

Registration form

**Distribution Primer 1 Water Quality Training Course \$100.00
48 HOUR RUSH ORDER PROCESSING FEE ADDITIONAL \$50.00**

Start and Finish Dates: _____
You will have 90 days from this date in order to complete this course

Name _____ **Signature** _____
I have read and understood the disclaimer notice on page 2. Digitally sign XXX

Address _____

City _____ **State** _____ **Zip** _____

Email _____ **Fax (____)** _____

Phone:
Home (____) _____ **Work (____)** _____

Operator ID # _____ **Exp. Date** _____

List hours worked on assignment must match State Requirement. _____

Please circle/check which certification you are applying the course CEU's/PDH's.

Water Treatment _____ Distribution _____ Other _____

Your certificate will be mailed to you in about two weeks.

Technical Learning College PO Box 3060 Chino Valley, AZ 86323
Toll Free (866) 557-1746 Fax (928) 272-0747 info@tlch2o.com

If you've paid on the Internet, please write your Customer # _____

We will stop mailing the certificate of completion we need your e-mail address. We will e-mail the certificate to you, if no e-mail address; we will mail it to you.

DISCLAIMER NOTICE

I understand that it is my responsibility to ensure that this CEU course is either approved or accepted in my State for CEU credit. I understand State laws and rules change on a frequent basis and I believe this course is currently accepted in my State for CEU or contact hour credit, if it is not, I will not hold Technical Learning College responsible. I fully understand that this type of study program deals with dangerous, changing conditions and various laws and that I will not hold Technical Learning College, Technical Learning Consultants, Inc. (TLC) liable in any fashion for any errors, omissions, advice, suggestions or neglect contained in this CEU education training course or for any violation or injury, death, neglect, damage or loss of your license or certification caused in any fashion by this CEU education training or course material suggestion or error or my lack of submitting paperwork. It is my responsibility to call or contact TLC if I need help or assistance and double-check to ensure my registration page and assignment has been received and graded. It is my responsibility to ensure all information is correct and to abide with all rules and regulations.

State Approval Listing Link, check to see if your State accepts or has pre-approved this course. Not all States are listed. NO REFUNDS

Professional Engineers; Most states will accept our courses for credit but we do not officially list the States or Agencies. Please check your State for approval.

State Approval Listing URL...

<http://www.tlch2o.com/PDF/CEU%20State%20Approvals.pdf>

You can obtain a printed version from TLC for an additional \$69.95 plus shipping charges.

AFFIDAVIT OF EXAM COMPLETION

I affirm that I personally completed the entire text of the course. I also affirm that I completed the exam without assistance from any outside source. I understand that it is my responsibility to file or maintain my certificate of completion as required by the state or by the designation organization.

Grading Information

In order to maintain the integrity of our courses we do not distribute test scores, percentages or questions missed. Our exams are based upon pass/fail criteria with the benchmark for successful completion set at 70%. Once you pass the exam, your record will reflect a successful completion and a certificate will be issued to you.

For security purposes, please fax or e-mail a copy of your driver's license and always call us to confirm we've received your assignment and to confirm your identity.

Thank you...

All downloads are electronically tracked and monitored for security purposes.

Distribution Primer 1 Answer Key

Name _____ Phone# _____

You can also type your own answer key

You are solely responsible that this course is accepted for credit by your State. Did you check with your State agency to ensure this course is accepted for credit? No refunds

Method of Course acceptance confirmation. Please fill this section

Website __ Telephone Call__ Email__ Spoke to_____

Did you receive the approval number, if applicable? _____

What is the course approval number, if applicable? _____

You are responsible to ensure that TLC receives the Assignment and Registration Key. Please call us to ensure that we received it.

You can also fill this assignment out electronically in Adobe Acrobat DC

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| 116. A B C D E F | 133. A B C D E F | 150. A B C D E F |

**Please fax the answer key to TLC Western Campus Fax (928) 272-0747.
Always call us after faxing the paperwork to ensure that we've received it.**

Rush Grading Service

If you need this assignment graded and the results mailed to you within a 48-hour period, prepare to pay an additional rush service handling fee of \$50.00. This fee may not cover postage costs. If you need this service, simply write RUSH on the top of your Registration Form. We will place you in the front of the grading and processing line.

Grading Information

In order to maintain the integrity of our courses we do not distribute test scores, percentages or questions missed. Our exams are based upon pass/fail criteria with the benchmark for successful completion set at 70%. Once you pass the exam, your record will reflect a successful completion and a certificate will be issued to you.

Please e-mail or fax this survey along with your final exam

DISTRIBUTION PRIMER 1 CEU TRAINING COURSE

CUSTOMER SERVICE RESPONSE CARD

NAME: _____

E-MAIL _____ PHONE _____

PLEASE COMPLETE THIS FORM BY CIRCLING THE NUMBER OF THE APPROPRIATE ANSWER IN THE AREA BELOW.

1. Please rate the difficulty of your course.
Very Easy 0 1 2 3 4 5 Very Difficult

2. Please rate the difficulty of the testing process.
Very Easy 0 1 2 3 4 5 Very Difficult

3. Please rate the subject matter on the exam to your actual field or work.
Very Similar 0 1 2 3 4 5 Very Different

4. How did you hear about this Course? _____

5. How would you improve the course?

How about the price of the course?

Poor ____ Fair ____ Average ____ Good ____ Great ____

How was your customer service?

Poor ____ Fair ____ Average ____ Good ____ Great ____

Any other concerns or comments.

Distribution Primer 1 CEU Training Course Assignment

The Assignment (Exam) is also available in Word on the Internet for your Convenience, please visit www.ABCTL.com and download the assignment and e-mail it back to TLC.

You'll have 90 days from the start of this course to complete in order to receive your Professional Development Hours (**PDHs**) or Continuing Education Unit (**CEU**). A score of 70 % is necessary to pass this course. We prefer if this exam is proctored. No intentional trick questions. If you should need any assistance, please email all concerns and the completed manual to info@tlch2o.com.

We would prefer that you utilize the enclosed answer sheet in the front, but if you are unable to do so, type out your own answer key. Please include your name and address on your manual and make copy for yourself. You can e-mail or fax your Answer Key along with the Registration Form to TLC. **(S) Means answer may be plural or singular. Multiple Choice Section, One answer per question and please use the answer key.**

SOC Introduction

1. Synthetic Organic Chemicals (SOCs) are organic (carbon based) chemicals that are less volatile than _____.

- A. Volatile Organic Compounds (VOCs)
- B. Synthetic Organic Chemicals (SOCs)
- C. Polychlorinated Biphenyls (PCBs)
- D. Maximum Contaminant Levels (MCL)
- E. Organic compounds
- F. None of the Above

2. _____ are used as pesticides, defoliants, fuel additives and as ingredients for other organic compounds. They are all man made and do not naturally occur in the environment.

- A. Volatile Organic Compounds (VOCs)
- B. Synthetic Organic Chemicals (SOCs)
- C. Polychlorinated Biphenyls (PCBs)
- D. Maximum Contaminant Levels (MCL)
- E. Organic compounds
- F. None of the Above

3. Some of the more well-known SOC's are Atrazine, 2,4-D, Dioxin and _____.

- A. Volatile Organic Compounds (VOCs)
- B. Synthetic Organic Chemicals (SOCs)
- C. Polychlorinated Biphenyls (PCBs)
- D. Maximum Contaminant Levels (MCL)
- E. Organic compounds
- F. None of the Above

4. SOC's most often enter the natural environment through application of pesticide (including runoff from areas where they are applied), as part of a legally discharged waste stream, improper or illegal waste disposal, accidental releases or as a byproduct of incineration. Some _____ are very persistent in the environment, whether in soil or water.

