مراجعة وفق الهيكل الوزاري منهج انسباير المسار M مع الإجابات

تم تحميل هذا الملف من موقع المناهج الإماراتية

موقع المناهج ⇦ المناهج الإماراتية ⇦ الصف الحادي عشر المتقدم ⇦ علوم ⇦ الفصل الثالث ⇦ ملفات متنوعة ⇦ الملف

تاريخ إضافة الملف على موقع المناهج: 2025-06-18 15:37:52

المزيد من مادة علوم:	ملفات ا كتب للمعلم ا كتب للطالب ا اختبارات الكترونية ا اختبارات ا حلول ا عروض بوربوينت ا أوراق عمل منهج انجليزي ا ملخصات وتقارير ا مذكرات وبنوك ا الامتحان النهائي ا للمدرس

إعداد: Hossam May

التواصل الاجتماعي بحسب الصف الحادي عشر المتقدم

صفحة المناهج الإماراتية على فيسبوك					
المواد على تلغرام	التربية الاسلامية	اللغة العربية	اللغة الانجليزية	الرياضيات	

المزيد من الملفات بحسب الصف الحادي عشر المتقدم والمادة علوم في الفصل الثالث

1	حل تجميعة أسئلة وفق الهيكل الوزاري منهج انسباير المسار C
2	حل تجميعة مراجعة وفق الهيكل الوزاري منهج بريدج المسار C
3	حل نموذج تدريبي للاختبار النهائي وفق الهيكل الوزاري
4	نموذج تدريبي للاختبار النهائي وفق الهيكل الوزاري
5	تجميعة مراجعة نهائية وفق الهيكل الوزاري

الإمارات العربية المتحدة
وزارة التربية والتعليم

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Revision for Biology G11 ADV-M

Biology Teacher\ May Hossam

Term 3 academic Year 2024-2025

School Principal
Salama Khalfan Al Mazrouei

Question 1

Figure 7

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Immigration (ih muh GRAY shun) is the term ecologists use to describe the number of individuals moving into a population. In most instances, emigration is about equal to immigration. Therefore, natality and mortality usually are the most important factors in determining the population growth rate.

Some populations tend to remain approximately the same size from year to year. Other populations vary in size depending on conditions within their habitats. To better understand why populations grow in different ways, you should understand two mathematical models for population growth—the exponential growth model and the logistic growth model.

Exponential growth model Look at **Figure 7** to see how a population of mice would grow if there were no limits placed on it by the environment.

Assume that two adult mice breed and produce a litter of two young. Also assume the two offspring are able to reproduce in one month. If all of the offspring survive to breed, the population grows slowly at first. This slow growth period is defined as the lag phase. The rate of population growth soon begins to increase rapidly because the total number of organisms that are able to reproduce has increased. After only two years, the experimental mouse population would reach more than three million mice.

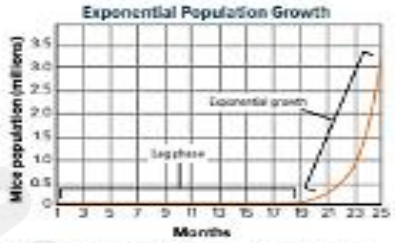

Figure 7 If mice were allowed to reproduce unhindered, the population would grow slowly at first but would accelerate quickly.

Infer *Why mice or other populations do not continue to grow exponentially.*

MATH Connection Notice in **Figure 7** that once the mice begin to reproduce rapidly, the graph becomes J-shaped. A J-shaped growth curve illustrates exponential growth. Exponential growth, also called geometric growth, occurs when the growth rate is proportional to the size of the population. All populations grow exponentially until some limiting factor slows the population's growth. It is important to recognize that even in the lag phase, the use of available resources is exponential. Because of this, the resources soon become limited and population growth slows.

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Figure 8 When a population exhibits growth that results in an S-shaped graph, it exhibits logistic growth. The population levels off at a limit called the carrying capacity.

