

Question 27
Benchmark A
Spring 2009

An aquatic ecologist collects data about the water quality of an Ohio lake throughout the year. In the summer, the ecologist shares data with a public health official from a nearby town.

Which data would a public health official use to determine whether the water was safe for swimming?

- A. the temperature of the surface water
- B. the amount of dissolved oxygen in the deep water
- C. the number of water lilies, *N. odorata*, growing in the lake
- D. the concentration of *E. coli* bacteria near the surface of the lake

Question 10
Benchmark A
Spring 2006

10. All cataracts were originally thought to be acquired; however, recent research indicates that some cataracts are genetic in nature.

What type of study would be most likely to lend support to the claim that cataracts can be inherited?

- A. analysis of cataract thickness in several species
- B. studying age-related onset of cataracts within a species
- C. linkage studies on DNA from families with a history of cataracts
- D. comparing characteristics of cataracts caused by specific diseases

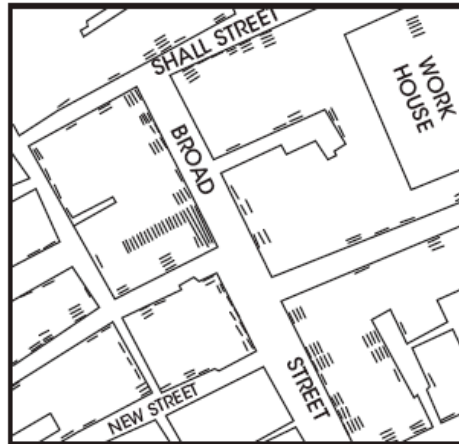
Question 36
Benchmark A
9th Practice Test

Our country depends on energy use. Choose one alternative energy source from among wind power, nuclear power, geothermal power and biomass. Identify your choice and describe one potential benefit and one potential disadvantage if its use is significantly increased. Respond in the space provided in your **Answer Document**. (2 points)

Question 39
Benchmark B
March 2008

39. In 1854, a cholera epidemic spread throughout parts of London causing hundreds of deaths. Physician John Snow, in investigating the epidemic, plotted the locations of cholera-related deaths on a map of the city. Numbers of deaths are indicated by parallel lines in front of buildings where deaths occurred.

Locations of Cholera Deaths



How did the data obtained from Snow's map most likely assist city officials in stopping the cholera epidemic?

- A. It allowed them to verify the exact number of cholera-related deaths.
- B. It allowed them to determine the average age of the individuals infected.
- C. It allowed them to predict the rate at which the epidemic would continue to spread.
- D. It allowed them to pinpoint the area most affected and determine the source of infection.

Question 18
Benchmark C
Spring 2009

Companies seeking new drug approval are required to conduct clinical trials involving human volunteers. During these trials, people with the disease are separated into different groups. One group receives a placebo (an inert or harmless substance used in controlled experiments). Each of the remaining groups receives a different dose of the drug (i.e., Group A receives a 30 mg dose once a day, Group B receives a 50 mg dose once a day, etc.).

Describe two reasons for testing new drugs at varying doses.

Respond in the space provided in your **Answer Document**. (2 points)

Question 2
Benchmark C
March 2008

When submitting research proposals to funding agencies, investigators must follow ethical guidelines.

What information in a research proposal would be considered bogus and lead to rejection of the proposal?

- A. plan for monitoring safety
- B. estimates of the number of participants required for the study
- C. data from experiments that have not been performed
- D. projected budget for equipment and laboratory personnel

Question 18
Benchmark C
March 2008

Individuals suffering from debilitating and sometimes terminal diseases often advocate a more rapid development cycle for approving new drug treatments. If the development cycle is accelerated, describe one potential benefit and one potential hazard of treating a disease.

Respond in the space provided in your **Answer Document**. (2 points)

Question 1
Benchmark C
9th Practice Test

A scientist's paper is rejected by a journal because the paper did **not** reveal key details about the experiment she performed to get her results. What ethical argument could the editor give for this rejection?

- A. Sample collection had been done by a graduate student.
- B. The scientist's findings were similar to results reported for other species.
- C. The scientist had repeated her experiment several times with identical results.
- D. Other scientists would not be able to verify her findings without more information.

Question 7
Benchmark C
Spring 2006

Use the information to answer questions 7 - 10.

