JD's REGENTS PREPARATION, LLC.

-Presents-

LIVING ENVIRONMENT

REGENTS EXAM REVIEW MANUAL

WITH 6 REGENTS EXAMS,
4 TOPICALLY ORGANIZED

SPECIAL EDITION
Each Question Linked to a QR Coded Video Solution

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Published by: JD's Regents Preparation, LLC.

Cover illustration by James A. Stiehl
Printed in the United States of America
ISBN: 978-1-939246-26-4

LIVING ENVIRONMENT

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Scientific Method

Base your answers to question 1,2 and 3 on the information below and on your knowledge of biology.

A student designed an experiment to investigate a claim that athletes would have lower heart rates than nonathletes during exercise. After the students classified themselves as an athlete or a nonathlete, their resting pulses were determined. Then all the students performed the same exercise for four minutes and their heart rates were determined by recording the pulse rate in beats per minute. The students continued to measure their pulse rates for an additional four minutes. The average heart rate per minute for each group was determined. The data were recorded, as shown on the table below.

Average Heart Rate Response to Exercise

(beats per minute)

	Time (minutes)	**Athlete Students**	**Nonathlete Students**
Resting Pulse	0	68	72
Exercising Period	1	76	78
	2	82	90
	3	95	115
	4	110	130
After Exercise	5	100	125
	6	95	120
	7	85	100
	8	68	95

1 State one appropriate hypothesis for this experiment.

06 17 80-82

2 Which statement is best supported by the data in the chart?

(1) After exercise, the nonathletic students had a lower heart rate than the athletic students.
(2) After exercise, the heart rates of the athletic students returned to resting pulse in four minutes.
(3) During exercise, both groups of students had the same increase above their resting pulse.
(4) During exercise, the athletic students had a higher heart rate than the nonathletic students.

3 To improve the validity of the conclusion reached in this experiment, the students should repeat the experiment

(1) disregarding any data that don't fit the hypothesis
(2) with a larger number of athletes and nonathletes
(3) comparing the heart rates and breathing rates of males and females
(4) with the athletes doing different exercises than the nonathletes

6 A broad body of evidence, subject to revisions, supported by different kinds of scientific investigations and often involving the contributions of scientists from different disciplines is necessary to develop

08 17 33

(1) an inference
(2) a fact
(3) a theory
(4) a prediction

Base your answers to questions 7 and 8 on the information and data table below and on your knowledge of biology.

A student wanted to investigate the effect of light on the rate of ripening of tomatoes. She set up four pots of the same size with identical amounts of soil, water, and type of tomato plants. Each plant was exposed to a different intensity of light as shown in the table below.

Plant	Light Intensity (lumens)	
1	0	
2	1,000	
3	5,000	
4	10,000	

7 To report the final results, which label would be most appropriate for the third column of the data table?

08 17 36-37

(1) Height of Tomato Plants (cm)
(2) Average Ripening Time (days)
(3) Average Weight of Tomatoes per Plant (grams)
(4) Acidity of Tomatoes (pH)

8 The independent variable in this experiment is the

(1) type of tomato plant
(2) amount of soil provided
(3) color of tomatoes
(4) light intensity

Base your answers to question 9 through 11 on the information below and on your knowledge of biology.

Secondhand Smoke and Estrogen

08 17 64-66

A fertility researcher conducted a study of pregnant women. The researcher's hypothesis was that the estrogen levels of pregnant women who were exposed to daily secondhand cigarette smoke would be higher than estrogen levels of pregnant women not exposed to daily secondhand smoke. The researcher measured the estrogen levels of eight pregnant women each week throughout their pregnancy. Four of the women lived in houses with heavy smokers, the other four did not. The women's ages varied from 19 to 42 years old. Six of the women were pregnant with girls, one was pregnant with a boy, and one was pregnant with twin boys. The research was submitted for peer review.

9-11 Analyze this experiment. In your answer, be sure to:

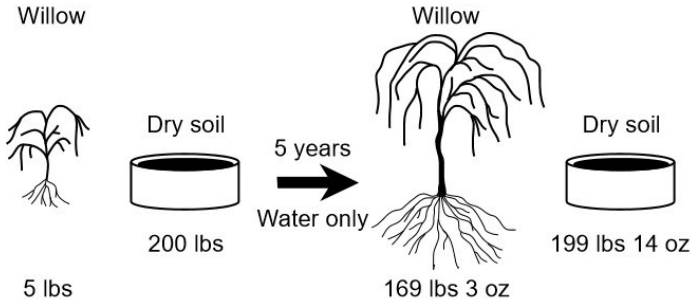
• identify one error in the researcher's experimental design

• identify one way, other than affecting estrogen levels, that secondhand smoke could affect a developing embryo

• explain why the process of peer review is an important step in this research

_____

In the early 1600s, a scientist planted a willow tree that weighed 5 pounds in 200 pounds of dry soil. He placed it outside and watered it for 5 years. At the end of that time, he observed that the tree had gained 164 pounds 3 ounces, while the soil had lost just 2 ounces.



