

5.10 Impacts of Urbanization

Name: _____ Class: _____ Date: _____

Total: 9 marks

Objective

Build the skills to answer exam questions on **impacts of urbanization**.

You must be able to:

- describe **urban sprawl** 城市扩张 and **impervious surfaces** 不透水面
- link paving to runoff, flooding, and the **urban heat island** 城市热岛
- suggest smart-growth solutions

1 Worked examples

Study these first. Each one shows the method for a question type used later —follow the steps and you can do the Practice and Exam-style questions yourself.

■ Urbanization impacts

As cities grow (**urban sprawl**), natural land is replaced with **impervious surfaces** (roads, roofs) that water cannot soak into.

■ Runoff and flooding

Impervious surfaces increase **runoff** and reduce **infiltration**, causing more **flooding** and carrying pollutants (oil, litter) into waterways.

■ Urban heat island

Cities are warmer than surrounding areas (the **urban heat island effect**) because dark surfaces absorb heat and there is little vegetation to cool the air.

■ Smart growth

Solutions include **mixed-use, dense development**, public transit, green roofs, and preserving green space —reducing sprawl and its impacts.

2 Practice

Now apply the methods above.

2.1 What is an impervious surface?

[1]

2.2 How does paving affect runoff and infiltration? [1]

2.3 What is the urban heat island effect? [1]

3 Exam-style questions

3.1 Cities are often warmer than surrounding rural areas because of the [1]

- A rain shadow effect
 - B urban heat island effect
 - C Coriolis effect
 - D greenhouse effect only
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3.2 A city expands, paving over fields.

(a) Explain how this increases flooding. [2]

(b) Suggest one smart-growth solution. [1]

3.3 Explain why the urban heat island effect occurs. [2]

4 Go further

You are now ready for the real exam questions on this subtopic:

- work through the **5.10 Impacts of Urbanization** lesson on the **Learn** page;
- read the **Impacts of Urbanization** section of the AP Environmental Science handout on the **Know** page.

Solutions

2.1 A surface (road, roof) that water cannot soak into.

2.2 It increases runoff and reduces infiltration.

2.3 Cities being warmer than surrounding rural areas.

3.1 B —the urban heat island effect.

3.2 (a) Paving stops water soaking in, so more runs off quickly over the hard surfaces, overwhelming drainage and causing floods. (b) Any one: green roofs, permeable pavement, preserving green space, denser development.

3.3 Dark paved surfaces and buildings absorb and re-radiate heat, and there is little vegetation to cool the air by shade and transpiration, so cities stay hotter.