- A. Volatile Organic Compounds (VOCs)
- B. Synthetic Organic Chemicals (SOCs)
- C. Polychlorinated Biphenyls (PCBs)
- D. Maximum Contaminant Levels (MCL)
- E. Organic compounds
- F. None of the Above

Volatile Organic Compounds (VOCs)

VOCs Explained

5. _____ are organic chemicals that have a high vapor pressure at ordinary, room-temperature conditions. Their high vapor pressure results from a low boiling point, which causes large numbers of molecules to evaporate or sublime from the liquid or solid form of the compound and enter the surrounding air. An example is formaldehyde, with a boiling point of -19°C (-2°F), slowly exiting paint and getting into the air.

- A. Volatile Organic Compounds (VOCs)
- B. Synthetic Organic Chemicals (SOCs)
- C. Polychlorinated Biphenyls (PCBs)
- D. Maximum Contaminant Levels (MCL)
- E. Organic compounds
- F. None of the Above

6. VOCs are numerous, varied, and ubiquitous. They include both human-made and naturally occurring chemical compounds. _____ are of VOCs. VOCs play an important role in communication between plants.

- A. 60 organic chemicals
- B. Most scents or odors
- C. Three contaminant groups
- D. Elevated odors
- E. Chemical compounds
- F. None of the Above

Antimony

7. Antimony is a toxic chemical element with symbol **Sb** and atomic number 51. A lustrous gray metalloid, it is found in nature mainly as the _____.

- A. Contaminant
- B. Analytical element
- C. Sulfide mineral stibnite (Sb_2S_3)
- D. Subsequent element
- E. Stibnite with iron
- F. None of the Above

What are EPA's drinking water regulations for antimony?

8. In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine the level of contaminants in drinking water at which no adverse health effects are likely to occur.

These _____, based solely on possible health risks and exposure over a lifetime with an adequate margin of safety, are called maximum contaminant level goals (MCLG).

- A. Grey areas are
- B. Enforceable health goals
- C. Nitrogen group contaminants
- D. Non-enforceable health goals
- E. Maximum contaminant levels (MCLs)
- F. None of the Above

9. Contaminants are _____ or matter in water.

- A. Contaminants
- B. Analytical problems
- C. Commonly found
- D. Organic and inorganic
- E. Prominent additives
- F. None of the Above

10. The MCLG for antimony is 0.006 mg/L or 6 ppb. EPA has set this level of protection based on the best available science to prevent potential health problems. EPA has set an enforceable regulation for antimony, called a _____, at 0.006 mg/L or 6 ppb.

- A. MCLG
- B. MCL
- C. CWA
- D. Emergency Planning and Community Right to Know Act (EPCRA)
- E. EPA
- F. None of the Above

11. MCLs are set as close to the health goals as possible, considering cost, benefits and the ability of public water systems to detect and remove contaminants using suitable treatment technologies. In this case, the MCL equals the _____, because analytical methods or treatment technology do not pose any limitation.

- A. MCLG
- B. MCLs
- C. Weight or law
- D. Goal
- E. EPA
- F. None of the Above

Asbestos

12. The MCLG for asbestos is 7 _____. EPA has set this level of protection based on the best available science to prevent potential health problems.

- A. MCLG
- B. MCLs
- C. MFL
- D. Emergency Planning and Community Right to Know Act (EPCRA)
- E. EPA
- F. None of the Above

13. MCLs are set as close to the health goals as possible, considering cost, benefits and the ability of public water systems to detect and remove contaminants using suitable treatment technologies. In this case, the _____, because analytical methods or treatment technology do not pose any limitation.

- A. MCLG
- B. MCL equals the MCLG
- C. MFL
- D. Emergency Planning and Community Right to Know Act (EPCRA)
- E. EPA
- F. None of the Above

14. The Phase II Rule, the regulation for asbestos, became effective in 1992. The Safe Drinking Water Act requires EPA to periodically review the national primary drinking water regulation for each contaminant and revise the regulation, if appropriate. EPA reviewed asbestos as part of the Six Year Review and determined that the 7 MFL MCLG and _____ for asbestos are still protective of human health.

- A. MCLG
- B. MCL equals the MCLG
- C. MFL
- D. Emergency Planning and Community Right to Know Act (EPCRA)
- E. 7 MFL MCL
- F. None of the Above

Barium

15. In 1974, Congress passed the _____. This law requires EPA to determine the level of contaminants in drinking water at which no adverse health effects are likely to occur. These non-enforceable health goals, based solely on possible health risks and exposure over a lifetime with an adequate margin of safety, are called maximum contaminant level goals (MCLG). Contaminants are any physical, chemical, biological or radiological substances or matter in water.

- A. MCLG
- B. Phase IIB Rule
- C. Safe Drinking Water Act
- D. Emergency Planning and Community Right to Know Act (EPCRA)
- E. EPA
- F. None of the Above

16. The MCLG for barium is 2 mg/L or 2 ppm. EPA has set this level of protection based on the best available science to prevent potential health problems. EPA has set an enforceable regulation for barium, called a maximum contaminant level (MCL), at _____.

- A. MCLG
- B. MCL equals the MCLG
- C. MFL
- D. Emergency Planning and Community Right to Know Act (EPCRA)
- E. 2 mg/L or 2 ppm
- F. None of the Above

17. MCLs are set as close to the health goals as possible, considering cost, benefits and the ability of public water systems to detect and remove contaminants using suitable treatment technologies. In this case, the _____, because analytical methods or treatment technology do not pose any limitation.

- A. MCLG
- B. MCL equals the MCLG
- C. EPA
- D. SDWA
- E. 2 mg/L or 2 ppm
- F. None of the Above

18. The _____, the regulation for barium, became effective in 1993. The Safe Drinking Water Act requires EPA to periodically review the national primary drinking water regulation for each contaminant and revise the regulation, if appropriate. EPA reviewed barium as part of the Six Year Review and determined that the 2 mg/L or 2 ppm MCLG and 2 mg/L or 2 ppm MCL for barium are still protective of human health.

- A. MCLG
- B. Phase IIB Rule
- C. Safe Drinking Water Act
- D. Emergency Planning and Community Right to Know Act (EPCRA)
- E. EPA
- F. None of the Above

19. The major sources of barium in drinking water are discharge of drilling wastes; _____; and erosion of natural deposits.

- A. Discharge from metal refineries
- B. Barium
- C. Barium carbonate, BaCO₃
- D. Soluble barium compounds
- E. Its high chemical reactivity
- F. None of the Above

Beryllium

20. In 1974, Congress passed the _____. This law requires EPA to determine the level of contaminants in drinking water at which no adverse health effects are likely to occur. These non-enforceable health goals, based solely on possible health risks and exposure over a lifetime with an adequate margin of safety, are called maximum contaminant level goals (MCLG). Contaminants are any physical, chemical, biological or radiological substances or matter in water.

- A. MCLG
- B. MCL equals the MCLG
- C. EPA
- D. Safe Drinking Water Act
- E. 2 mg/L or 2 ppm
- F. None of the Above

21. The _____ for beryllium is 0.004 mg/L or 4 ppb. EPA has set this level of protection based on the best available science to prevent potential health problems. EPA has set an enforceable regulation for beryllium, called a maximum contaminant level (MCL), at 0.004 mg/L or 4 ppb.

- A. MCLG
- B. MCL equals the MCLG
- C. EPA
- D. SDWA
- E. 2 mg/L or 2 ppm
- F. None of the Above

22. _____ are set as close to the health goals as possible, considering cost, benefits and the ability of public water systems to detect and remove contaminants using suitable treatment technologies. In this case, the MCL equals the MCLG, because analytical methods or treatment technology do not pose any limitation.

- A. MCLs
- B. MCL equals the MCLG
- C. EPA
- D. SDWA
- E. 2 mg/L or 2 ppm
- F. None of the Above

23. The _____, the regulation for beryllium, became effective in 1994. The Safe Drinking Water Act requires EPA to periodically review the national primary drinking water regulation for each contaminant and revise the regulation, if appropriate. EPA reviewed beryllium as part of the Six Year Review and determined that the 0.004 mg/L or 4 ppb MCLG and 0.004 mg/L or 4 ppb MCL for beryllium are still protective of human health.