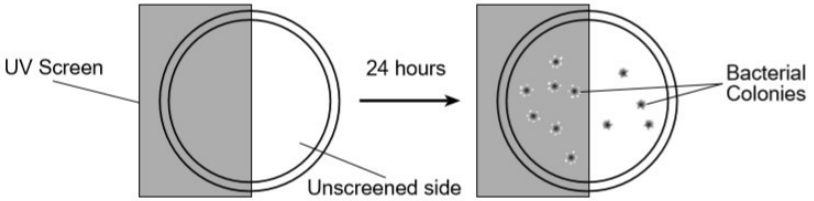
12 From this, he concluded that plants gain weight from the water they take in. His conclusion was based on

06 18 32

(1) the input of scientists from many countries doing similar studies
(2) the application of advanced technologies to the study of a problem
(3) careful observation, measurements, and inferences from his data
(4) an extensive knowledge of the process of photosynthesis

Base your answers to question 13 and 14 on the information and diagram below and on your knowledge of biology.

An experiment was carried out to determine the effect of exposure to ultraviolet (UV) light on the growth of bacteria. Equal quantities of bacterial cells were spread on Petri dishes that are used to grow colonies of bacteria. Half of each dish was shielded from the UV light with a UV screen. The other half was exposed to UV light for various amounts of time. After the UV treatment, the bacteria were grown in an incubator for 24 hours and the number of colonies was counted. The diagram below represents the setup of the experiment.



The table below contains the data collected at different exposure times by counting the number of bacterial colonies on both the screen-covered side and unscreened side.

Bacterial Growth

Exposure Time to UV Light (min)	**Colonies on Screened Side**	**Colonies on Unscreened Side**
0 (No exposure)	20	22
0.5	21	19
1.0	23	16
2.0	22	10
5.0	24	5
10.0	23	1

13-14 Analyze the experiment that produced the data in the table. In your answer, be sure to:

06 18 59-60

• state a hypothesis for the experiment

• state whether the results of the experiment support or fail to support your hypothesis. Support your answer

Laboratory Skills and Equipment

Base your answers to questions 1 through 4 on the information and data table below and on your knowledge of biology.

Illinois Greater Prairie Chicken on the Rise

As pioneers moved west in the mid-1800s, the greater prairie chicken population in Illinois was estimated to number in the millions. Since then, their population has drastically declined. Evidence of the rapidly declining population was obtained from studying the number of eggs that hatched over several years. In Jasper County, Illinois, the number of prairie chickens fell from 2,000 to less than 50 in under 35 years. Researchers compared the DNA from feather samples from the living Illinois chickens to the DNA from feather samples dating from the year 1930 found in a museum. It was found that the living Illinois chicken population had a very low level of genetic diversity. In 1992, researchers attempted to increase genetic variation by transporting more than 500 healthy prairie chickens into Illinois from the states of Minnesota, Kansas, and Nebraska. The data table below shows the changes in the percent of eggs that hatched from samples taken in different years. Researchers documented that this increase in the percent of eggs that hatched was not influenced by environmental events.

Prairie Chicken Egg Hatching

Years	Percent of Eggs Hatched
1970–1974	89
1975–1979	88
1980–1984	83
1985–1989	78
1990	38
1993–1996	94

Adapted from: http://www.sciencedaily.com/releases/1998/11/981130045644.htm

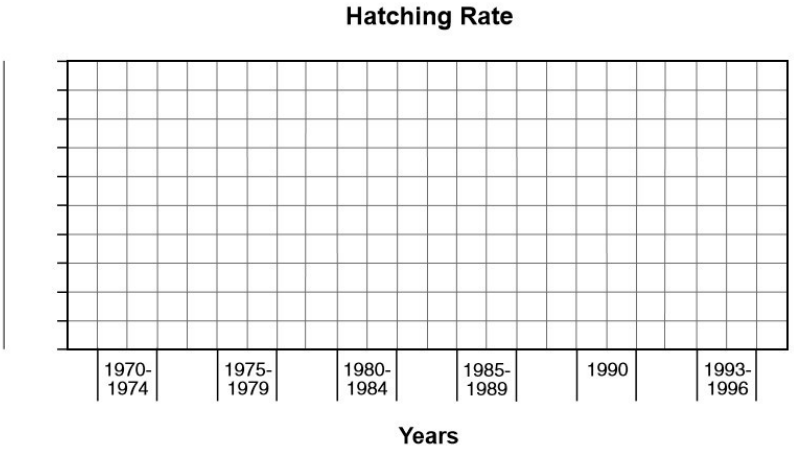
Using the information given, construct a bar graph on the grid following the directions below.