Question 1

Figure 7

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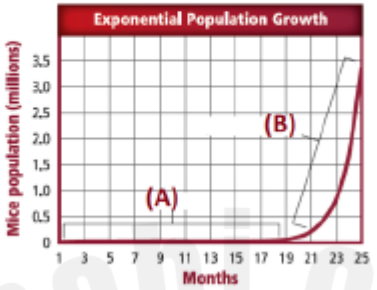
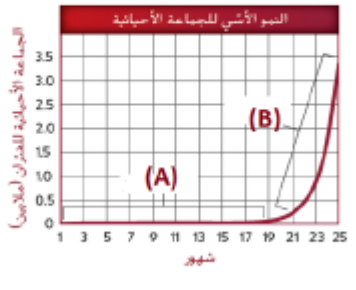
The graph below represents the population growth of mice over time, What does the letter (A) refer to?



الرسم البياني أدناه يوضح نمو جماعة أحيائية من الفئران ،
ما الذي يشير إليه(الحرف A)؟



a. Exponential growth — النمو الأسي

b. Acceleration phase — طور التسارع

c. Lag phase — طور التباطىء

d. Straight-line growth — النمو الخطّي

Question 1

Figure 7

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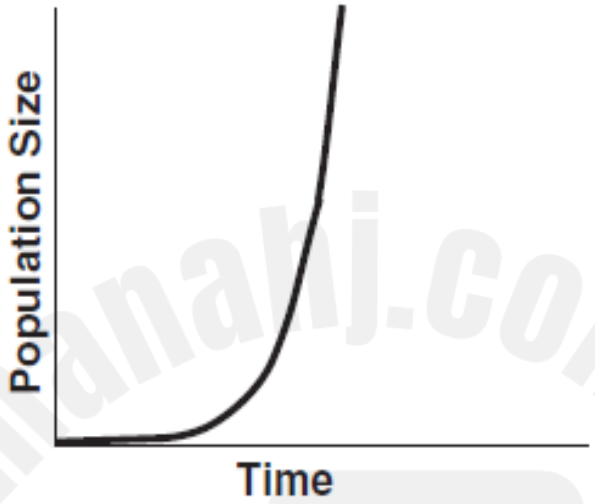
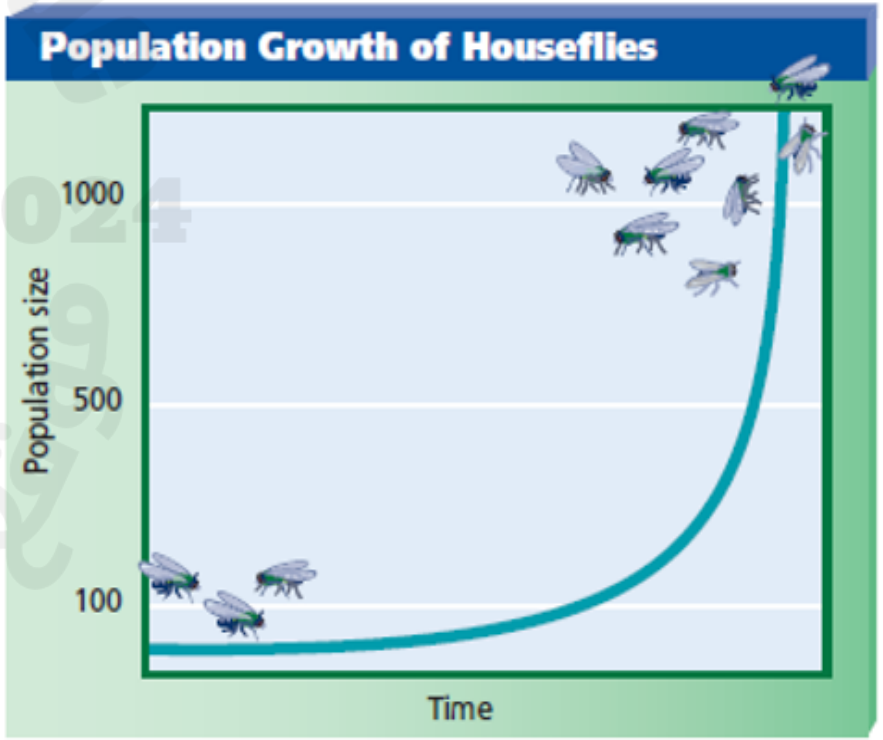
5 What type of growth is represented by the J-shaped curve shown below?