- A. Phase V Rule
- B. MCL
- C. Group 2
- D. Emergency Planning and Community Right to Know Act (EPCRA)
- E. EPA
- F. None of the Above

How does Beryllium get into my Drinking Water?

24. Beryllium naturally enters surface water and ground water through the weathering of rocks and soils or from industrial wastewater discharges. The major source of environmental releases from _____ are coal and fuel oil combustion.

- A. Divalent elements
- B. Brittle alkaline earth metal
- C. Industrial waste disposal practices
- D. Hardness and resistance to corrosion
- E. Waste batteries and paints
- F. None of the Above

25. A federal law called the _____ requires facilities in certain industries, which manufacture, process, or use significant amounts of toxic chemicals, to report annually on their releases of these chemicals. For more information on the uses and releases of chemicals in your state, contact the Community Right-to-Know Hotline: (800) 424-9346.

- A. Phase V Rule
- B. MCL
- C. OSHA
- D. Emergency Planning and Community Right to Know Act (EPCRA)
- E. EPA
- F. None of the Above

Cadmium - Inorganic Contaminant 0.005 mg/L MCL

26. In 1974, Congress passed the _____. This law requires EPA to determine the level of contaminants in drinking water at which no adverse health effects are likely to occur. These non-enforceable health goals, based solely on possible health risks and exposure over a lifetime with an adequate margin of safety, are called maximum contaminant level goals (MCLG). Contaminants are any physical, chemical, biological or radiological substances or matter in water.

- A. MCLG
- B. CWA
- C. Safe Drinking Water Act
- D. Emergency Planning and Community Right to Know Act
- E. EPA
- F. None of the Above

27. The MCLG for cadmium is _____. EPA has set this level of protection based on the best available science to prevent potential health problems.

- A. 4.0
- B. .002
- C. 1.3
- D. .015
- E. 0.005 mg/L or 5 ppb
- F. None of the Above

28. EPA has set an enforceable regulation for cadmium, called a maximum contaminant level (MCL), at _____ are set as close to the health goals as possible, considering cost, benefits and the ability of public water systems to detect and remove contaminants using suitable treatment technologies. In this case, the MCL equals the MCLG, because analytical methods or treatment technology do not pose any limitation.

- A. 4.0 D. .015
- B. .002 E. 0.005 mg/L or 5 ppb
- C. 1.3 F. None of the Above

29. The Phase II Rule, the regulation for cadmium, became effective in 1992. The Safe Drinking Water Act requires EPA to periodically review the national primary drinking water regulation for each contaminant and revise the regulation, if appropriate. EPA reviewed cadmium as part of the Six Year Review and determined that the _____ MCLG and 0.005 mg/L or 5 ppb MCL for cadmium are still protective of human health.

- A. 4.0 D. .015
- B. .002 E. 0.005 mg/L or 5 ppb
- C. 1.3 F. None of the Above

How does cadmium get into my drinking water?

30. The major sources of cadmium in drinking water are corrosion of galvanized pipes; erosion of natural deposits; _____; runoff from waste batteries and paints.

- A. It is a divalent element D. It may burn and release toxic fumes
- B. Brittle alkaline earth metal E. Discharge from metal refineries
- C. Coal and fuel oil combustion F. None of the Above

31. A federal law called the _____ requires facilities in certain industries, which manufacture, process, or use significant amounts of toxic chemicals, to report annually on their releases of these chemicals. For more information on the uses and releases of chemicals in your state, contact the Community Right-to-Know Hotline: (800) 424-9346.

- A. MCLG D. Emergency Planning and Community Right to Know Act
- B. CWA E. EPA
- C. Safe Drinking Water Act F. None of the Above

How will I know if cadmium is in my drinking water?

32. When routine monitoring indicates that cadmium levels are above the _____, your water supplier must take steps to reduce the amount of cadmium so that it is below that level. Water suppliers must notify their customers as soon as practical, but no later than 30 days after the system learns of the violation.

- A. MCLG D. SDWA limit
- B. MCL E. 2 mg/L or 2 ppm
- C. EPA standard F. None of the Above

Copper

What are Copper's Health Effects?

33. Some people who drink water containing copper in excess of the _____ may, with short term exposure, experience gastrointestinal distress, and with long-term exposure may experience liver or kidney damage. People with Wilson's Disease should consult their personal doctor if the amount of copper in their water exceeds the action level.

- A. MCLG D. Standard
- B. MCL E. Action level
- C. Limit F. None of the Above

What are EPA's Drinking Water Regulations for Copper?

34. In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine the level of contaminants in drinking water at which no adverse health effects are likely to occur. These non-enforceable health goals, based solely on possible health risks and exposure over a lifetime with an adequate margin of safety, are called _____. Contaminants are any physical, chemical, biological or radiological substances or matter in water.

- A. MCLG
- B. MCL
- C. Limit
- D. Standard
- E. Action level
- F. None of the Above

35. The _____ for copper is 1.3 mg/L or 1.3 ppm. EPA has set this level of protection based on the best available science to prevent potential health problems.

- A. MCLG
- B. MCL
- C. Limit
- D. Standard
- E. Action level
- F. None of the Above

36. For most contaminants, EPA sets an enforceable regulation called a maximum contaminant level (MCL) based on the MCLG. _____ as feasible, considering cost, benefits and the ability of public water systems to detect and remove contaminants using suitable treatment technologies. However, because copper contamination of drinking water often results from corrosion of the plumbing materials belonging to water system customers, EPA established a treatment technique rather than an MCL for copper.

- A. MCLG
- B. MCL
- C. Limit
- D. Standard
- E. MCLs are set as close to the MCLGs
- F. None of the Above

37. A treatment technique is an enforceable procedure or level of technological performance which water systems must follow to ensure control of a contaminant. The treatment technique regulation for copper (referred to as the Lead and Copper rule) requires water systems to control the corrosivity of the water. The regulation also requires systems to collect tap samples from sites served by the system that are more likely to have plumbing materials containing lead. If more than 10 percent of tap water samples exceed the copper action level of 1.3 _____, water systems must take additional steps to reduce corrosiveness.

- A. MCLG
- B. MCL
- C. Limit
- D. Milligrams per Liter (mg/L)
- E. Action level
- F. None of the Above

38. _____ promulgated the Lead and Copper Rule in 1991, and revised the regulation in 2000 and in 2007. States may set a more stringent regulation for copper in drinking water than EPA.

- A. CWA
- B. SDWA
- C. OSHA
- D. Emergency Planning and Community Right to Know Act (EPCRA)
- E. EPA
- F. None of the Above

Copper Explained

39. Pure copper is _____; a freshly exposed surface has a reddish-orange color. It is used as a conductor of heat and electricity, a building material, and a constituent of various metal alloys.

- A. Known also as Lead
- B. Soft and malleable
- C. A carbon-nitrogen chemical
- D. Related to turquoise
- E. A liquid like Mercury
- F. None of the Above

40. Its compounds are commonly encountered as _____, which often impart blue or green colors to minerals such as turquoise and have been widely used historically as pigments.

- A. Copper (II) salts
- B. Element
- C. Carbon-nitrogen chemical
- D. A mixture of gold and copper
- E. Salts
- F. None of the Above

Cyanide

41. Cyanide is a carbon-nitrogen chemical unit which combines with many_____.
- A. Copper (II) salts
 - B. Organic and inorganic compounds
 - C. Carbon-nitrogen chemicals
 - D. Nitrogen atoms
 - E. Salts
 - F. None of the Above

Uses for Cyanide.

42. The most commonly used form, _____, is mainly used to make compounds and other synthetic fibers and resins.
- A. Copper (II) salts
 - B. Cyanide (II)
 - C. Carbon-nitrogen chemical
 - D. The nitrogen atom
 - E. Salts of the anion CN^-
 - F. None of the Above

What are Cyanide's Health Effects?

