1.	The interaction of different substances where the combined effect is greater than the sum of the effect of the separate substances:
a)	dose response
b)	synergism
c)	particulates
d)	threshold
e)	biomagnification
	Ans: b Difficulty: Easy Link to: 15.1

2.	Which of the following terms refers to the accumulation of a substance in living tissue as it moves through the food web:
a)	dose response
b)	synergism
c)	particulates
d)	threshold
e)	biomagnification
	Ans: e Difficulty: Easy Link to: 15.2

3.	Which of the following terms refers to the principle that the effect of a certain chemical on an individual depends on the concentration of this chemical:
a)	dose response
b)	synergism
c)	particulates
d)	threshold
e)	biomagnification
	Ans: a Difficulty: Easy Link to: 15.3

4.	Using oil pollution as an example, _____ is a pollution point source, and _____ is an area source:
a)	engine-oil leakage; oil-well blowout
b)	oil tanker spill; engine-oil leakage
c)	engine-oil leakage; oil sprayed on dirt roads to reduce dust

d)	oil tanker spill; oil-well blowout
e)	oil sprayed on dirt roads to reduce dust; acid rain

Ans: b
Difficulty: Easy
Link to: 15.1

5.	Anthropogenic sources of radiation include medical and dental x-rays, nuclear weapons tests, and nuclear power plants. A natural source of radiation is/are:
a)	the Sun
b)	granite bedrock
c)	natural radioisotopes in the soil and atmosphere
d)	all of these
e)	none of these – all radiation in the environment is caused by humans

Ans: d
Difficulty: Easy
Link to: 15.2

6.	Which of the following is a true statement about exposure to electromagnetic fields (EMF):
a)	appliances and electrical lines commonly expose people to magnetic fields between 10 and 100 times stronger than the Earth's magnetic field
b)	electrical-transmission lines pose the only meaningful threat of EMF exposure and should be avoided at all costs
c)	the only protection against EMF exposure is to put electrical transmission and distribution lines underground
d)	increased exposure to electromagnetic radiation leads to an increased risk of cancer
e)	magnetic fields generated by household appliances drop off sharply just a few meters away from the source

Ans: e
Difficulty: Medium
Link to: 15.2

7.	Fungicides are:
a)	chemicals to control weeds
b)	chemicals to control insect pests
c)	chemicals to control fungal plant diseases
d)	fungal plant diseases

e)	any variety of fungus that attacks livestock or humans
	Ans: c Difficulty: Easy Link to: 15.2

8.	Which of the following is a true statement about the health risks from synthetic organic compounds:
a)	some synthetic organic compounds are fat-soluble and subject to biomagnification
b)	some synthetic organic compounds are very toxic even at very low concentrations
c)	synthetic organic compounds today are used in a wide variety of products
d)	not all organic compounds are hazardous to human health
e)	all of the statements above are correct
	Ans: e Difficulty: Medium Link to: 15.2

9.	A carcinogen is a particular kind of: I. therapy to treat cancer II. toxin that may cause cancer III. pollutant that affects the DNA
a)	I only
b)	II only
c)	III only
d)	II and III
e)	I and III
	Ans: d Difficulty: Easy Link to: 15.2

10.	Biomagnification is associated with all of the following except:
a)	the accumulation of chemicals in organisms
b)	higher toxin concentrations at successive trophic levels
c)	the development of tolerance to a pesticide or toxin
d)	biomagnification can occur in both aquatic and terrestrial habitats
e)	herbivores are less impacted than carnivores

	Ans: c Difficulty: Medium Link to: 15.3

11.	"Body burden" refers to the:
a)	ability of the body to reproduce
b)	development of cancer
c)	how much weight a person can carry
d)	body's ability to develop a physiological tolerance to toxins
e)	accumulation of heavy metals in the body
	Ans: e Difficulty: Easy Link to: 15.3

12.	Explain the term "ecological gradient" in the sense of environmental health and toxicology:
a)	the change in temperature approaching a source of thermal pollution
b)	the change in vegetation with distance from a pollution source
c)	variations in the degree of adaptation and tolerance in plant and animal species
d)	the concentration of a pesticide necessary to kill a given percent of the population of a pest
e)	the maximum slope that will maintain viable vegetation
	Ans: b Difficulty: Medium Link to: 15.3

13.	What is the major source of chronic heat pollution in water systems?
a)	electric power plants
b)	petroleum refineries
c)	geothermal power
d)	volcanic eruptions
e)	friction
	Ans: a Difficulty: Easy Link to: 15.2

14.	The Environmental Science textbook discusses wild leopard frogs that develop hermaphroditism. What is hermaphroditism?

a)	abnormal bone growth
b)	respiratory defects
c)	growth retardation
d)	male and female reproductive organs in the same frog
e)	retardation of the vocal cords

Ans: d
Difficulty: Easy
Link to: case study

15.	Noise pollution (sound) is measured in units of decibels (dB), which are each one-tenth of a bel. How much louder is 50 dB than 30 dB?
a)	about 1.67 times
b)	2 times
c)	20 times
d)	100 times
e)	2^{20} times