A sinusoidal
B linear
C exponential
D random

7. According to the graph, the growth rate of a house fly population _____.
a. increases, then drops suddenly
b. increases, at a steady rate
c. increases rapidly
d. levels off after a certain amount of time



Question 2

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Carrying capacity Ecosystems have limits to the numbers of organisms and populations they can support. The maximum number of individuals in a species that an environment can support for the long term is the **carrying capacity.** You will notice in **Figure 8** on the last page that logistic growth levels off at the line on the graph identified as the carrying capacity.

Carrying capacity is limited by such factors as the availability of living and nonliving resources and from such challenges as predation, competition, and disease. Organisms would have the capacity to produce populations of great size were it not for the fact that environments and resources are finite. This fundamental tension affects the abundance (number of individuals) of species in any given ecosystem. When populations develop in an environment with plentiful resources, there are more births than deaths. The population soon reaches or passes the carrying capacity. As a population nears the carrying capacity, resources become limited.

If a population exceeds the carrying capacity, deaths outnumber births because adequate resources are not available to support all of the individuals. The population then falls below the carrying capacity as individuals die. The concept of carrying capacity is used to explain why many populations tend to stabilize.

Reproductive patterns

The graph in **Figure 8** shows the number of individuals increasing until the carrying capacity is reached. The graph is a useful population model, and can be used to predict how a population's number might change over time.

However, there are several additional factors that must be considered for real populations. Species of organisms vary in the number of births per reproduction cycle, in the age that reproduction begins, and in the life span of the organism. Both plants and animals are placed into groups based on their reproductive factors. However, not all organisms fit under a specific reproductive strategy.

Members of one of the groups are called the *r*-strategists. The rate strategy, or *r*-strategy, is an adaptation for living in an environment where fluctuation in biotic or abiotic factors occur. Fluctuating factors might be availability of food, changing temperatures, or migrating animals. An *r*-strategist is generally a small organism such as a fruit fly, a mouse, or the locusts shown in **Figure 9**. *r*-strategists usually have short life spans and produce many offspring.

The reproductive strategy of an *r*-strategist is to produce as many offspring as possible in a short time period in order to take advantage of some environmental factor. Organisms classified as *r*-strategists typically expend little or no energy in raising their young to adulthood. Populations of *r*-strategists are usually controlled by density-independent factors, and they usually do not maintain a population near the carrying capacity.

Figure 9 Locusts, which are an example of *r*-strategists, produce many offspring in their short lifetimes.

Infer *what specific factors might fluctuate in a locust's environment*

Just as some environments fluctuate, others are fairly predictable. The elephants in **Figure 10** experience a carrying capacity that changes little from year to year. The carrying-capacity strategy, or *k*-strategy, is an adaptation for living in environments that are fairly stable.

A *k*-strategist generally is a larger organism that has a long life span, produces few offspring, and whose population reaches equilibrium at the carrying capacity.

Figure 10 Elephants are *k*-strategists that produce few offspring, but they invest a lot of care in the raising of their offspring.

The reproductive strategy of a *k*-strategist is to produce only a few offspring that have a better chance of living to reproductive age because of the energy, resources, and time invested in the care for the young. The number of individuals in a population of *k*-strategists usually are controlled by density-dependent factors and not by density-independent factors. For example, a ten-degree change in temperature might be enough to drastically reduce the number of locusts in a population, but it would not likely influence the number of elephants in a population.

Check Your Progress

Summary

- There are population characteristics that are common to all populations of organisms, including plants, animals, and bacteria.
- Populations tend to be distributed randomly, uniformly, or in clumps.
- Population-limiting factors are either density-independent or density-dependent.
- Populations tend to stabilize near the carrying capacity of their environment.