43. Some people who drink water containing cyanide well in excess of the maximum contaminant level (_____) for many years could experience nerve damage or problems with their thyroid. This health effects language is not intended to catalog all possible health effects for cyanide. Rather, it is intended to inform consumers of some of the possible health effects associated with cyanide in drinking water when the rule was finalized.
- A. MCLG
 - B. MCL
 - C. Group 2
 - D. Emergency Planning and Community Right to Know Act (EPCRA)
 - E. EPA
 - F. None of the Above

What are EPA's Drinking Water Regulations for Cyanide?

44. In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine the level of contaminants in drinking water at which no adverse health effects are likely to occur. These non-enforceable health goals, based solely on possible health risks and exposure over a lifetime with an adequate margin of safety, are called_____.
- A. MCLG
 - B. MCL
 - C. Limit
 - D. Standard
 - E. MCLs are set as close to the MCLGs
 - F. None of the Above
45. _____are any physical, chemical, biological or radiological substances or matter in water.
- A. Naked contaminants
 - B. Halides
 - C. Contaminants
 - D. Solutions of inorganic contaminants
 - E. Cyanides
 - F. None of the Above
46. The _____ for cyanide is 0.2 mg/L or 200 ppb. EPA has set this level of protection based on the best available science to prevent potential health problems. EPA has set an enforceable regulation for cyanide, called a maximum contaminant level (MCL), at 0.2 mg/L or 200 ppb.
- A. MCLG
 - B. MCL
 - C. Limit
 - D. Standard
 - E. MCLs are set as close to the MCLGs
 - F. None of the Above
47. _____, considering cost, benefits and the ability of public water systems to detect and remove contaminants using suitable treatment technologies. In this case, the MCL equals the MCLG, because analytical methods or treatment technology do not pose any limitation.
- A. MCLG
 - B. MCL
 - C. Limit
 - D. Standard
 - E. MCLs are set as close to the health goals as possible
 - F. None of the Above

48. The Phase V Rule, the regulation for cyanide, became effective in 1994. The Safe Drinking Water Act requires _____ to periodically review the national primary drinking water regulation for each contaminant and revise the regulation, if appropriate. EPA reviewed cyanide as part of the Six Year Review and determined that the 0.2 mg/L or 200 ppb MCLG and 0.2 mg/L or 200 ppb MCL for cyanide are still protective of human health.

- A. MCLG
- B. MCL
- C. Limit
- D. Standard
- E. MCLs are set as close to the health goals as possible
- F. None of the Above

Cyanide Explained

49. A cyanide is a chemical compound that contains the _____, which consists of a carbon atom triple-bonded to a nitrogen atom.

- A. Naked contaminants
- B. Halides
- C. Contaminants
- D. Solutions of inorganic contaminants
- E. Cyanides
- F. None of the Above

50. Cyanides most commonly refer to _____ which is isoelectronic with carbon monoxide and with molecular nitrogen. Most cyanides are highly toxic.

- A. Cyanide salts
- B. Salts of the anion CN^- ,
- C. Carbon-nitrogen chemical
- D. Solutions of salts of the anion CN^- ,
- E. Cyanides solutions
- F. None of the Above

Fluoride

What are EPA's Drinking Water Regulations for Fluoride?

51. In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine the level of contaminants in drinking water at which no adverse health effects are likely to occur. These non-enforceable health goals, based solely on possible health risks and exposure over a lifetime with an adequate margin of safety, are called maximum contaminant level goals (MCLG). _____ are any physical, chemical, biological or radiological substances or matter in water.

- A. MCLG
- B. MCL
- C. Limit
- D. Standard
- E. MCLs are set as close to the health goals as possible
- F. None of the Above

52. The _____ for fluoride is 4.0 mg/L or 4.0 ppm. EPA has set this level of protection based on the best available science to prevent potential health problems. EPA has set an enforceable regulation for fluoride, called a maximum contaminant level (MCL), at 4.0 mg/L or 4.0 ppm.

- A. MCLG
- B. MCL
- C. Limit
- D. Standard
- E. MCLs are set as close to the health goals as possible
- F. None of the Above

53. MCLs are set as close to the health goals as possible, considering cost, benefits and the ability of public water systems to detect and remove contaminants using suitable treatment technologies. In this case, the _____, because analytical methods or treatment technology do not pose any limitation.

- A. MCLG
- B. MCL
- C. Limit
- D. Standard
- E. MCL equals the MCLG
- F. None of the Above

54. Tooth discoloration and/or pitting is caused by excess fluoride exposures during the formative period prior to eruption of the teeth in children. The secondary standard of 2.0 mg/L is intended as a guideline for an upper bound level in areas which have high levels of naturally occurring fluoride. The level of the _____ was set based upon a balancing of the beneficial effects of protection from tooth decay and the undesirable effects of excessive exposures leading to discoloration.

- A. MCLG
- B. MCL
- C. Limit
- D. Secondary standard (SMCL)
- E. MCL equals the MCLG
- F. None of the Above

Fluoride Explained

55. Fluoride is the anion F^- , the reduced form of fluorine when as an ion and when bonded to another element. Inorganic fluorine containing compounds are called fluorides. Fluoride, like other halides, is a monovalent ion (-1 charge). Its compounds often have properties that are distinct relative to other halides. Structurally, and to some extent chemically, the _____ resembles the hydroxide ion.

- A. Naked fluoride
- B. Halides
- C. Fluoride
- D. Solutions of inorganic fluorides
- E. Fluoride ion
- F. None of the Above

Mercury

56. _____ regulates mercury in drinking water to protect public health. Mercury may cause health problems if present in public or private water supplies in amounts greater than the drinking water standard set by EPA.

- A. MCLG
- B. MCLs
- C. SDWA
- D. Emergency Planning and Community Right to Know Act (EPCRA)
- E. EPA
- F. None of the Above

What is Mercury?

57. Mercury is a liquid metal found in natural deposits such as ores containing _____.

- A. Aluminum
- B. Ultraviolet light
- C. Cinnabar (mercuric sulfide)
- D. Mercury-aluminum amalgam
- E. Other elements
- F. None of the Above

What are Mercury's Health Effects?

58. Some people who drink water containing mercury well in excess of the maximum contaminant level (MCL) for many years could experience kidney damage. This health effects language is not intended to catalog all possible _____ for mercury. Rather, it is intended to inform consumers of some of the possible health effects associated with mercury in drinking water when the rule was finalized.

- A. MCLG
- B. MCLs
- C. Health effects
- D. Standards
- E. EPA
- F. None of the Above

What are EPA's Drinking Water Regulations for Mercury?

59. In 1974, Congress passed the _____. This law requires EPA to determine the level of contaminants in drinking water at which no adverse health effects are likely to occur. These non-enforceable health goals, based solely on possible health risks and exposure over a lifetime with an adequate margin of safety, are called maximum contaminant level goals (MCLG). Contaminants are any physical, chemical, biological or radiological substances or matter in water.

- A. MCLG
- B. MCL
- C. Limit
- D. Secondary standard (SMCL)
- E. Safe Drinking Water Act
- F. None of the Above

Nitrate (Measured as Nitrogen) - Inorganic Contaminant 10 mg/L MCL

60. EPA regulates _____ in drinking water to protect public health. Nitrate may cause health problems if present in public or private water supplies in amounts greater than the drinking water standard set by EPA.

- A. Nitrates and nitrites
- B. Nitrate ion
- C. Nitrate
- D. Nitrates are converted to nitrites
- E. Various organic and inorganic compounds
- F. None of the Above

What is Nitrate?

61. Nitrates and nitrites are _____ which combine with various organic and inorganic compounds.

- A. Nitrogen-oxygen chemical units
- B. Nitrate ion
- C. Nitrate
- D. Nitrates are converted to nitrites
- E. Various organic and inorganic compounds
- F. None of the Above

Uses for Nitrate.

