

UNIT 3

WATER POLLUTION



1. WARMING UP

1.1. Write the following words under the correct heading.

fertilizers, industrial wastewater, wastewater from homes, sewage, animal wastes, wastes from feeders, toxic substances

sources of water pollution

municipal	industrial	agricultural



2. DEVELOPING LANGUAGE - Water Pollution: Sources and Control

The major sources of water pollution can be classified as ***municipal***, ***industrial***, and ***agricultural***.

Municipal water pollution consists of wastewater from homes and commercial establishments. For many years, the main goal of treating municipal wastewater was simply to reduce its content of suspended solids, oxygen-demanding materials, dissolved inorganic compounds (particularly

compounds of phosphorus and nitrogen), and harmful bacteria. In recent years, however, more stress has been placed on improving the means of disposal of the solid residues from municipal treatment processes. The basic methods of treating municipal wastewater fall into three stages: primary treatment, including grit removal, screening, grinding, flocculation (aggregation of the solids), and sedimentation; secondary treatment, which entails oxidation of dissolved organic matter by means of using biologically active sludge, which is then filtered off; and tertiary treatment, in which advanced biological methods of nitrogen removal and chemical and physical methods, such as granular filtration and activated carbon absorption are employed. The handling and disposal of solid residues can account for 25 to 50 percent of the capital and operational costs of a treatment plant.

The characteristics of industrial wastewater can differ markedly both within and among industries. The impact of industrial discharges depends not only on their collective characteristics, such as biochemical oxygen demand and the amount of suspended solids, but also on their content of specific inorganic and organic substances. Three options (which are not mutually exclusive) are available in controlling industrial wastewater. Control can take place at the point of generation within the plant; wastewater can be pretreated for discharge to municipal treatment systems; or wastewater can be treated completely at the plant and either reused or discharged directly into receiving waters.

Agriculture, including commercial livestock and poultry farming, is the source of many organic and inorganic pollutants in surface waters and groundwater. These contaminants include both sediment from the erosion of cropland and compounds of phosphorus and nitrogen that partly originate in animal wastes and commercial fertilizers. Animal wastes are high in oxygen-demanding material, nitrogen, and phosphorus, and they often harbor pathogenic organisms. Wastes from commercial feeders are contained and disposed of on land; their main threat to natural waters, therefore, is via runoff and leaching. Control may involve settling basins for liquids, limited biological treatment in aerobic or anaerobic lagoons, and a variety of other methods.

Marine Pollution

Wastes that are discharged directly into U.S. marine waters are estimated conservatively to exceed 45 million metric tons per year. About 80 percent of this amount is waste produced by dredging, 10 percent is industrial waste, and 9 percent is sewage sludge. The presence of toxic substances, the rapid uptake of contaminants by marine organisms, heavy deposits of materials on the bottom environment near the shore, and excessive growth of undesirable organisms—the combination of all these aspects has very serious consequences.



Oil Spill clean-up

Oil Spills

These large-scale accidental discharges of liquid petroleum products are an important cause of pollution along shore lines. The most spectacular involve the supertankers used for oil transport, but many other ships also spill oil, and offshore drilling operations contribute a large share of the pollution. One estimate is that of every million tons of oil shipped, one ton is spilled. Some of the largest spills thus far recorded involve the tanker Amoco Cadiz off the French coast in 1978 (1.6 million barrels of crude oil) and the Ixtoc I oil well in

the Gulf of Mexico in 1979 (3.3 million barrels). The largest spill in the U.S. (240,000 barrels) was that of the tanker Exxon Valdez in Prince William Sound, Gulf of Alaska, in March 1989. Within a week, under high winds, this spill had become a 6700-sq-km (2600-sq-mi) slick that endangered wildlife and fisheries in the entire gulf area.

The oil spills in the Persian Gulf in 1983, during the Iran-Iraq conflict, and in 1991, during the Persian Gulf War, resulted in enormous damage to the entire area, especially to the marine life.

"Water Pollution," Microsoft (R) Encarta. Copyright (c) 1998 Microsoft Corporation. Copyright (c) 1998 Funk & Wagnall's Corporation.



