AP ENVIRONMENTAL SCIENCE • EXERCISE SHEET

8.3 Endocrine Disruptors

Name: _____ Class: _____ Date: _____ **Total: 9 marks**

Objective

Build the skills to answer exam questions on **endocrine disruptors**.

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

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.

What they are

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

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.

Examples

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

Effects

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

2 Practice

Now apply the methods above.

2.1 What system do endocrine disruptors interfere with? [1]

2.2 Give one example of an endocrine disruptor. [1]

2.3 Why can very low doses have large effects? [1]

3 Exam-style questions

3.1 Endocrine disruptors are dangerous because they interfere with [1]

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

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

(a) Explain how an endocrine disruptor could cause this. [2]

(b) State one effect on the frog population. [1]

3.3 Explain why endocrine disruptors can be harmful even at concentrations far below those of typical toxins. [2]

4 Go further

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

- work through the **8.3 Endocrine Disruptors** lesson on the **Learn** page;
- read the **Endocrine Disruptors** section of the AP Environmental Science handout on the **Know** page.

Solutions

2.1 The endocrine (hormone) system.

2.2 Any one: atrazine, BPA, DDT.

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

3.1 B —hormones, even at low doses.

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

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