62. The greatest use of nitrates is as a fertilizer. Once taken into the body, nitrates are converted to _____.

- A. Nitrates and nitrites
- B. Nitrate ion
- C. Nitrate
- D. Nitrites
- E. Various organic and inorganic compounds
- F. None of the Above

What are EPA's Drinking Water Regulations for Nitrate?

63. In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine the level of contaminants in drinking water at which no adverse health effects are likely to occur. These non-enforceable health goals, based solely on possible health risks and exposure over a lifetime with an adequate margin of safety, are called maximum contaminant level goals (MCLG). Contaminants are any _____.

- A. MCLG
- B. MCL
- C. Limit
- D. Secondary standard (SMCL)
- E. An enforceable regulation for nitrate
- F. None of the Above

64. The MCLG for nitrate is 10 mg/L or 10 ppm. EPA has set this level of protection based on the best available science to prevent potential health problems. EPA has set an enforceable regulation for nitrate, called a maximum contaminant level (MCL), at 10 mg/L or 10 ppm. _____, considering cost, benefits and the ability of public water systems to detect and remove contaminants using suitable treatment technologies. In this case, the MCL equals the MCLG, because analytical methods or treatment technology do not pose any limitation.

- A. MCLG
- B. MCLs
- C. Limits
- D. MCLGs are set as close to the health goals as possible
- E. MCLs are set as close to the health goals as possible
- F. None of the Above

65. The Phase II Rule, the _____ for nitrate, became effective in 1992. The Safe Drinking Water Act requires EPA to periodically review the national primary drinking water regulation for each contaminant and revise the regulation, if appropriate. EPA reviewed nitrate as part of the Six Year Review and determined that the 10 mg/L or 10 ppm MCLG and 10 mg/L or 10 ppm MCL for nitrate are still protective of human health.

- A. MCLG
- B. MCLs
- C. Grouping
- D. Regulation
- E. Standard
- F. None of the Above

How does Nitrate get into my Drinking Water?

66. The major sources of nitrates in drinking water are runoff from fertilizer use; leaking from septic tanks, sewage; and erosion of natural deposits. A federal law called the Emergency Planning and Community Right to Know Act (EPCRA) requires facilities in certain industries, which manufacture, process, or use significant amounts of toxic chemicals, to report annually on their releases of these chemicals. For more information on the uses and releases of chemicals in your state, contact the _____.

- A. MCLG
- B. Water supplier
- C. Cops
- D. Emergency Planning and Community Right to Know Act (EPCRA)
- E. EPA
- F. None of the Above

Nitrite (Measured as Nitrogen)

67. EPA regulates nitrite in drinking water to protect public health. Nitrite may cause health problems if present in public or private water supplies in amounts greater than the drinking water standard set by _____.

- A. MCLG
- B. Water supplier
- C. Cops
- D. Emergency Planning and Community Right to Know Act (EPCRA)
- E. EPA
- F. None of the Above

What is Nitrite?

68. Nitrates and nitrites are _____ which combine with various organic and inorganic compounds.
- A. Nitrogen-oxygen chemical units
 - B. Nitrate ion
 - C. Nitrate
 - D. Nitrates are converted to nitrites
 - E. Various organic and inorganic compounds
 - F. None of the Above

Uses for Nitrite.

69. The greatest use of nitrates is as a fertilizer. Once taken into the body, _____ are converted to nitrites.
- A. Nitrites
 - B. Nitrate ions
 - C. Nitrates
 - D. Nitrogen ions
 - E. Various organic and inorganic compounds
 - F. None of the Above

What are EPA's Drinking Water Regulations for Nitrite?

70. In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine the level of contaminants in drinking water at which no adverse health effects are likely to occur. These non-enforceable health goals, based solely on _____ and exposure over a lifetime with an adequate margin of safety, are called maximum contaminant level goals (MCLG). Contaminants are any physical, chemical, biological or radiological substances or matter in water.

- A. MCLG
- B. MCLs
- C. Limits
- D. MCLGs are set as close to the health goals as possible
- E. MCLs are set as close to the health goals as possible
- F. None of the Above

71. The MCLG for nitrite is 1 mg/L or 1 ppm. EPA has set this level of protection based on the best available science to prevent potential health problems. EPA has set an enforceable regulation for nitrite, called a maximum contaminant level (MCL), at 1 mg/L or 1 ppm. MCLs are set as close to the health goals as possible, considering cost, benefits and the ability of public water systems to detect and remove contaminants using _____. In this case, the MCL equals the MCLG, because analytical methods or treatment technology do not pose any limitation.

- A. MCLG
- B. MCLs
- C. The Phase II Rule
- D. MCLGs are set as close to the health goals as possible
- E. MCLs are set as close to the health goals as possible
- F. None of the Above

72. _____, the regulation for nitrite, became effective in 1992. The Safe Drinking Water Act requires EPA to periodically review the national primary drinking water regulation for each contaminant and revise the regulation, if appropriate. EPA reviewed nitrite as part of the Six Year Review and determined that the 1 mg/L or 1 ppm MCLG and 1 mg/L or 1 ppm MCL for nitrite are still protective of human health. States may set more stringent drinking water MCLGs and MCLs for nitrite than EPA.

- A. MCLG
- B. MCLs
- C. The Phase II Rule
- D. MCLGs are set as close to the health goals as possible
- E. MCLs are set as close to the health goals as possible
- F. None of the Above

How does Nitrite get into my Drinking Water?

73. The major sources of _____ in drinking water are runoff from fertilizer use; leaching from septic tanks, sewage; and erosion of natural deposits.

- A. Nitrites
- B. Nitrate ion
- C. Nitrate
- D. Nitrogen ions
- E. Various organic and inorganic compounds
- F. None of the Above

Selenium

74. Selenium (Se) is an essential element for _____, with the majority of our intake coming from foods such as nuts, cereals, meat, fish, and eggs.

- A. Vitamins
- B. Drinking water
- C. Minerals
- D. Selenide or selenate compounds
- E. Human nutrition
- F. None of the Above

75. The concentration of Selenium in drinking water is usually low, and comes from natural minerals. In soils, selenium often occurs in soluble forms such as selenate, which are leached into rivers very easily by runoff increasing the amount of _____.

- A. Selenium
- B. Selenium in drinking water
- C. Minerals
- D. Selenide or selenate compounds
- E. An essential element
- F. None of the Above

76. _____ is also a by-product of copper mining / smelting. Selenium is also used in photoelectric devices because its electrical conductivity varies with light.

- A. Selenium
- B. Selenium in water
- C. Minerals
- D. Selenide or selenate compounds
- E. An essential element for human nutrition
- F. None of the Above

77. Acute toxicity caused by _____ or other sources of intake has been observed in laboratory animals and in animals grazing in areas where high selenium levels exist in the soil. The US EPA has established the MCL for selenium in water at 0.05 mg/l.

- A. Selenium
- B. Selenium in drinking water
- C. Minerals
- D. Selenide or selenate compounds
- E. High levels of selenium in water
- F. None of the Above

Selenium Explained

78. Selenium is found impurely in metal sulfide ores, where it partially replaces the sulfur. Commercially, selenium is produced as _____ in the refining of these ores, most often during copper production.

- A. Metal sulfide ores
- B. Natural deposits
- C. Antioxidant enzymes
- D. Silicon
- E. Glutathione peroxidase
- F. None of the Above

Thallium

79. Thallium is a metal found in natural deposits such as ores containing _____.

- A. Metal sulfide ores
- B. Natural deposits
- C. Selenium
- D. Silicon
- E. Other elements
- F. None of the Above

Uses for Thallium.

80. The greatest use of _____ is in specialized electronic research equipment.

- A. Nonselective toxicity
- B. Thallium
- C. Selenium
- D. Potassium ores
- E. This soft gray poor metal
- F. None of the Above

What are Thallium's Health Effects?

81. Some people who drink water containing thallium well in _____ for many years could experience hair loss, changes in their blood, or problems with their kidneys, intestines, or liver problems.