Demonstrate Understanding

1. **Compare and contrast** spatial distribution, population density, and population growth rate.
2. **Summarize** the concepts of carrying capacity and limiting factors, and their effects on reproductive patterns.
3. **Sketch** diagrams showing population dispersion patterns.
4. **Analyze** the impact a nonnative species might have on a native species in terms of population dynamics.

Explain Your Thinking

5. **Design** an experiment that you could perform to determine which population growth model applies to fruit fly populations.
6. WRITING Connection Write a newspaper article describing how a weather event, such as drought, has affected a population of animals in your community.

LEARNSMART Go online to follow your personalized learning path to review, practice, and reinforce your understanding.

Question 2

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Which of the following organisms does not follow a r- strategy for reproduction?

أي من الكائنات الحية التالية لا يعتمد استراتيجية r للتكاثر؟

a fruit fly ذبابة الفاكهة (A)

Locusts الجراد (B)

Mouses الفئران (C)

Elephant الفيلة (D)

Which of the following organism follows an r-strategy for reproduction?

أي من الكائنات الحية التالية يعتمد استراتيجية r- للتكاثر؟

(A)

(B)

(C)

(D)

Question 2

Page 135 136

Based on the table below, which letter of the following corresponds to the correct definition of carrying capacity?

استناداً إلى الجدول أدناه، أي حرف مما يلي يقابل تعريفاً صحيحاً للقدرة الاستيعابية؟

A	The number of organism per unit area. عدد الكائنات الحية في كل وحدة مساحة.
B	The number of individuals moving away from a population. عدد الأفراد الذين يغادرون الجماعة الأحيائية.
C	The number of individuals moving into a population. عدد الأفراد الذين ينضمون إلى الجماعة الأحيائية.
D	The maximum number of individuals in a species that an environment can support for the long term. أكبر عدد من أفراد نوع ما تستطيع البيئة دعمه على المدى الطويل.

a. A

b. B

c. C

d. D

Question 2

Page 135 136

Which of the following organism follows the r-strategy for reproduction?

أي من الكائنات الحية التالية يعتمد استراتيجية r- للتكاثر؟


(A)


(B)


(C)


(D)

Learning Outcomes Covered

- BIO.3.4.03.012

a. A

b. B ✓

c. C

d. D

Question 2

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17. species whose population growth is controlled by density-dependent factors النوع الذي يتحكم العامل المعتمد علي الكثافة في نمو الجماعة

- carrying capacity القدرة الاستيعابية
- exponential growth النمو الاسي
- K-selected استراتيجية ✓
- r-selected استراتيجية

Which organism follows an *r-strategy* for reproduction? ما الكائن الذي يتبع *استراتيجية r-* للتكاثر؟

a. الحمار الوحشي Zebra
b. طير أبو الحناء Robin
c. ذباب مايو Mayfly
d. الإنسان Human

Question 2

Page 135 136

6 Populations of *K*-strategists usually _____ .

A are controlled by density-dependent factors

B are controlled by density-independent factors

C do not reach equilibrium at the carrying capacity

D produce as many offspring as possible in a short period of time

15 Mice are an example of an *r*-strategist reproduction pattern because _____ .

A they produce few individuals

B the expend great energy raising young

C they produce many offspring

D they maintain populations near the carrying capacity

Question 2

Page 135 136

Which strategy is considered as an adaptation for living in an environment where fluctuation in biotic or abiotic factors occur?

A. k-strategy reproductive pattern.
B. r-strategy reproductive pattern.
C. a low mortality rate.
D. high mortality rate

Which strategy involve a larger organism that has a long-life span, produces few offspring, and whose population reaches equilibrium at the carrying capacity?