Ans: d
Difficulty: Medium
Link to: 15.2

16.	The word "toxic" refers to materials that are:
a)	poisonous
b)	retained in tissue by biomagnification
c)	a form of synergism with other chemicals
d)	increasing the risk of cancer.
e)	all of these

Ans: a
Difficulty: Easy
Link to: 15.3

17.	The term "ideal pesticide" refers to:
a)	a chemical that harms nothing in the environment
b)	a pesticide that is active only briefly and then degrades into harmless substances
c)	a chemical that kills all varieties of pests that threaten a crop
d)	a pesticide that needs to be applied only once
e)	a chemical that affects only one pest and no other living thing or aspect of the environment

	Ans: e Difficulty: Medium Link to: 15.2

18.	The content of heavy metals in human and in animal bodies is referred to as:
a)	heavy body
b)	ferric contamination
c)	body burden
d)	synergism
e)	biomagnification
	Ans: c Difficulty: Easy Link to: 15.3

19.	Which of the following examples is not a pollution point source:
a)	contamination of groundwater from a solid waste landfill
b)	air pollution from the smoke stack of a large chemical plant
c)	chemicals leaked into a stream from an accidental spill
d)	air pollution from automobile exhaust
e)	water pollution from an oil refinery
	Ans: d Difficulty: Easy Link to: 15.1

20.	What is synergism?
a)	the association of two dissimilar species, to the benefit of both
b)	the transmission of heat energy in greenhouses
c)	the addition of herbicides to fertilizers in order to make crops pest-resistant
d)	the primary interaction between two substances in order to build up genetic resistance to a toxin
e)	the interaction of different substances such that the effect combined is greater than the sum of the separate effects
	Ans: e Difficulty: Easy Link to: 15.3

21.	100 ppm (100 mg/kg) is equal to 0.01%. How many ppm is equal to 1%

a)	1 mg/kg
b)	100 mg/kg
c)	10,000 mg/kg
d)	1,000,000 mg/kg
e)	100,000,000 mg/kg

Ans: c
Difficulty: Medium
Link to: 15.3

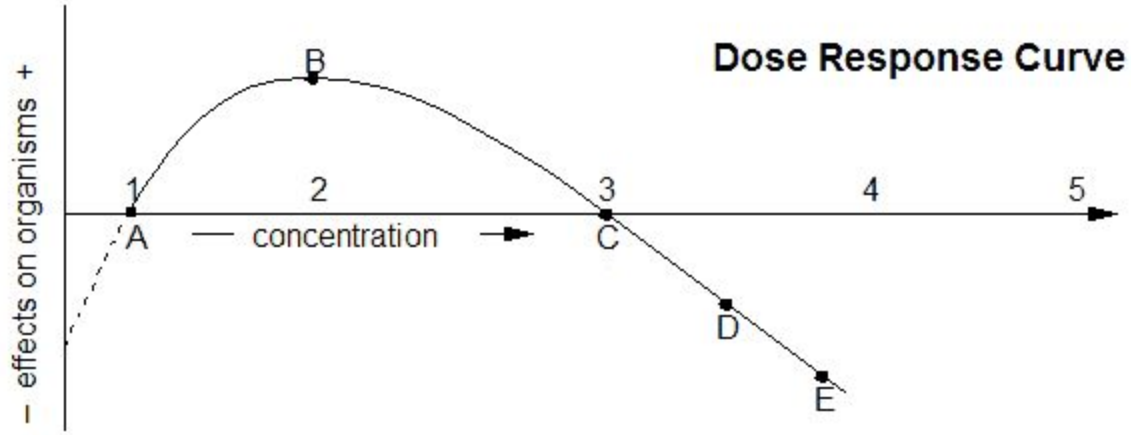
22.	The "lethal dose" concept refers to the dose of a toxin at which:
a)	all of a population dies
b)	a specified percentage of a population dies
c)	the substance becomes fatal to humans
d)	the first organism in the environment is killed
e)	all living organisms in the environment are killed

Ans: b
Difficulty: Easy
Link to: 15.3

23.	Why do small plants with a relatively short life time cope with pollution better than larger plants with a longer span?
a)	smaller biomass accumulates smaller quantities of pollutants
b)	they develop immunity
c)	they are exposed to less polluted air
d)	they are better able to develop a tolerance over multiple generations
e)	the adaptation rate of these plants is much smaller than of plants with a long lifetime

Ans: d
Difficulty: Medium
Link to: 15.3

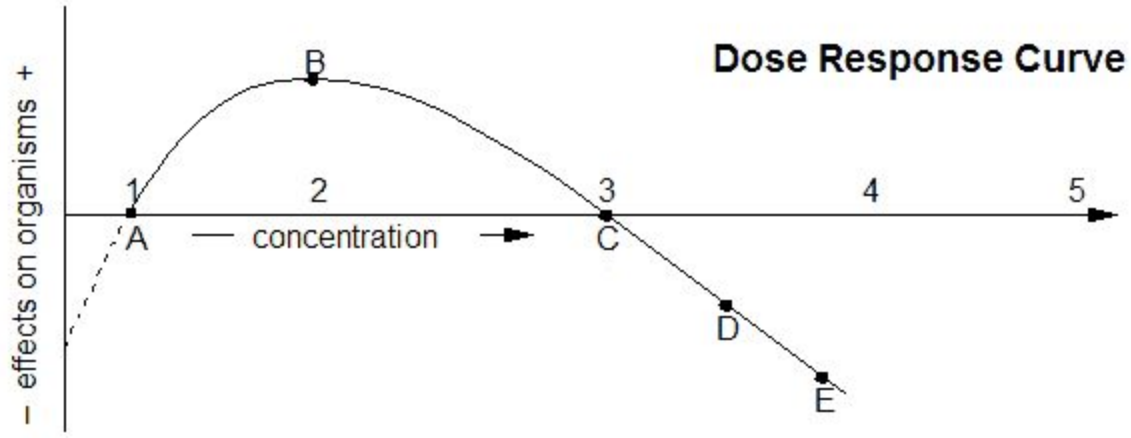
24.	If the below curve were for the effects of fluoride on humans, what dose should a dentist recommend to his patient?