3. SCANNING

3.1. Read the text and check which of the statements below are TRUE and which FALSE.

1. The major sources of water pollution can be classified as municipal, industrial, and agricultural. ☐
2. The main goal of treating municipal wastewater is simply to reduce its content of suspended solids, oxygen-demanding materials, dissolved inorganic compounds and harmful bacteria. ☐
3. The main goal of treating municipal wastewater is to improve the means of disposal of the solid residues from municipal treatment processes. ☐
4. The handling and disposal of solid residues can account for 50 percent of the capital and operational costs of a treatment plant. ☐
5. The characteristics of industrial wastewater do not differ among industries. ☐
6. The impact of industrial discharges depends not only on their collective characteristics, such as biochemical oxygen demand and the amount of suspended solids, but also on their content of specific inorganic and organic substances. ☐
7. Control of industrial wastewater can only take place at the point of ☐

generation within the plant.

8. Agriculture, including commercial livestock and poultry farming, is the source of many organic and inorganic pollutants in surface waters and groundwater. ☐
9. Wastes that are discharged directly into marine waters are produced by dredging, industrial water and sewage sludge. ☐
10. Oil spills result in enormous damage to the environment and especially to the marine life. ☐



4. PRACTISING LANGUAGE

4.1. Match the synonyms below.

1. entail
2. discharge
3. estimate
4. conservatively
5. excessive
6. spectacular
7. entire
8. via

- A. moderately
- B. whole
- C. attracting public attention
- D. value
- E. unload
- F. make necessary
- G. extreme
- H. through

1.....2.....3.....4.....5.....6.....7.....8.....



5. EXPANDING LANGUAGE

5.1. Each of the following words has several meanings. After reading the text decide with which meaning the word is used in your text. Tick the correct answer.

1. stress

- a. pressure*
- b. weight or force*
- c. emphasis*

2. treat

- a. behave/act*
- b. consider*
- c. deal with*
- d. put (a substance) through a process (in manufacture)*

3. spill

- a. run over the side of the container*
- b. upset/cause to fall*

4. discharge

- a. unload*
- b. give or send out*
- c. fire (a gun)*
- d. send away*
- e. pay a debt*

5.2. Classify the following words taken from your text under two columns: TECHNICAL and GENERAL ENGLISH.

municipal, commercial, inorganic, bacteria, treatment, sedimentation, sludge, suspended, stress, residues, oxidation, filtration, discharge, control, wastes, sewage, oil spill, contaminants, large-scale, recorded, offshore, gulf, wildlife, marine, dredging, tanker, shipped, removal

6. PRACTISING STRUCTURES

6.1. Fill in the **Comparative** and **Superlative** form of the adjectives below.

POSITIVE	COMPARATIVE	SUPERLATIVE
short		
high		
sufficient		
large		
traditional		
many		
low		
little		
important		
big		
early		
good		
spectacular		
efficient		
necessary		
bad		
suitable		
easy		
heavy		
sad		



6.2. Fill in the sentences below with the appropriate form of **Comparative of Superlative**.

1. Atoms are _____ (small) than molecules.
2. The oxygen atom is the _____ (common) atom in the universe.

3. Iron is the _____ (widely) used metal.
4. Aluminium is _____ (light) and _____ (resistant) to corrosion than iron and steel.
5. Aluminium is the _____ (abundant) metal in the earth.
6. Titanium is _____ (light) and _____ (strong) than steel.
7. Mercury has the _____ (low) melting point of all metals.
8. The melting point of copper is _____ (high) than gold and _____ (low) than platinum.
9. Larger vehicles consume _____ (much) gasoline than smaller ones.
10. Hydrogen is the _____ (abundant) element in the universe.
11. Many synthetic fabrics are _____ (durable) than cotton.
12. Gold is the _____ (chemically) active of all metals.
13. Copper is used for electric wiring because it is a _____ (good) conductor than silver.
14. Bronze, an alloy of tin and copper, is _____ (hard) than either tin or copper.
15. Plastics are _____ (easily) recycled than metals.
16. Simiazine is one of the(persistent) herbicides.