06 17 44-47

1 Label the y-axis on the line provided.

2 Mark an appropriate scale, without any breaks in the data, on the y-axis.

3 Construct vertical bars to represent the data. Shade in each bar.



4 The scientists transported prairie chickens from three different states into the state of Illinois in order to

(1) decrease egg hatching rate
(2) increase egg fertilization
(3) increase genetic diversity
(4) develop different feather colors

5 During the laboratory activity The Beaks of Finches, you obtained food under two conditions: with competition and with no competition. State one way the results obtained from these two conditions differed when you did this activity.

06 17 78

6 A student added glucose indicator to a beaker of an unknown liquid. Starch indicator was added to a different beaker containing an equal amount of the same unknown liquid. The color of the indicator solutions before they were added to the beakers and

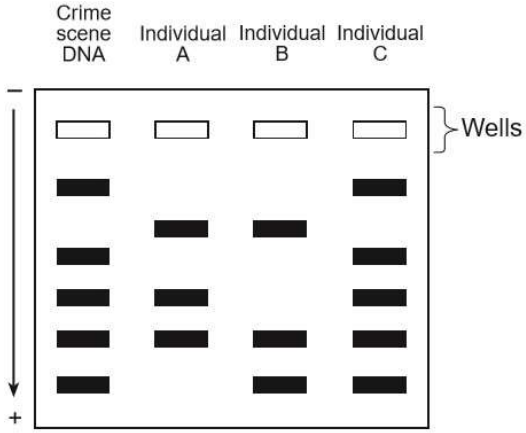
the color of the contents of the beakers after adding the indicator solutions are recorded in the chart below.

Beaker	Solution	Color of Indicator Solution Before Adding to Beaker	Color of Contents of Beaker After Adding Indicator Solution
1	unknown liquid + glucose indicator	blue	blue (after heating)
2	unknown liquid + starch indicator	amber	blue-black

State one conclusion the student would make about the unknown liquid based on the results. Support your answer with information from the data table.

06 17 83

7 An unknown sample of DNA found at a crime scene was compared to DNA samples taken from three individuals. The results of the technique used to compare the samples are represented below.



What factor causes the DNA fragments to move in this technique?

06 17 85

Base your answers to questions 8 through 11 on the information and data table below and on your knowledge of biology.

The concentration of a specific antibody in the blood of an individual was measured at various times over a period of 50 days. The results obtained are shown in the data table below.

Antibody Concentration in an Individual

Day	Antibody Concentration in Arbitrary Units (arb. units)
5	0
10	110
16	120
25	10
35	200
45	390
50	200

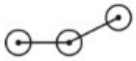
Using the information in the data table, construct a line graph on the grid, following the directions below.

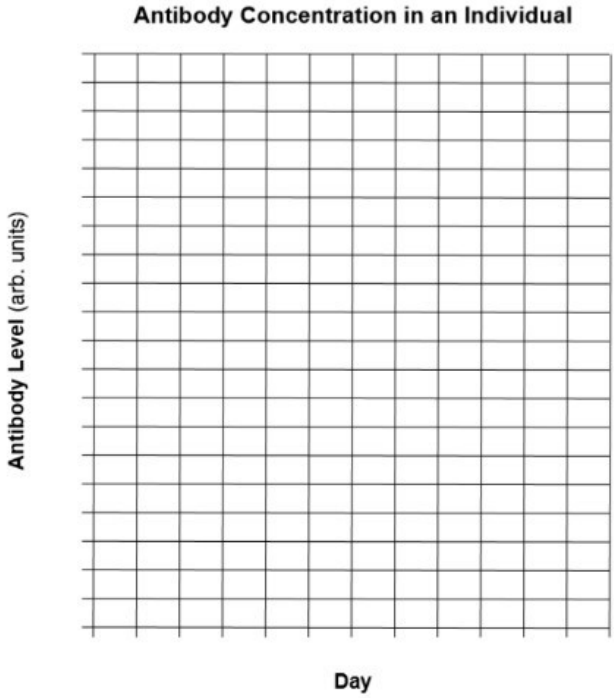
8 Mark an appropriate scale, without any breaks in the data, on each labeled axis.