a)	dose 1
b)	dose 2
c)	dose 3
d)	dose 4
e)	dose 5

Ans: b
Difficulty: Medium
Link to: 15.3

25.	Point C is a significant threshold. What does point C signify?



a)	maximum benefit
b)	harm exceeds benefits
c)	death of 50% of a test population
d)	first measurable effects
e)	death of 100% of a test population

	Ans: b Difficulty: Medium Link to: 15.3

26.	All of the following are infectious agents except:
a)	giardiasis
b)	salmonella
c)	dioxin
d)	malaria
e)	cryptosporidosis
	Ans: c Difficulty: Easy Link to: 15.2

27.	Major concepts in evaluating and treating the effects of environmental pollutants include all of the following except:
a)	individuals vary in their response to exposure to the same dose of a pollutant
b)	some pollutants have minimum thresholds
c)	effects of environmental toxins are nonreversible
d)	the chemical form of the pollutant has a great effect on its toxicity
e)	the pollutant and its activity are changed by ecological and biological processes
	Ans: c Difficulty: Medium Link to: 15.2

28.	Suppose that the E.P.A. must clean up a site where barrels of poisonium, a radioisotope with a half-life of 1500 years, have been dumped. The agency will isolate the barrels in a salt mine until the level of radioactivity has been reduced to one-eighth of its present level. For how long must this material be isolated?
a)	around 190 years
b)	1500 years
c)	4500 years
d)	12,000 years
e)	1500^3 years

	Ans: c Difficulty: Medium Link to: 15.2

29.	The lessons learned from the pollution episode at Minamata, Japan include all of the following except:
a)	pollutants can be chemically transformed in the environment into more toxic forms
b)	DDT can cause damage to the environment that may last for decades
c)	humans are themselves susceptible to toxic pollutants
d)	toxic pollutants may be naturally concentrated through the process of biomagnification
e)	a pollution problem may be slow to be recognized, admitted, and remedied
	Ans: b Difficulty: Medium Link to: A Closer Look 15.2

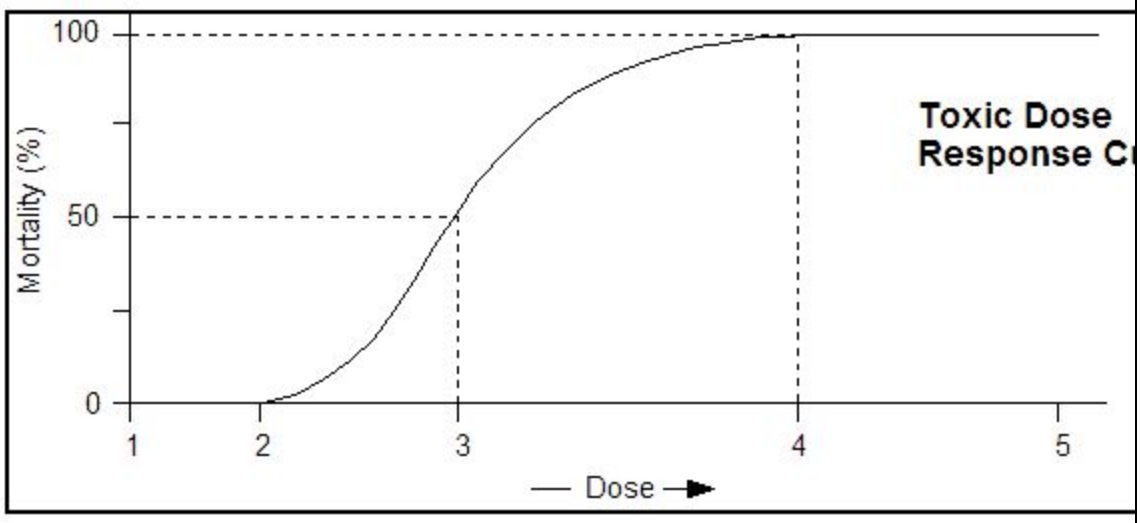
30.	Which of the following measures is not part of risk assessment?
a)	hazard identification
b)	dose response assessment
c)	risk characterization
d)	assessment of exposure
e)	cost of clean up
	Ans: e Difficulty: Easy Link to: 15.4

31.	Once absorbed, some toxic compounds are retained in the tissue of various life forms for long periods of time. These pollutants pose special risks to humans and other organisms high on the food chain through the process of:
a)	carcinogenesis
b)	compound contamination
c)	synergism
d)	threshold effect
e)	biomagnification

	Ans: e Difficulty: Easy Link to: 15.3

32.	Sulfur dioxide and particulates are both pollutants with harmful effects to human health. However when humans are exposed to both simultaneously, the effects are much more severe. This process is known as:
a)	carcinogenesis
b)	compound contamination
c)	synergism
d)	threshold effect
e)	biomagnification
	Ans: c Difficulty: Easy Link to: 15.1

33.