- A. MCLG
- B. MCLs
- C. The Phase II Rule
- D. MCLGs are set as close to the health goals as possible
- E. Excess of the maximum contaminant level (MCL)
- F. None of the Above

Chlorine Gas Section

82. Background: _____ is a pulmonary irritant with intermediate water solubility that causes acute damage in the upper and lower respiratory tract.

- A. Chlorine or Cl₂
- B. Chlorine Gas
- C. Odor threshold
- D. Leaks
- E. Hypochlorous acid
- F. None of the Above

83. Chlorine is a _____ at standard temperature and pressure. It is extremely reactive with most elements.

- A. Chlorine or Cl₂
- B. Chlorine Gas
- C. Odor threshold
- D. Yellowish-green gas
- E. Hypochlorous acid
- F. None of the Above

84. Because its density is greater than that of air, the gas settles low to the ground. It is a respiratory irritant, and burns the skin. Just a few breaths of it are fatal. _____ does not occur naturally, although chlorine can be found in a number of compounds.

- A. Cl₂ gas
- B. Chlorine Gas
- C. Odor threshold
- D. Leaks
- E. Hypochlorous acid
- F. None of the Above

85. Pathophysiology: Chlorine is a greenish-yellow, _____ at room temperature and atmospheric pressure. The intermediate water solubility of chlorine accounts for its effect on the upper airway and the lower respiratory tract.

- A. Chlorine or Cl₂
- B. Chlorine Gas
- C. Odor threshold
- D. Noncombustible gas
- E. Hypochlorous acid
- F. None of the Above

86. Exposure to chlorine gas may be pro-longed because its moderate water solubility may not cause upper airway symptoms for several minutes. In addition, _____ is greater than that of air, causing it to remain near ground level and increasing exposure time.

- A. Chlorine or Cl₂
- B. Chlorine Gas
- C. Odor threshold
- D. The density of the gas
- E. Hypochlorous acid
- F. None of the Above

87. The _____ for chlorine is approximately 0.3-0.5 parts per million (ppm); however, distinguishing toxic air levels from permissible air levels may be difficult until irritative symptoms are present.

- A. Chlorine or Cl₂
- B. Chlorine Gas
- C. Odor threshold
- D. Leaks
- E. Hypochlorous acid
- F. None of the Above

Mechanism of Activity

88. The mechanisms of the above _____ are poorly understood and the predominant anatomic site of injury may vary, depending on the chemical species produced.

- A. Free oxygen radicals
- B. Chlorine Gas
- C. Chemical species
- D. Biological activity
- E. Hypochlorous acid
- F. None of the Above

89. Cellular injury is believed to result from the oxidation of functional groups in cell components, from reactions with tissue water to form _____, and from the generation of free oxygen radicals.

- A. Free oxygen radicals
- B. Chlorine Gas
- C. Chemical species
- D. Hypochlorous and hydrochloric acid
- E. Hypochlorous acid
- F. None of the Above

90. Although the idea that chlorine causes direct tissue damage by generating free oxygen radicals was once accepted, _____.

- A. Free oxygen radicals
- B. Chlorine Gas
- C. Chemical species
- D. Leaks
- E. Hypochlorous acid
- F. None of the Above

91. The cylinders on the right contain chlorine gas. The gas comes out of the cylinder through a _____. The cylinders are on a scale that operators use to measure the amount used each day. The chains are used to prevent the tanks from falling over.

- A. Vents
- B. Chlorine Gas
- C. Panic bar equipped doors
- D. Leaks
- E. Gas regulator
- F. None of the Above

92. Chlorine gas is stored in vented rooms that have panic bar equipped doors. Operators have the equipment necessary to reduce the impact of a gas leak, but rely on trained emergency response teams to contain _____.

- A. Vents
- B. Chlorine Gas
- C. Panic bar equipped doors
- D. Leaks
- E. Gas regulator
- F. None of the Above

Solubility Effects

93. _____ is highly soluble in water. The predominant targets of the acid are the epithelia of the ocular conjunctivae and upper respiratory mucus membranes.

- A. Ammonia
- B. Chlorine Gas
- C. Hydrochloric acid
- D. Chlorine exposure
- E. Hypochlorous acid
- F. None of the Above

94. _____ is also highly water soluble with an injury pattern similar to hydrochloric acid.

- A. Ammonia
- B. Chlorine Gas
- C. Hydrochloric acid
- D. Chlorine exposure
- E. Hypochlorous acid
- F. None of the Above

95. _____ may account for the toxicity of elemental chlorine and hydrochloric acid to the human body.

- A. Ammonia
- B. Chlorine Gas
- C. Hydrochloric acid
- D. Chlorine exposure
- E. Hypochlorous acid
- F. None of the Above

Early Response to Chlorine Gas

96. Chlorine gas, when mixed with ammonia, reacts to form _____. In the presence of water, chloramines decompose to ammonia and hypochlorous acid or hydrochloric acid.

- A. Ammonia
- B. Chlorine Gas
- C. Hydrochloric acid
- D. Chloramine gas
- E. Hypochlorous acid
- F. None of the Above

97. The early response to chlorine exposure depends on the concentration of chlorine gas, duration of exposure, water content of the tissues exposed, and _____.

- A. Individual susceptibility
- B. Chlorine Gas
- C. Hydrochloric acid
- D. Chlorine exposure
- E. Hypochlorous acid
- F. None of the Above

Chlorine (DDBP)

98. Chlorine present as Cl, HOCl, and OCl⁻ is called _____ and that which is bound but still effective is combined chlorine. A particularly important group of compounds with combined chlorine is the chloramines formed by reactions with ammonia.

- A. Free available chlorine
- B. Chlorine Gas
- C. Hydrochloric acid
- D. Chlorine exposure
- E. Hypochlorous acid
- F. None of the Above

99. One especially important feature of disinfection using chlorine is the ease of overdosing to create a residual concentration. There is a constant danger that _____ leaving the treatment plant may become contaminated later.

- A. Break Point Chlorination
- B. Chlorine Gas
- C. Combined chlorine
- D. Safe water
- E. The trihalomethanes (THMs)
- F. None of the Above

100. There may be breaks in water mains, loss of pressure that permits an inward leak, or plumbing errors. This residual concentration of chlorine provides some degree of protection right to the water faucet. With _____, a typical residual is from 0.1 to 0.5 ppm.

- A. Break Point Chlorination
- B. Chlorine Gas
- C. Combined chlorine
- D. Safe water
- E. Free available chlorine
- F. None of the Above

101. Because _____ are less effective, a typical residual is 2 ppm for combined chlorine.

- A. Break Point Chlorination
- B. Chlorine Gas
- C. Combined chlorine
- D. Chlorinated organic compounds
- E. The trihalomethanes (THMs)
- F. None of the Above

102. There will be no chlorine residual unless there is an excess over the amount that reacts with the organic matter present. However, reaction kinetics complicates interpretation of _____. The correct excess is obtained in a method called Break Point Chlorination.

- A. Break Point Chlorination
- B. Chlorine Gas
- C. Combined chlorine
- D. Chlorination data
- E. The trihalomethanes (THMs)
- F. None of the Above

Chlorine by-products

103. _____ are the chemicals formed when the chlorine used to kill disease-causing micro-organisms reacts with naturally occurring organic matter (i.e., decay products of vegetation) in the water. The most common chlorination by-products found in U.S. drinking water supplies are the trihalomethanes (THMs).

- A. Break Point Chlorination
- B. Chlorine Gas
- C. Combined chlorine
- D. Chlorination by-products
- E. The trihalomethanes (THMs)
- F. None of the Above

104. The amount of _____ formed in drinking water can be influenced by a number of factors, including the season and the source of the water.

- A. Break Point Chlorination
- B. Chlorine Gas
- C. Combined chlorine
- D. Safe water
- E. Trihalomethanes or THM(s) (s) means plural or singular
- F. None of the Above

105. _____ are generally lower in winter than in summer, because concentrations of natural organic matter are lower and less chlorine is required to disinfect at colder temperatures.