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Question 3

Figure 8

Page 134

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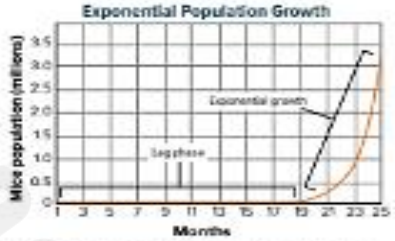

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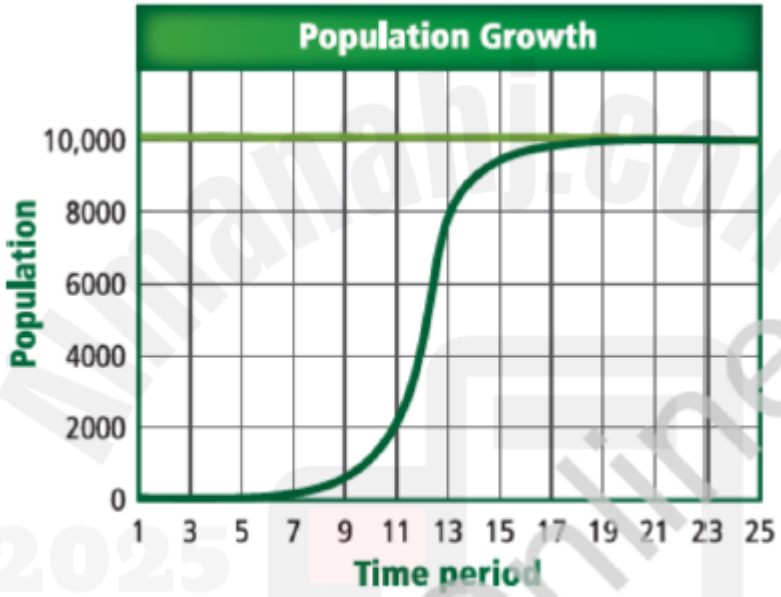
Question 3

Figure 8

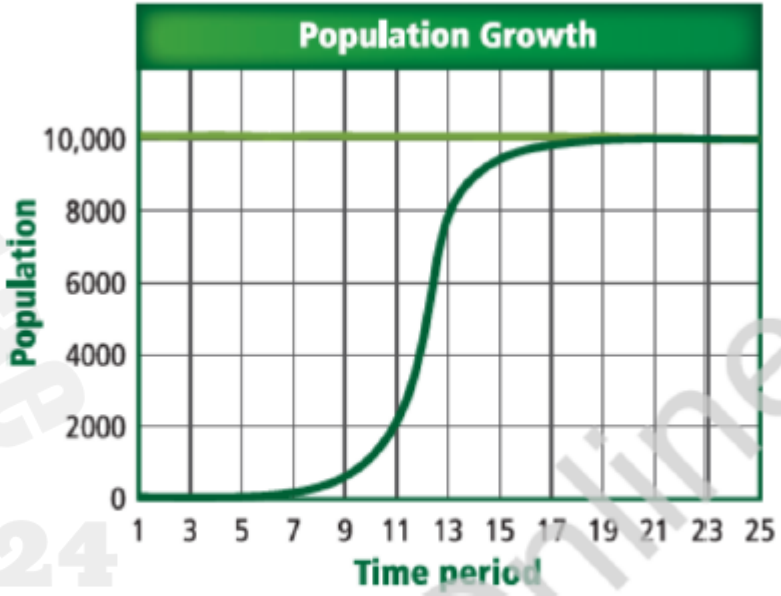
Page 134

22. What do the time periods 1–7 represent? ماذا تمثل الفترة من 1 الي 7



- carrying capacity القدرة الاستيعابية
- geometric growth النمو الجيومتري
- acceleration phase طور التسارع
- ✓ lag phase طور التباطؤ

20. Which population growth model does this graph illustrate? نوع النمو الموضح بالشكل



- exponential growth الاسي
- lag phase طور التباطؤ
- ✓ logistic growth اللوجيستي
- straight-line growth نمو الخط المستقيم

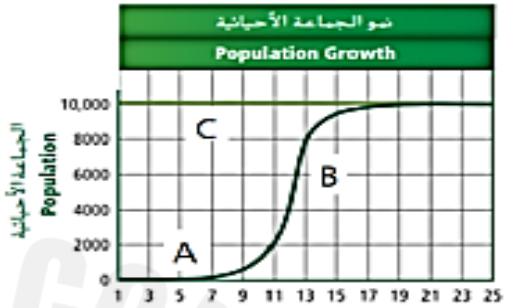
Question 3

Figure 8

Page 134

What does the horizontal line (C) on this graph represent?