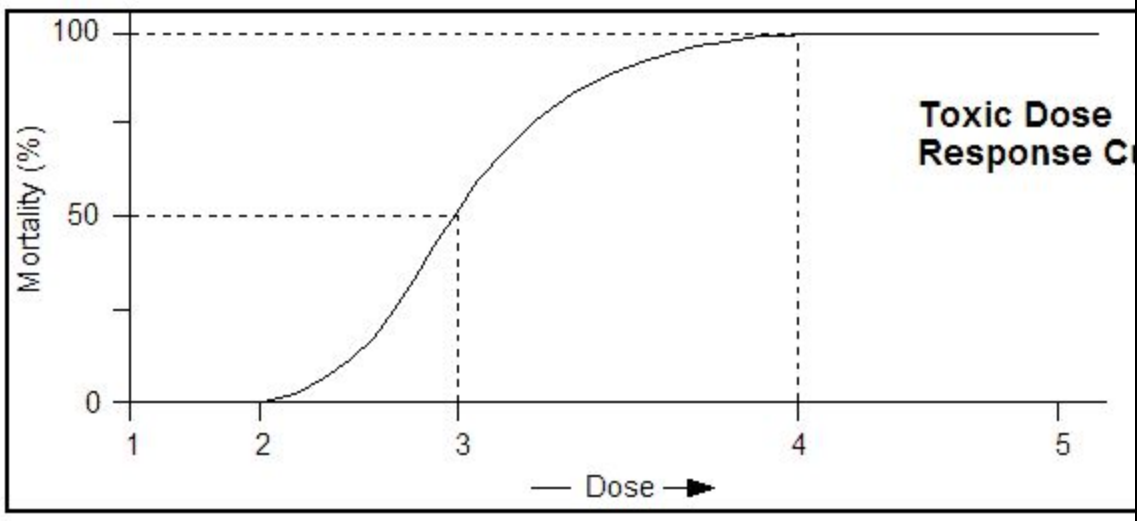


If the curve above indicates the effects of an agricultural pesticide on a severe pest, what is the maximum dose a farmer should apply to his crop?

a)	dose 1
b)	dose 2
c)	dose 3
d)	dose 4
e)	dose 5

	Ans: d Difficulty: Easy Link to: 15.3

34.

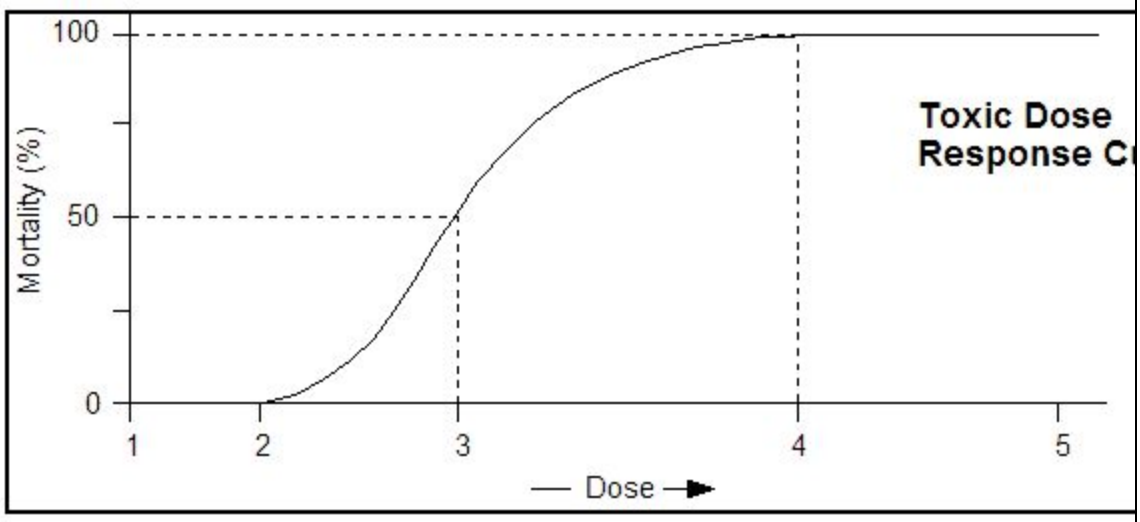


How would an increasing tolerance in the pests to this chemical affect the position of the curve?

a)	would shift curve to the left
b)	would shift curve to the right
c)	would shift curve down
d)	would shift curve up and to the left
e)	would shift curve down and to the right

Ans: b
Difficulty: Medium
Link to: 15.3

35.