- A. THM concentrations
- B. THM levels
- C. Combined chlorine
- D. Other disinfectants
- E. Trihalomethanes or THM(s) (s) means plural or singular
- F. None of the Above

106. _____ are also low when wells or large lakes are used as the drinking water source, because organic matter concentrations are generally low in these sources. The opposite — high organic matter concentrations and high THM levels — is true when rivers or other surface waters are used as the source of the drinking water.

- A. THM concentrations
- B. THM levels
- C. Combined chlorine
- D. Other disinfectants
- E. Trihalomethanes or THM(s) (s) means plural or singular
- F. None of the Above

Health Effects

107. Laboratory animals exposed to _____ have shown increased incidences of cancer. Also, several studies of cancer incidence in human populations have reported associations between long-term exposure to high levels of chlorination by-products and an increased risk of certain types of cancer.

- A. THM concentrations
- B. THM levels
- C. Very high levels of THMs
- D. Other disinfectants
- E. Trihalomethanes or THM(s) (s) means plural or singular
- F. None of the Above

108. For instance, a recent study conducted in the Great Lakes basin reported an increased risk of bladder and possibly colon cancer in people who drank _____ for 35 years or more.

- A. Chlorinated surface water
- B. Chlorine Gas
- C. Combined chlorine
- D. Other disinfectants
- E. Trihalomethanes or THM(s) (s) means plural or singular
- F. None of the Above

Risks and Benefits of Chlorine

109. Current evidence indicates the benefits of chlorinating our drinking water — reduced incidence of water-borne diseases — are much greater than the risks of health effects from _____.

- A. THM concentrations
- B. THM levels
- C. Very high levels of THMs
- D. Other disinfectants
- E. THM(s) (s) means plural or singular
- F. None of the Above

110. Although other disinfectants are available, _____ continues to be the choice of water treatment experts. When used with modern water filtration practices, chlorine is effective against virtually all infectious agents — bacteria, viruses, and protozoa.

- A. Ozone
- B. Chlorine Gas
- C. Combined chlorine
- D. Other disinfectants
- E. Chlorine
- F. None of the Above

111. It is easy to apply, and most importantly, _____ remain in the water and continue to disinfect throughout the distribution system. This ensures the water remains free of microbial contamination on its journey from the treatment plant to the consumer's tap.

- A. Small amounts of chlorine
- B. Chlorine Gas
- C. Combined chlorine
- D. Other disinfectants
- E. Trihalomethanes or THM(s) (s) means plural or singular
- F. None of the Above

112. A number of cities use ozone to disinfect their source water and to reduce _____.

- A. THM concentrations
- B. THM levels
- C. Very high levels of THMs
- D. THM formation
- E. Trihalomethanes or THM(s) (s) means plural or singular
- F. None of the Above

113. Although _____ is a highly effective disinfectant, it breaks down quickly, so that small amounts of chlorine or other disinfectants must be added to the water to ensure continued disinfection as the water is piped to the consumer's tap.

- A. Ozone
- B. Chlorine Gas
- C. Chloramine(s)
- D. Alternative disinfectants
- E. Chlorine dioxide
- F. None of the Above

114. Modifying water treatment facilities to use ozone can be expensive, and ozone treatment can create other _____ that may be harmful to health if they are not controlled (i.e., bromate).

- A. Ozone
- B. Chlorine Gas
- C. Chloramine(s)
- D. Alternative disinfectants
- E. Undesirable by-products
- F. None of the Above

115. Examples of other disinfectants include _____ and chlorine dioxide.

- A. Ozone
- B. Chlorine Gas
- C. Chloramine(s)
- D. Alternative disinfectants
- E. Chlorine dioxide
- F. None of the Above

116. _____ are weaker disinfectants than chlorine, especially against viruses and protozoa; however, they are very persistent and, as such, can be useful for preventing re-growth of microbial pathogens in drinking water distribution systems.

- A. Ozone
- B. Chlorine Gas
- C. Chloramine(s)
- D. Alternative disinfectants
- E. Chlorine dioxide
- F. None of the Above

117. Chlorine dioxide can be an effective disinfectant, but it forms chlorate and chlorite, compounds whose toxicity has not yet been fully determined. Assessments of the _____ from these and other chlorine-based disinfectants and chlorination by-products are currently under way.

- A. Ozone
- B. Chlorine Gas
- C. Chloramine(s)
- D. Alternative disinfectants
- E. Chlorine dioxide
- F. None of the Above

118. In general, the preferred method of controlling chlorination by-products is removal of the naturally occurring organic matter from the source water so it cannot react with the chlorine to form by-products. _____ levels may also be reduced through the replacement of chlorine with alternative disinfectants.

- A. Ozone
- B. THM
- C. Chloramine(s)
- D. Alternative disinfectants
- E. Chlorine dioxide
- F. None of the Above

New EPA Rules

Arsenic

119. Arsenic is a chemical that occurs naturally in _____. When rocks, minerals, and soil erode, they release arsenic into water supplies. When people either drink this water or eat animals and plants that drink it, they are exposed to arsenic.

- A. Divalent elements
- B. Brittle alkaline earth metal
- C. Industrial waste disposal practices
- D. Hardness and resistance to corrosion
- E. Waste batteries and paints
- F. None of the Above

120. For most people in the U.S., eating and drinking are the most common ways that people are exposed to arsenic, although it can also come from industrial sources. Studies have linked long-term exposure of _____ in drinking water to a variety of cancers in humans.

- A. Copper (II) salts
- B. Organic and inorganic compounds
- C. Carbon-nitrogen chemicals
- D. Nitrogen atoms
- E. Salts
- F. None of the Above

Water Sampling Terms, and Definitions

Microbes

121. Coliform bacteria are common in the environment and are generally not harmful. However, the presence of these bacteria in drinking water is usually a result of a problem with the treatment system or the pipes which distribute water, and indicates that the water may be contaminated with _____ that can cause disease.

- A. Pathogens
- B. Campylobacteriosis
- C. Cryptosporidium
- D. Giardia lamblia
- E. Bacteria, viruses, and protozoan
- F. None of the Above

122. _____ are bacteria whose presence indicates that the water may be contaminated with human or animal wastes.

- A. Fecal Coliform and E. coli
- B. Campylobacteriosis
- C. Cryptosporidium
- D. Giardia lamblia
- E. Bacteria, viruses, and protozoa
- F. None of the Above

123. _____ in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms.

- A. Pathogens
- B. Campylobacteriosis
- C. Cryptosporidium
- D. Microbes
- E. Bacteria, viruses, and protozoa
- F. None of the Above

124. _____ has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth.

- A. Turbidity
- B. Microbes
- C. Cryptosporidium
- D. Giardia lamblia
- E. Pathogens
- F. None of the Above

125. _____ may indicate the presence of disease causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

- A. Turbidity
- B. Microbes
- C. Cryptosporidium
- D. Giardia lamblia
- E. Pathogens
- F. None of the Above

126. _____ is a parasite that enters lakes and rivers through sewage and animal waste. It causes cryptosporidiosis, a mild gastrointestinal disease. However, the disease can be severe or fatal for people with severely weakened immune systems.

- A. Turbidity
- B. Microbes
- C. Cryptosporidium
- D. Giardia lamblia
- E. Pathogens
- F. None of the Above

127. The EPA and the CDC have prepared advice for those with severely compromised immune systems who are concerned about _____.

- A. Turbidity
- B. Microbes
- C. Cryptosporidium
- D. Giardia lamblia
- E. Pathogens
- F. None of the Above

128. _____ is a parasite that enters lakes and rivers through sewage and animal waste. It causes gastrointestinal illness (e.g. diarrhea, vomiting, cramps).

