☐☐☐ Describe natural sources of CO_2 and particulates.

7.5 Indoor Air Pollutants 室内空气污染物

- ☐☐☐ Identify indoor air pollutants.
- ☐☐☐ Describe the effects of indoor air pollutants.

7.6 Reduction of Air Pollutants 空气污染物的减少

- ☐☐☐ Explain how air pollutants can be reduced at the source.

7.7 Acid Rain 酸雨

- ☐☐☐ Describe acid deposition.
- ☐☐☐ Describe the effects of acid deposition on the environment.

7.8 Noise Pollution 噪声污染

☐☐☐ Describe human activities that result in noise pollution and its effects.

8. Aquatic and Terrestrial Pollution 水生与陆地污染

8.1 Sources of Pollution 污染源

☐☐☐ Identify differences between point and nonpoint sources of pollution.

8.2 Human Impacts on Ecosystems 人类对生态系统的影响

☐☐☐ Describe the impacts of human activities on aquatic ecosystems.

8.3 Endocrine Disruptors 内分泌干扰物

☐☐☐ Describe endocrine disruptors.
☐☐☐ Describe the effects of endocrine disruptors on ecosystems.

8.4 Human Impacts on Wetlands and Mangroves 人类对湿地与红树林的影响

☐☐☐ Describe the impacts of human activity on wetlands and mangroves.

8.5 Eutrophication 富营养化

☐☐☐ Explain the environmental effects of excessive use of fertilizers and detergents on aquatic ecosystems.

8.6 Thermal Pollution 热污染

☐☐☐ Describe the effects of thermal pollution on aquatic ecosystems.

8.7 Persistent Organic Pollutants (POPs) 持久性有机污染物

☐☐☐ Describe the effect of persistent organic pollutants (POPs) on ecosystems.

8.8 Bioaccumulation and Biomagnification 生物累积与生物放大

☐☐☐ Describe bioaccumulation and biomagnification.
☐☐☐ Describe the effects of bioaccumulation and biomagnification.

8.9 Solid Waste Disposal 固体废物处置

☐☐☐ Describe solid waste disposal methods.
☐☐☐ Describe the effects of solid waste disposal methods.

8.10 Waste Reduction Methods 废物减量方法

☐☐☐ Describe changes to current practices that could reduce the amount of generated waste and their associated benefits and drawbacks.

8.11 Sewage Treatment 污水处理

☐☐☐ Describe best practices in sewage treatment.

8.12 Lethal Dose 50% (LD50) 半数致死剂量

☐☐☐ Define lethal dose 50% (LD_{50}).

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8.13 Dose Response Curve 剂量反应曲线

☐☐☐ Evaluate dose response curves.

8.14 Pollution and Human Health 污染与人类健康

☐☐☐ Identify sources of human health issues that are linked to pollution.

8.15 Pathogens and Infectious Diseases 病原体与传染病

☐☐☐ Explain human pathogens and their cycling through the environment.

9. Global Change 全球变化

9.1 Stratospheric Ozone Depletion 平流层臭氧耗损

☐☐☐ Explain the importance of stratospheric ozone to life on Earth.

9.2 Reducing Ozone Depletion 减少臭氧耗损

☐☐☐ Describe chemicals used to substitute for chlorofluorocarbons (CFCs).

9.3 The Greenhouse Effect 温室效应

☐☐☐ Identify the greenhouse gases.
☐☐☐ Identify the sources and potency of the greenhouse gases.

9.4 Increases in the Greenhouse Gases 温室气体的增加

☐☐☐ Identify the threats to human health and the environment posed by an increase in greenhouse gases.

9.5 Global Climate Change 全球气候变化

☐☐☐ Explain how changes in climate, both short- and long-term, impact ecosystems.

9.6 Ocean Warming 海洋变暖

☐☐☐ Explain the causes and effects of ocean warming.

9.7 Ocean Acidification 海洋酸化

☐☐☐ Explain the causes and effects of ocean acidification.

9.8 Invasive Species 入侵物种

☐☐☐ Explain the environmental problems associated with invasive species and strategies to control them.

9.9 Endangered Species 濒危物种

☐☐☐ Explain how species become endangered and strategies to combat the problem.

9.10 Human Impacts on Biodiversity 人类对生物多样性的影响

☐☐☐ Explain how human activities affect biodiversity and strategies to combat the problem.