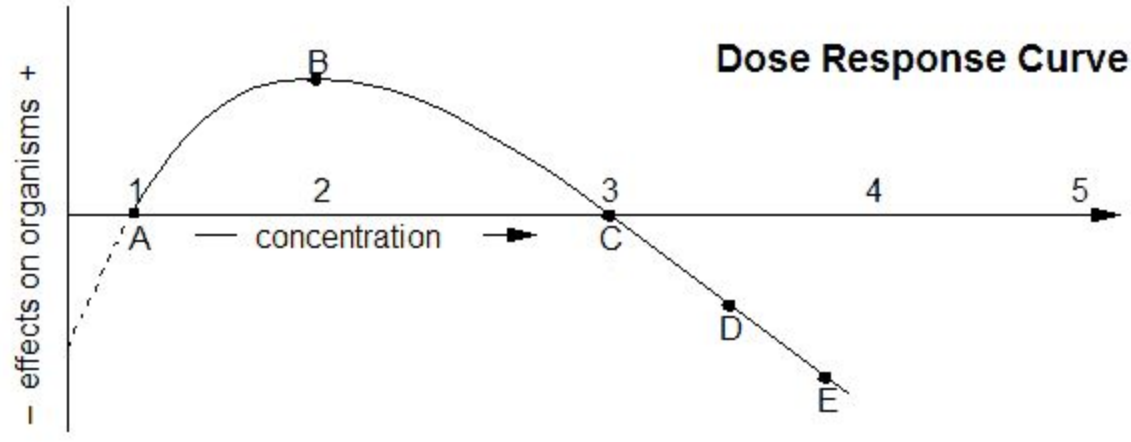


If the curve above represents the incidental mortality of apple trees after spraying of a pesticide to control apple weevils, what is the largest dose that an apple grower should choose?

a)	dose 1
b)	dose 2
c)	dose 3
d)	dose 4
e)	dose 5

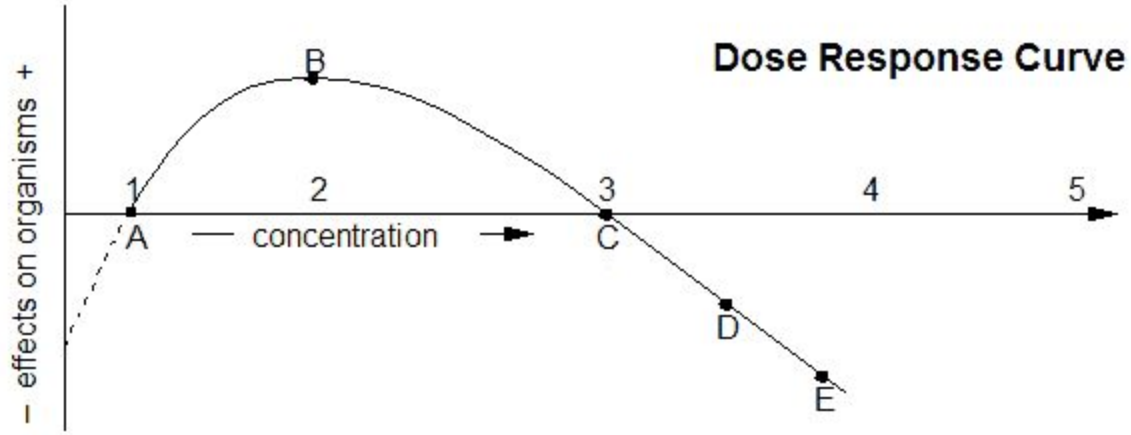
Ans: b
Difficulty: Medium
Link to: 15.3

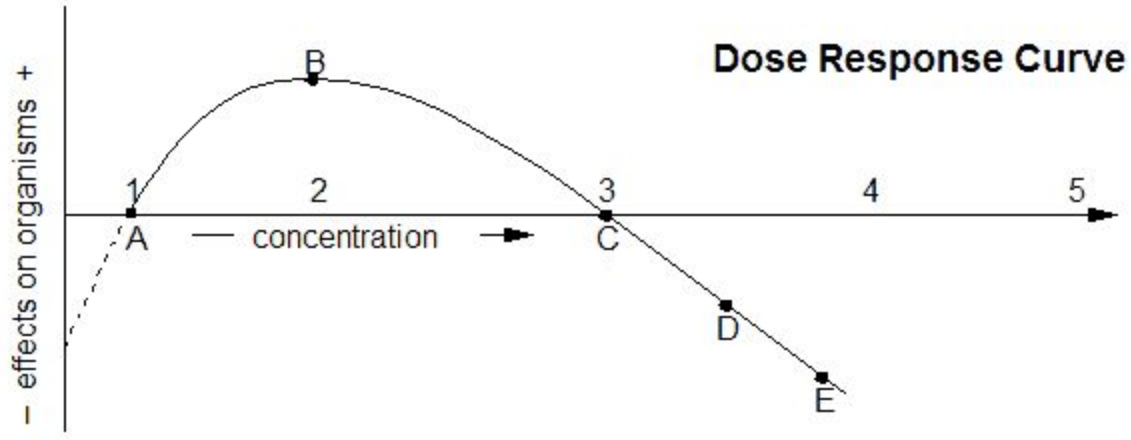
36. What does point B signify?