- A. Turbidity
- B. Microbes
- C. Cryptosporidium
- D. Giardia lamblia
- E. Pathogens
- F. None of the Above

Waterborne Pathogens and Disease Section

129. Bacteria, viruses, and protozoan that cause disease are known as _____.

- A. Pathogens
- B. Campylobacteriosis
- C. Cryptosporidium
- D. Giardia lamblia
- E. Fast food
- F. None of the Above

130. Most pathogens are generally associated with _____ that cause intestinal illness and affect people in a relatively short amount of time, generally a few days to two weeks. They can cause illness through exposure to small quantities of contaminated water or food, or from direct contact with infected people or animals.

- A. Diseases
- B. Campylobacteriosis
- C. Cryptosporidium
- D. Giardia lamblia
- E. Bacteria, viruses, and protozoan
- F. None of the Above

How Diseases are Transmitted

131. _____ that may cause waterborne outbreaks through drinking water have one thing in common: they are spread by the fecal-oral or feces-to-mouth route.

- A. Pathogens
- B. Campylobacteriosis
- C. Cryptosporidium
- D. Giardia lamblia
- E. Diseases
- F. None of the Above

132. _____ may get into water and spread when infected humans or animals pass the bacteria, viruses, and protozoa in their stool. For another person to become infected, he or she must take that pathogen in through the mouth.

- A. Pathogens
- B. Campylobacteriosis
- C. Cryptosporidium
- D. Giardia lamblia
- E. Diseases
- F. None of the Above

133. Waterborne pathogens are different from other types of pathogens such as the viruses that cause influenza (the flu) or the bacteria that cause tuberculosis. _____ are spread by secretions that are coughed or sneezed into the air by an infected person.

- A. Pathogens
- B. Campylobacteriosis
- C. Cryptosporidium
- D. Giardia lamblia
- E. Diseases
- F. None of the Above

134. Human or animal wastes in watersheds, failing septic systems, failing sewage treatment plants or cross-connections of water lines with sewage lines provide the potential for contaminating water with _____.

- A. Pathogens
- B. Campylobacteriosis
- C. Cryptosporidium
- D. Giardia lamblia
- E. Diseases
- F. None of the Above

135. The water may not appear to be contaminated because the feces has been broken up, dispersed, and diluted into _____.

- A. Pathogens
- B. Campylobacteriosis
- C. Cryptosporidium
- D. Giardia lamblia
- E. Bacteria, viruses, and protozoa
- F. None of the Above

136. These particles, containing _____, may remain in the water and be passed to humans or animals unless adequately treated.

- A. Pathogens
- B. Campylobacteriosis
- C. Cryptosporidium
- D. Giardia lamblia
- E. Bacteria, viruses, and protozoan
- F. None of the Above

Bacterial Diseases

137. Campylobacteriosis is the most common diarrhea illness caused by bacteria. Symptoms include abdominal pain, malaise, fever, nausea and vomiting, and they usually begin three to five days after exposure. The _____ is frequently over within two to five days and usually lasts no more than 10 days.

- A. Pathogens
- B. Campylobacteriosis
- C. Cryptosporidium
- D. Giardia lamblia
- E. Bacteria, viruses, and protozoa
- F. None of the Above

138. _____ outbreaks have most often been associated with food, especially chicken and unpasteurized milk, as well as un-chlorinated water.

- A. Pathogens
- B. Campylobacteriosis
- C. Cryptosporidium
- D. Giardia lamblia
- E. Bacteria, viruses, and protozoan
- F. None of the Above

Positive or Coliform Present Results

What do you do when your sample is positive or coliform present?

139. When you are notified of _____ you need to contact either the Drinking Water Program or your local county health department within 24 hours, or by the next business day after the results are reported to you. The Drinking Water Program contracts with many of the local health departments to provide assistance to water systems.

- A. Colony-forming units (CFU)
- B. A positive test result
- C. Corrective measures
- D. MCL violations
- E. Heterotrophic Plate Count (HPC)
- F. None of the Above

140. After you have contacted an agency for assistance, you will be instructed as to the proper repeat sampling procedures and _____ for solving the problem. It is very important to initiate the repeat sampling immediately as the corrective measures will be based on those results.

- A. Colony-forming units (CFU)
- B. A positive test result
- C. Corrective measures
- D. Possible corrective measures
- E. Heterotrophic Plate Count (HPC)
- F. None of the Above

Maximum Contaminant Levels (MCLs)

141. State and federal laws establish standards for drinking water quality. Under normal circumstances when these standards are being met, the water is safe to drink with no threat to human health. These standards are known as maximum contaminant levels (MCL). When a particular contaminant exceeds its _____ a potential health threat may occur.

- A. Colony-forming units (CFU)
- B. A positive test result
- C. Corrective measures
- D. MCL
- E. Heterotrophic Plate Count (HPC)
- F. None of the Above

142. The MCLs are based on extensive research on toxicological properties of the contaminants, risk assessments and factors, _____. You conduct the monitoring to make sure your water is in compliance with the MCL.

- A. Colony-forming units (CFU)
- B. A positive test result
- C. Corrective measures
- D. MCL violations
- E. Short term (acute) exposure and long term (chronic) exposure
- F. None of the Above

143. There are two types of _____ for coliform bacteria. The first is for total coliform; the second is an acute risk to health violation characterized by the confirmed presence of fecal coliform or E. coli.

- A. Colony-forming units (CFU)
- B. A positive test result
- C. Corrective measures
- D. MCL violations
- E. Heterotrophic Plate Count (HPC)
- F. None of the Above

Heterotrophic Plate Count HPC

144. Heterotrophic Plate Count (HPC) --- formerly known as the standard plate count, is a procedure for estimating the number of _____ and measuring changes during water treatment and distribution in water or in swimming pools.

- A. Colony-forming units (CFU)
- B. A positive test result
- C. Corrective measures
- D. Live heterotrophic bacteria
- E. Heterotrophic Plate Count (HPC)
- F. None of the Above

145. _____ may arise from pairs, chains, clusters, or single cells, all of which are included in the term "colony-forming units" (CFU).

- A. Colonies
- B. A positive test result
- C. Corrective measures
- D. MCL violations
- E. Heterotrophic Plate Count (HPC)
- F. None of the Above

Water Disinfectant Terminology

146. Many water suppliers add _____ to drinking water to kill germs such as giardia and e coli. Especially after heavy rainstorms, your water system may add more disinfectant to guarantee that these germs are killed.

- A. Chlorine
- B. Chlorine Dioxide
- C. A disinfectant
- D. Chloramine
- E. Alternative disinfectant(s)
- F. None of the Above

147. _____ Some people who use drinking water containing chlorine well in excess of the EPA standard could experience irritating effects to their eyes and nose. Some people who drink water containing chlorine well in excess of the EPA standard could experience stomach discomfort.

- A. Chlorine
- B. Chlorine Dioxide
- C. A disinfectant
- D. Chloramine
- E. Alternative disinfectant(s)
- F. None of the Above

148. _____ Some people who use drinking water containing chloramines well in excess of the EPA standard could experience irritating effects to their eyes and nose. Some people who drink water containing chloramines well in excess of the EPA standard could experience stomach discomfort or anemia.

- A. Chlorine
- B. Chlorine Dioxide
- C. A disinfectant
- D. Chloramine
- E. Alternative disinfectant(s)
- F. None of the Above

149. _____ Some infants and young children who drink water containing chlorine dioxide in excess of the EPA standard could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the EPA standard. Some people may experience anemia.

- A. Chlorine
- B. Chlorine Dioxide
- C. A disinfectant
- D. Chloramine
- E. Alternative disinfectant(s)
- F. None of the Above

Disinfection Byproducts

150. Disinfection byproducts form when _____ added to drinking water to kill germs react with naturally-occurring organic matter in water.

- A. Chlorine
- B. Chlorine Dioxide
- C. Disinfectants
- D. Chloramine
- E. Alternative disinfectant(s)
- F. None of the Above

You are finished with your assignment. Please email or fax your registration page and answer key to us. Always call an hour later to ensure we received it.