**6.3. Choose the correct answer**

1. That building is _____ than the other next to it.
a) tallest b) tall c) taller d) the tallest
2. The factory he works has _____ employees than mine.
a) much b) more c) many d) the most
3. Your job is _____ paid of all.
a) the worse b) the worst c) worst d) the better
4. He designs _____ than his friend.

a) well b) best c) the best d) better

5. Is this test _____ than the other one?

a) most difficult b) much difficult c) difficulter d) more difficult

6. January was _____ month of the year.

a) the busiest b) busiest c) the busyest d) busier

7. A Pentium computer is _____ than an XT.

a) expensive b) more expensive c) the most expensive
d) expensiver

8. Our company is _____ in the area.

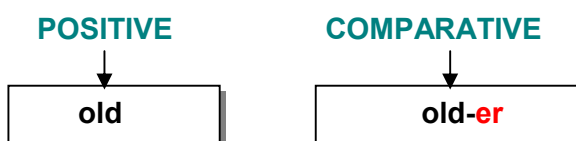
a) large b) largest c) larger d) the largest

Comparisons

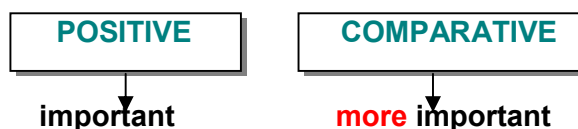
- 1.1. Τα επίθετα περιγράφουν ή προσδιορίζουν ουσιαστικά και τα συναντούμε σε τρεις τύπους: θετικό (**positive**) , συγκριτικό (**comparative**) και υπερθετικό (**superlative**) .

I. ΣΧΗΜΑΤΙΣΜΟΣ & ΧΡΗΣΗ

- 1.2. Ο συγκριτικός (**COMPARATIVE**) χρησιμοποιείται όταν συγκρίνουμε δύο πρόσωπα ή πράγματα και σχηματίζεται με την κατάληξη **-er**.



- 1.3. Ο Συγκριτικός Βαθμός των **πολυσύλλαβων** επιθέτων και επιρρημάτων σχηματίζεται με τη λέξη **more**.



- ↗ Ο δεύτερος όρος σύγκρισης εισάγεται με το **than**.



My computer is **older**

than yours.

- 2.1. Ο Υπερθετικός Βαθμός (**SUPERLATIVE**) χρησιμοποιείται για να συγκρίνουμε ένα πρόσωπο ή πράγμα με περισσότερα από ένα πρόσωπα ή πράγματα που ανήκουν στην ίδια ομάδα και σχηματίζεται με την κατάληξη **-est**.

POSITIVE	COMPARATIVE	SUPERLATIVE
old	old- er	old- est

- 2.2. Ο Υπερθετικός Βαθμός των **πολυσύλλαβων** επιθέτων και επιρρημάτων σχηματίζεται με τη λέξη **most**.

POSITIVE	COMPARATIVE	SUPERLATIVE
important	more important	most important

➤ Η λέξη **the** προηγείται του επιθέτου στον Υπερθετικό Βαθμό. Επίσης συνήθως ο Υπερθετικός Βαθμός ακολουθείται από μια φράση που δηλώνει το σύνολο, (*in his class, in the world, of the week, of all*).

π.χ. My computer is **the** oldest **in the factory**.

II. ΚΑΝΟΝΕΣ ΣΥΛΛΑΒΙΣΜΟΥ



3.1. Τα μονοσύλλαβα επίθετα ή επιρρήματα που τελειώνουν σε **-e**, παίρνουν μόνο το **-r** στον Συγκριτικό Βαθμό και το **-st** στον Υπερθετικό.

π.χ. simple simple**r** simple**st**



3.2. Όσα δισύλλαβα Επίθετα ή Επιρρήματα τελειώνουν σε **-y** το μετατρέπουν σε **-i** και μετά παίρνουν την κατάληξη **-er/-est**.