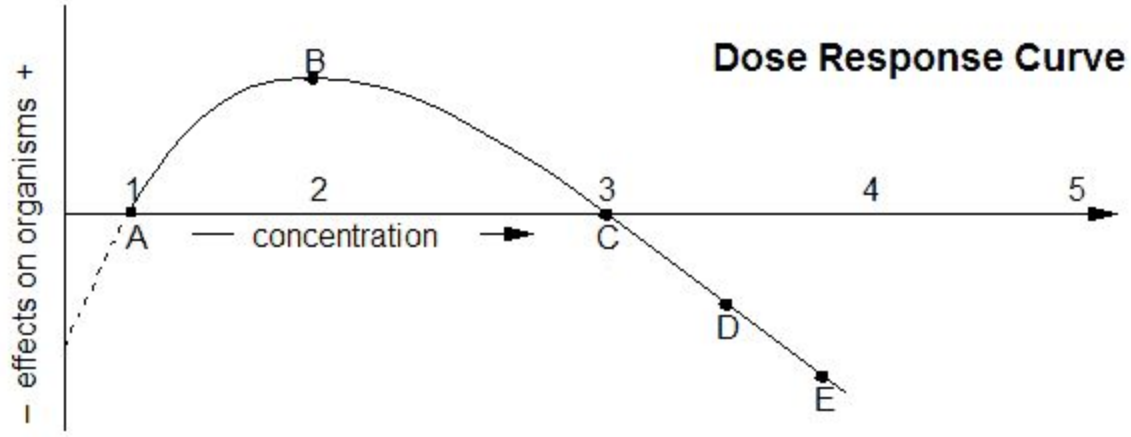
Ans: dose that results in the maximum net benefit

	Difficulty: Easy Link to: 15.3

37.	In the figure above, what does point C signify? 
Ans:	dose above which harm exceeds benefits
	Difficulty: Easy Link to: 15.3

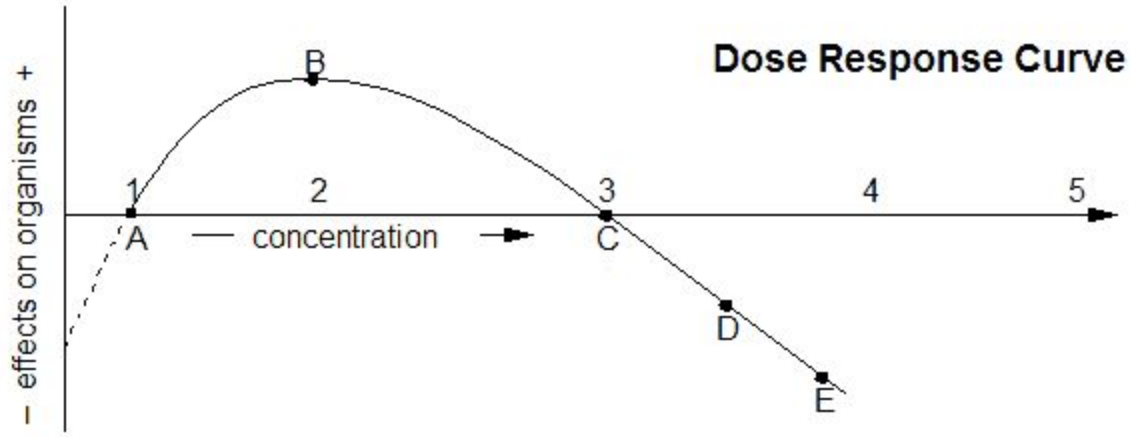
38.	Point D in the figure above is a significant threshold between point C and point E (death of the organism). What does point D signify? 
Ans:	threshold effect -– the first measurable effects
	Difficulty: Easy Link to: 15.3

39.	If the above curve were for the effects of fluoride on humans, what dose should a dentist recommend to his patient?



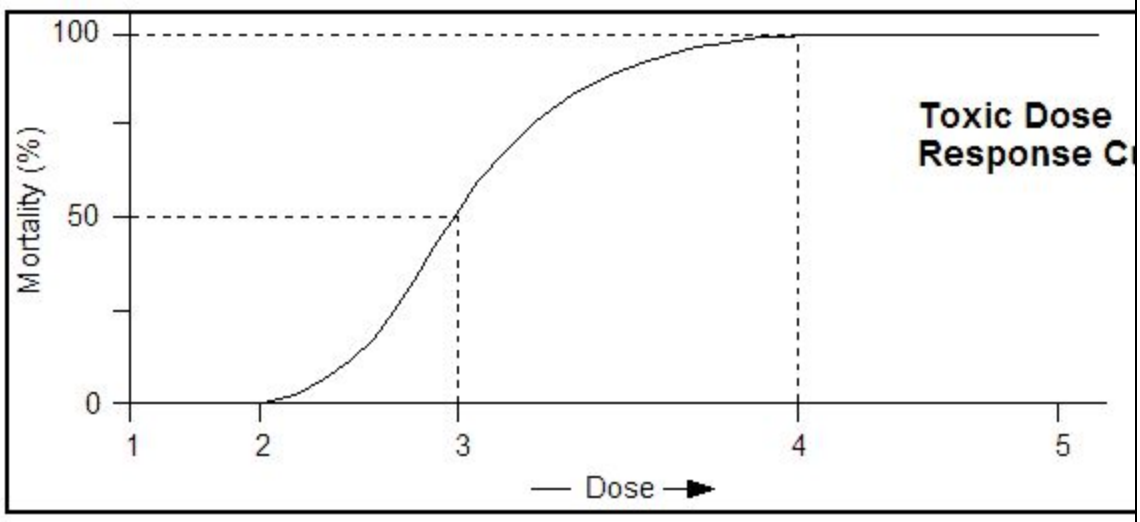
Ans:	dose 2	
	Difficulty: Easy Link to: 15.3	

40.	If the above curve were for the effects of an agricultural pesticide, what dose should a farmer apply to his land?



Ans:	dose 4	
	Difficulty: Easy Link to: 15.3	

41.