Cataracts

In 2004, wildlife rescuers found a great horned owl nearly dead from starvation. The owl's eyes had formed cataracts, which cloud the natural lens and inhibit the eye's ability to focus and form clear images. Cataracts can be inherited or acquired as a result of aging, disease and/or use of certain medications. Without clear vision, the owl, named Minerva, had been unable to hunt.

Minerva was taken to the Veterinary School at the University of Wisconsin, Madison, after a local veterinarian confirmed the presence of cataracts. A pair of lenses specifically made for owls was implanted in Minerva's eyes. After the surgery and a recovery period, Minerva was moved to a large, enclosed area where small rodents were released and her ability to hunt was to be evaluated. Scientists confirmed that, if she showed a clear ability to hunt, she would be released back into her natural habitat.

7. Provide two reasons why the researchers' actions in rescuing and operating on Minerva either were or were not ethical. Respond in the space provided in your **Answer Document**. (2 points)

10th Grade Science Ohio Graduation Test
Scientific Ways of Knowing

Question 17
Benchmark C
March 2007

17. A medical research group placed the following advertisement in a newspaper:

**Seeking Volunteers for
Medical Research Study**

Volunteers are needed to participate in a 12-week research study to test a new drug for type 2 diabetes. Participants must be between the ages of 18 and 80 and must not be taking more than one oral medication for diabetes. The following will be provided to participants at no cost:

- Medical evaluations (physical exam)
- Diagnostic testing (blood & urine tests)
- Experimental study medication
- Compensation for time and travel expenses

If you are interested in participating, please contact Rudy at 1-808-555-5000.

In order for potential participants to make a medically sound decision, what is the research group's ethical obligation?

- A. Pay all participants' health insurance costs during the entire course of the study.
- B. Inform participants of the exact amount of compensation they will be receiving.
- C. Provide participants with a list of additional studies that may be relevant to their condition.
- D. Disclose all medical procedures and provide information on risks and potential side effects.

Question 33
Benchmark C
March 2007

A university student wants to perform an experiment using mice as test subjects. The procedure would require the mice to be injected with a specific bacterial infection and then treated with an antibiotic. Their response to the treatment would be observed and recorded. Provide two questions that an ethics review board would raise regarding the proposed work. For each question, explain why it is important that the question be answered prior to granting permission for the experiment. Respond in the space provided in your **Answer Document**. (4 points)

Question 3
Benchmark D
Spring 2009

If you were working for the Center for Disease Control and discovered a new, highly dangerous pathogen, what information should be presented to the public that may prevent a widespread epidemic of the disease?

- A. the fatality rate caused by the pathogen
- B. a report on how the pathogen is transmitted from one organism to another
- C. pictures showing microscopic images of the pathogen so they will be familiar with it
- D. a description of the surface receptors found on the pathogen and the immune response

Question 10
Benchmark D
Spring 2005

When a medical technician analyzes human body fluids such as blood, which safety precaution would **not** be necessary?

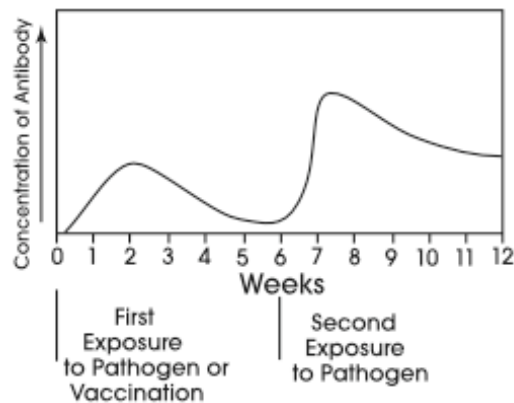
- A. protective gloves
- B. safety goggles/face shield
- C. closed-toed shoes
- D. lead-lined apron

Question 36
Benchmark D
Spring 2005

A medical researcher is investigating immune response in patients exposed to a specific pathogen. The graph below shows the concentration of a particular antibody in the bloodstream produced during the process of acquired immunity. One curve shows the primary immune response (after the first exposure to the pathogen), and the other curve shows the secondary immune response (after the second exposure to the pathogen).

A vaccination serves as the first exposure to a pathogen and triggers the body's primary immune response. Some vaccines contain weakened or inactive pathogens. Other vaccines contain highly similar but nonpathogenic forms.

Concentration of Antibody in Primary and Secondary Acquired Immune Response



36. Describe two benefits of receiving a vaccine, such as the polio vaccine, in protecting the body against disease, and include data from the graph to support each benefit. Respond in the space provided in your **Answer Document**. (4 points)