ما يمثل الخط الأفقي (C) في هذا الرسم البياني؟



Learning Outcomes Covered

- BIO.3.4.01.033

a. The carrying capacity

b. The exponential growth

c. The geometric growth

d. The straight-line growth

Question 3

Figure 8

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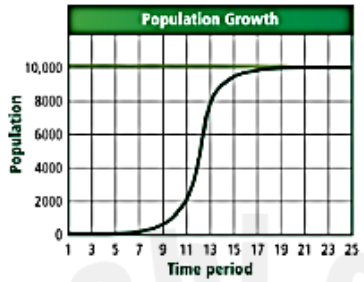
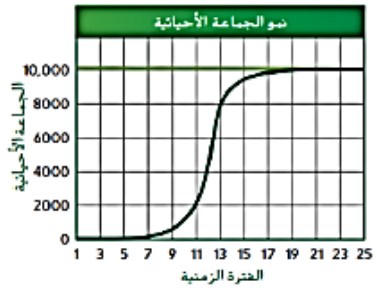
What is the horizontal line on this graph called?



ماذا يسمى الخط الأفقي في هذا الرسم البياني؟



Learning Outcomes Covered

- BIO.3.4.01.033

a. Carrying capacity — القدرة الاستيعابية ✓
b. Exponential growth — النمو الأسي
c. Geometric growth — النمو الهندسي
d. Straight-line growth — النمو الخطي

8 The phrase *carrying capacity* refers to _____.

A storing extra food for winter
B the number of organisms a habitat can support
C transporting food to organisms in an area
D the maximum possible weight of an individual organism

Question 3

Figure 8

Page 134

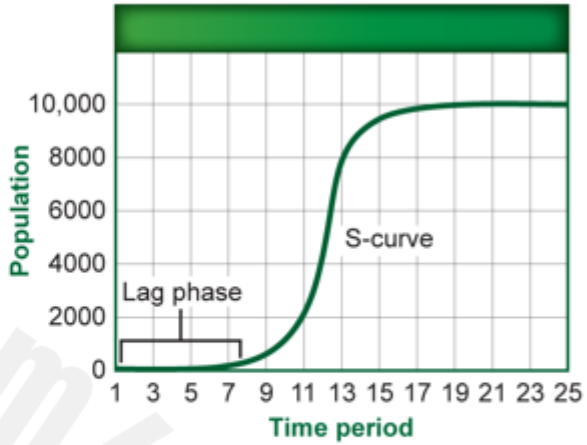
Why does the population growth level off at 10,000?

A. Biotic factors have made survival difficult.

B. The population has reached its carrying capacity.

C. Density-independent factors have slowed the growth of the population.

D. Immigration into the population has reached the maximum limit.



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Question 4

Page 134

Which of the following is a characteristic of exponential population growth?

أي مما يلي يُعد سمة من سمات الزيادة السكانية الأسية؟

a. يتم استهلاك الموارد بشكل أسي طوال كافة المراحل
Resources are consumed exponentially during all phases

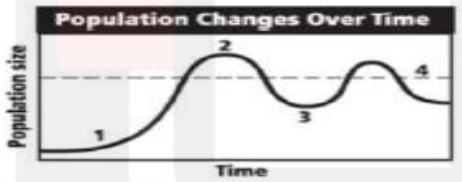
b. الزيادة السكانية الأولية سريعة
Initial population growth is rapid

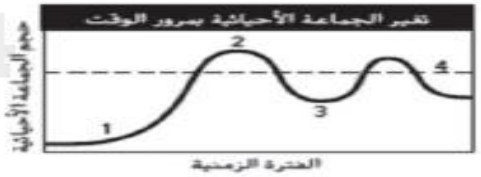
c. معدل الزيادة يتطابق بشكل عكسي مع عدد السكان
Growth rate is inversely proportional to population size

d. مرحلة التباطؤ تتبع النمو السريع
The lag phase follows rapid growth

Which part of the graph below indicates the carrying capacity of the habitat?