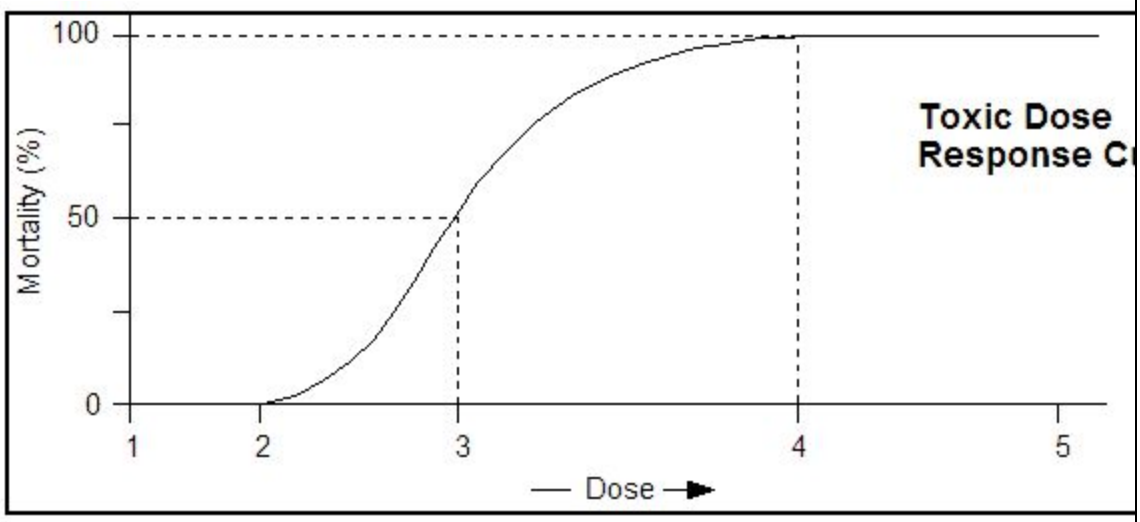


Dose 2 is known as:

Ans: minimum threshold dose

Difficulty: Easy
Link to: 15.3

42.

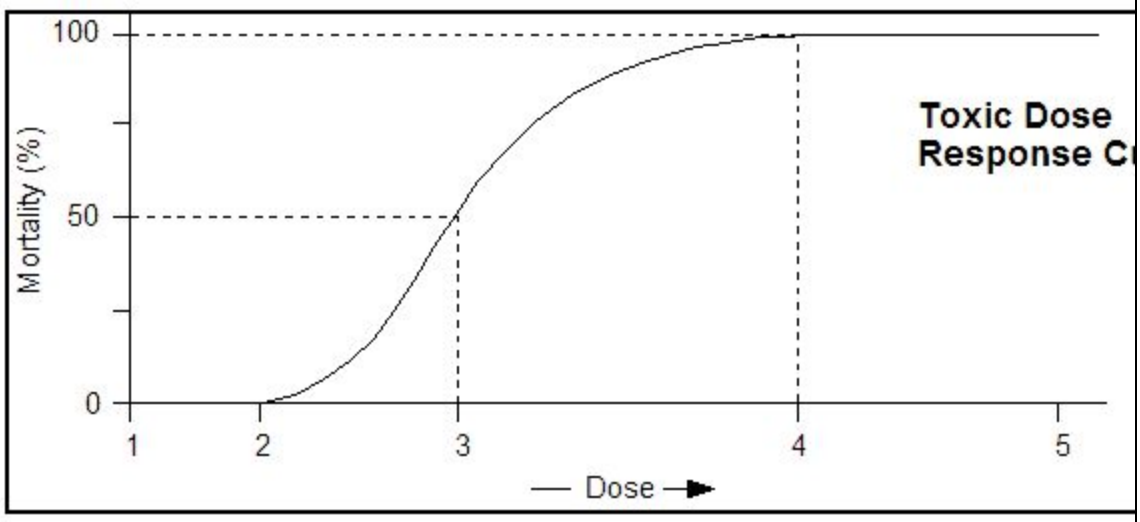


In the figure above, Dose 3 is known as:

Ans: Lethal Dose-50 (LD-50)

Difficulty: Easy
Link to: 15.3

43.