08 17 44-47

9 Plot the data on the grid. Connect the points and surround each point with a small circle.

10 State one reason for the change in antibody production during the first 10 days.

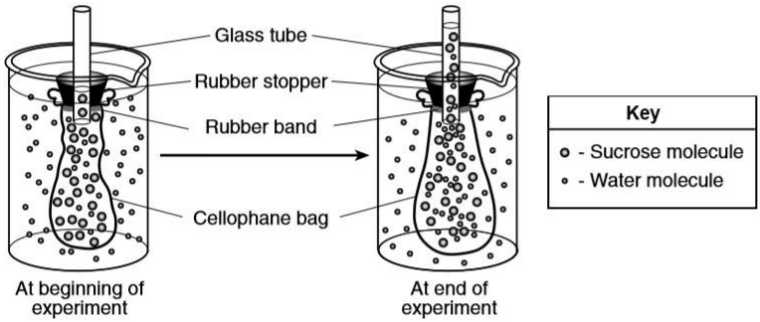
Example: 



11 The antibody level (in arb. units) of the individual on day 30 is closest to

(1) 30
(2) 70
(3) 110
(4) 160

The diagram below represents a laboratory experiment involving sucrose and water molecules in a cellophane bag which functions in the same way as dialysis tubing.



08 17 75

12 Which statement correctly explains the rise of liquid in the tube at the end of the experiment?

(1) The concentration of sucrose molecules increased as water molecules entered the bag. This concentration increase pushed the liquid up the tube.

(2) Water entered the bag due to the lower concentration of water inside. The extra water pushed the liquid up the tube as the bag filled.

(3) Sucrose indicator entered the bag and reacted with the sucrose molecules. The reaction made the bag increase in size and pushed the liquid up the tube.

(4) Sucrose molecules moved out of the bag and up the tube while water moved out, causing the rise of liquid in the tube.

Moose-killing Winter Ticks

Moose habitat is determined by temperature. Moose prefer areas where the average summer temperature is around 15°C and does not exceed 27°C for too long. The reason for this temperature dependency: Moose cannot sweat.

Besides the cooling effect of water, which moose are almost always near, aquatic environments provide them with a good supply of food, and in the past, have protected them against biting insects. However, the North American moose population is facing a new threat: a parasite called the winter tick. These ticks lodge themselves in the animal's fur and hold on through the winter, sucking the animal's blood. Many infected moose end up dying of exhaustion and weakness as a result of the large number of ticks feeding on them.

Ticks are most active during dry days in the fall. Adult ticks that drop off moose in the spring and land on snow cover have a poorer survival rate. Climate change can be predicted to improve conditions for winter ticks due to longer and warmer falls, and earlier snowmelt in the spring.

Surveys of the moose population in northeastern Minnesota have recorded the change shown
below in the moose population between 2005 and 2013.

Estimated Moose Population In Northeastern Minnesota

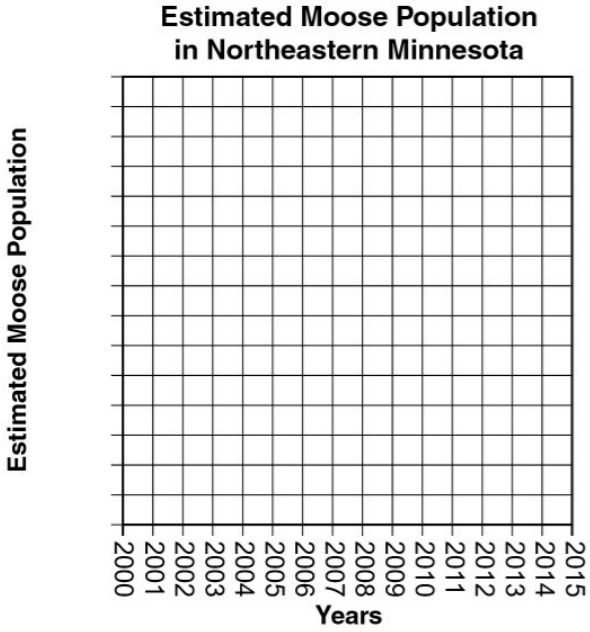
Survey Year	Estimated Moose Population
2005	8160
2006	8840
2007	6860
2008	7890
2009	7840
2010	5700
2011	4900
2012	4230
2013	2760

15 Using the information in the data table, construct a line graph on the grid below, following the directions below.

06 18 44-47

16 Mark an appropriate scale, without any breaks in the data, on the axis labeled "Estimated Moose Population." Plot the data for the estimated moose population on the grid. Connect the points and surround each point with a small circle.

17 Explain how climate change could result in an increased number of moose infested with winter ticks.



18 Increased average yearly temperatures in regions presently inhabited by moose could result in a disruption in homeostasis in these animals because

(1) a decrease in average temperatures will increase mutations in their skin cells
(2) an increase in average temperatures will decrease the amount of blood ticks can consume
(3) moose will not be able to maintain an appropriate body temperature, since they do not sweat
(4) moose will sweat more and lose too much water from their bodies