

Exercise walk-through

Endocrine Disruptors ■ 8.3

eXercise

You must be able to

- define an **endocrine disruptor** 内分泌干扰物
- explain how they interfere with hormones
- give examples and effects

Method — What they are

Endocrine disruptors are chemicals that interfere with the **hormone (endocrine) system** of animals and humans, even at very **low doses**.

Method — How they act

They can **mimic** or **block** natural hormones, disrupting development, reproduction, and growth. Because hormones act in tiny amounts, small pollutant doses can have big effects.

Method — Examples

- **Atrazine** (herbicide) — feminizes male frogs.
- **BPA** (in some plastics) — mimics estrogen.
- **DDT** and some industrial chemicals.

Method — Effects

Reproductive problems, developmental defects, and altered sex ratios in wildlife (e.g. intersex fish) and possible human health effects.

Practice 2.1 ■ 1 mark

What system do endocrine disruptors interfere with?

Solution 2.1

Method: What they are

Worked steps

The endocrine (hormone) system **B1**.

Practice 2.2 ■ 1 mark

Give one example of an endocrine disruptor.

Solution 2.2

Worked steps

Any one: atrazine, BPA, DDT **B1**.

Practice 2.3 ■ 1 mark

Why can very low doses have large effects?

Solution 2.3

Worked steps

Hormones act in tiny amounts, so even small pollutant doses can disrupt them **B1**.

Exam-style 3.1 ■ 1 mark

Endocrine disruptors are dangerous because they interfere with

- A** the skeleton
- B** hormones, even at low doses
- C** photosynthesis
- D** digestion only

Solution 3.1

Method: What they are

- A the skeleton
- B hormones, even at low doses 
- C photosynthesis
- D digestion only

Worked steps

B — hormones, even at low doses.

Exam-style 3.2 ■ 2 marks

A herbicide runs off into a pond and male frogs develop female traits.

- (a) Explain how an endocrine disruptor could cause this.
- (b) State one effect on the frog population.

Solution 3.2

Method: Examples

Worked steps

(a) The chemical mimics a female hormone (estrogen), disrupting the frogs' hormone system and causing male frogs to develop female traits **M1** **A1**. (b) Reduced reproduction / skewed sex ratio, lowering population **B1**.

Exam-style 3.3 ■ 2 marks

Explain why endocrine disruptors can be harmful even at concentrations far below those of typical toxins.

Solution 3.3

Method: What they are

Worked steps

They mimic or block hormones, which naturally work at very low concentrations, so tiny amounts can strongly disrupt development and reproduction **M1** **A1**.