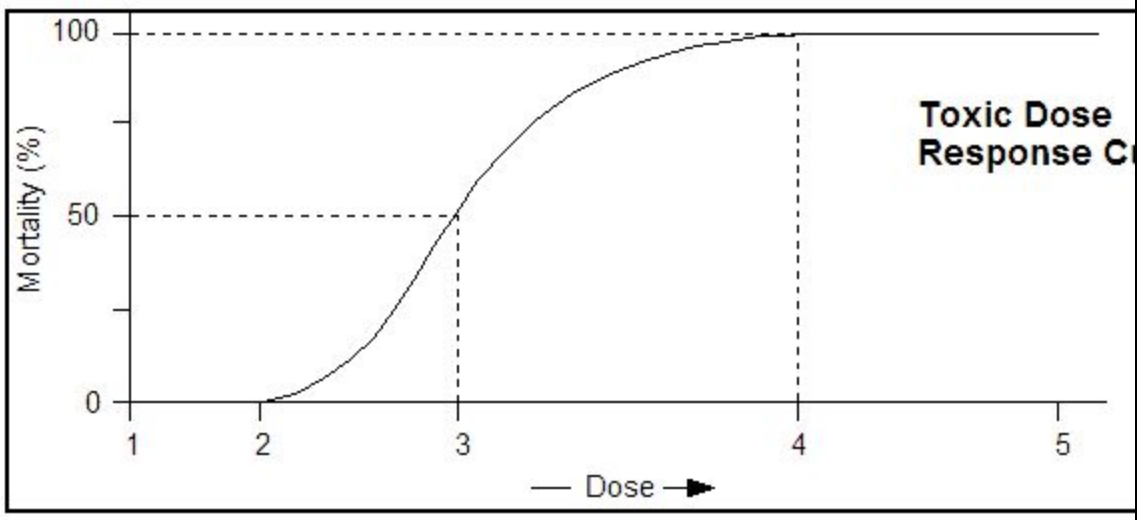


If the curve shown above represented the effects of an agricultural pesticide on a severe pest, what is the maximum dose a farmer should apply to his crop?

Ans: Dose 4

Difficulty: Easy
Link to: 15.3

44.



What would be the effect of a higher dose?

Ans: no measurable increase in the mortality of the pest, but greater pesticide cost, toxic build-up, etc.

	Difficulty: Medium Link to: 15.3

45.	How would an increasing tolerance in the pests to this chemical affect the position of the curve?
Ans:	would shift curve to the right or down
	Difficulty: Medium Link to: 15.3

46.	The textbook lists seven major categories of pollutants. List these seven categories and give an example of a source for each one.
Ans:	Toxic heavy metals – industrial discharge Organic compounds – industrial processes, pest control, pharmaceuticals, food additives, etc. Radiation – medical x-rays Thermal pollution – electrical power plants Particulates – plowing farm fields Electromagnetic fields – electrical transmission lines Noise pollution – your roommate's stereo
	Difficulty: Easy Link to: 15.2

47.	Distinguish between environmentally benign and hazardous organic compounds.
Ans:	Benign organic compounds are produced by living organisms. Artificially organic compounds are usually environmentally hazardous. Some organic compounds are more hazardous than others. Fat-soluble compounds are likely to undergo biomagnification and degrade fast. Some organic compounds that are of serious concern are pesticides, herbicides and dioxin.
	Difficulty: Medium Link to: 15.2

48.	List the four general steps involved in the process of risk assessment. identification of the hazard

Ans:	dose-response assessment exposure assessment risk characterization
	Difficulty: Easy Link to: 15.4

49.	Arsenic was one of the first pesticides used on potatoes, cotton and apples. Why is this pesticide not ideal for the whole environment?
Ans:	It is a highly toxic substance that affects virtually all forms of life, including humans.
	Difficulty: Medium Link to: 15.3

50.	You want to trace an artificial organic compound through the environment. How can you determine the likely pathways?
Ans:	It can be traced by testing its solubility in water, absorption by natural solids, leaching rates, volatility, and fat or oil solubility.
	Difficulty: Hard Link to: 15.3

51.	List three major effects of lead poisoning.
Ans:	stillbirth, deformities, brain damage
	Difficulty: Easy Link to: 15.2

52.	Name three effects of oil on marine life.
Ans:	directly toxic reduces insulating effects of fur and feathers inhibits oxygen and carbon-dioxide exchange between ocean and atmosphere (inhibits photosynthesis)
	Difficulty: Easy Link to: 15.2

53.	Name four of six major categories of environmental pollutants listed in the textbook. toxic chemical compounds
Ans:	radioisotopes organic compounds heat particulates noise
	Difficulty: Easy Link to: 15.2

54.	What are organic compounds?
Ans:	Organic compounds are compounds of carbon. They are produced naturally by organisms but can also be produced artificially by humans.
	Difficulty: Easy Link to: 15.2

55.	What is genetic tolerance? Give an example.
Ans:	Genetic tolerance is adaptation to the environment. It results when those individuals who are most resistant survive an exposure to a toxin and have more offspring than the others. Insects become resistant to pesticides.
	Difficulty: Medium Link to: 15.3

56.	What is a hormonally active agent (HAA) and what are its effects?
Ans:	Substances that interact with the hormone systems of an organism, whether or not they are linked to disease or abnormalties. HAA interact with an organism and the mechanisms for regulating growth and development disrupting normal growth functions.
	Difficulty: Easy Link to: case study