π.χ. early earl**-ier** earl**-iest**



3.3. Όσα μονοσύλλαβα Επίθετα ή Επιρρήματα τελειώνουν σε **ένα σύμφωνο** μπροστά από το οποίο υπάρχει **ένα μόνον φωνήεν** που τονίζεται, **διπλασιάζουν** το τελικό σύμφωνο και μετά παίρνουν την κατάληξη **-er/-est**

π.χ. big big**ger** big**gest**



3.4. Μερικά δισύλλαβα Επίθετα ή Επιρρήματα όπως clever, stupid, narrow, gentle, friendly, κ.λ.π., σχηματίζουν τον Συγκριτικό και Υπερθετικό Βαθμό είτε με **-er/-est**, είτε με τις λέξεις **more/most**.

π.χ. clever clever**er** clever**est**
clever **more** clever **most** clever

(Irregular Comparatives)

POSITIVE	COMPARATIVE	SUPERLATIVE
good / well	better	best
bad / badly	worse	worst
a lot of / much / many	more	most
little	less	least
far	farther / further	farthest / furthest



Glossary

absorption	απορρόφηση
account for	εξηγώ/λογοδοτώ
activated	ενεργοποιημένος
aerobic	αερόβιος
aggregation	σύνολο/άθροισμα/συσσώρευση
agricultural.	αγροτικός
anaerobic	αναερόβιος
bacteria (ενικός- bacterium)	βακτηρίδια
basin	λεκάνη/δεξαμενή/στέρνα/κοιλάδα
capital	κεφάλαιο
collective	συλλογικός
commercial	εμπορικός
conflict	διαμάχη/σύγκρουση/αντίθεση
conservatively	συντηρητικά
contribute	συνεισφέρω
crude oil	αργό πετρέλαιο
disposal	διάθεση
dissolve	διαλύω/αναλύομαι
dredge	βυθοκόρος
dredging	
endanger	διακινδυνεύω/εκθέτω σε κίνδυνο
enormous	πελώριος/τεράστιος
entail	συνεπάγομαι
entire	ολοσχερής/ολόκληρος/όλος
establishment	ίδρυμα/οίκος/το κατεστημένο/ίδρυση
estimate	εκτιμώ/υπολογίζω/λογαριάζω/εκτίμηση /υπολογισμός
exceed	υπερβαίνω/ξεπερνώ
exclusive	αποκλειστικός/εκλεκτικός/κλειστός
fall into	διαιρούμαι
feeder	τροφοδότης
fishery	ψαρότοπος
flocculation	συσσώρευση

goal	σκοπός
granular filtration	φιλτράρισμα
grinding	άλεσμα
grit removal	χοντρή άμμος/πετραδάκια /αμμοχάλικο
gulf	κόλπος
handle	χειρίζομαι
harbor	λιμάνι/καταφύγιο/κρύβω
impact	επίδραση/επιρροή/αντίκτυπος
industrial	βιομηχανικός
industrial discharge	βιομηχανική εκροή
lagoon	λιμνοθάλασσα
leaching	διύλισμός
livestock	κτηνοτροφία
markedly	έντονα/φανερά/σαφώς
municipal	δημοτικός/αστικός
mutually	αμοιβαία
nitrogen	άζωτο
offshore	από την ξηρά προς τη θάλασσα/σε μικρή απόσταση από την ακτή
oil spill	διαρροή πετρελαίου
operational costs	λειτουργικά έξοδα
originate	προέρχομαι/δημιουργώ/επινιώ
oxidation	οξειδωση
oxygen	οξυγόνο
poultry farming	φάρμα πουλερικών
primary	πρωταρχικός/βασικός
recorded	καταγεγραμμένος
removal	μετακόμιση/αφαίρεση
reuse	επαναχρησιμοποιοώ
runoff	αδειάζω/άδειασμα
screening	εσχάρωση
sedimentation	ιζηματογένεση
settle	εγκαθιστώ/κανονίζω/ρυθμίζω
slick	κηλίδα/γλιστερός
sludge	ενεργός ιλύς/λασπώδη απόβλητα

solid residues	στερεά κατάλοιπα
spectacular	θεαματικός/εκπληκτικός
spill	χύνω/διαρρέω
stress	τονίζω
suspended solids	αιρούμενα στερεά σωματίδια
tertiary	τριτοβάθμιος
treat	επεξεργάζομαι
treatment	επεξεργασία
uptake	αντίληψη
via	μέσω/δια μέσου
wastewater	λύμματα