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.

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).

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

☐☐☐ 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}).

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.