أي جزء من الرسم البياني أدناه يمثل القدرة الاستيعابية للموطن البيئي؟





a. 1

b. 3

c. 2

d. 4

Question 5

Figure 5

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Figure 4 on the last page shows an example of the effects that fire can have on a population. The ponderosa pines have been damaged by a crown fire, a fire that advances to the tops of the trees. In this example, the fire limits the population of ponderosa trees by killing many of the trees. However, smaller but more frequent ground fires have the opposite effect on the population. By thinning lower growing plants that use up nutrients, a healthier population of mature ponderosa pines is produced.

Populations can be limited by the results of human interference. For example, over the last 100 years, building dams and other human activities on the Colorado River have significantly reduced the river's water flow and changed its temperature. In addition, the introduction of nonnative fish species altered the river's biotic factors. Because of the changes in the river, the number of small fish called humpback chub was reduced. During the 1960s, the number of humpback chub dropped so low that they were in danger of disappearing from the Colorado River altogether. Air, land, and water pollution are the result of human activities that also can limit populations. Pollution reduces the available resources by making some of the resources toxic.

Density-dependent factors

Any factor in the environment that depends on the number of members in a population per unit area is a **density-dependent factor.** Density-dependent factors are often biotic factors such as predation, disease, competition, and parasites.

Predation A study of density-dependent factors was done on the wolf and moose populations in northern Michigan on Isle Royale, located in Lake Superior. The results of this study are shown in **Figure 5**.

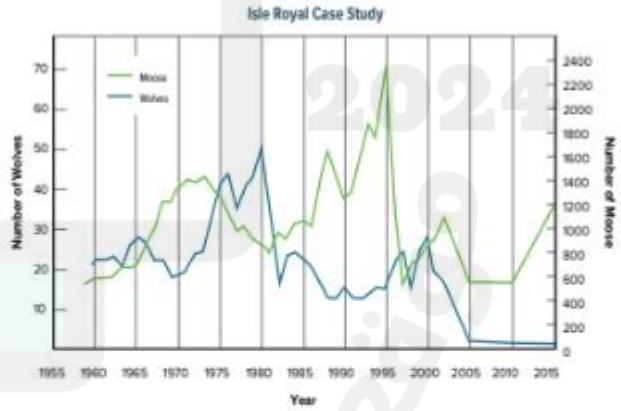


Figure 5 The long-term study of the wolf and moose populations on Isle Royale shows the relationship between the number of predators and prey over time.

Infer *what might have caused the increase in the number of moose between 1990 and 1995.*

Question 5

Figure 5

Page 132

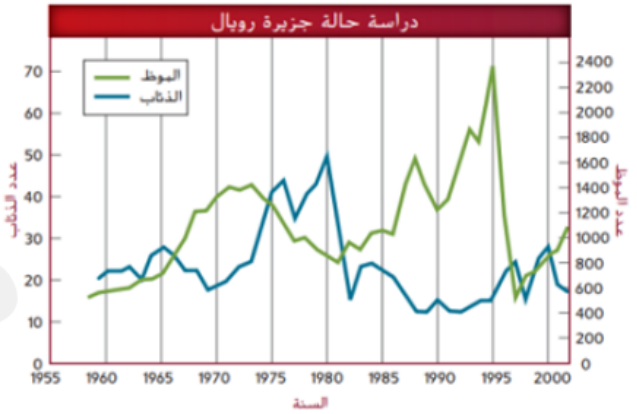
The figure below shows the long-term study of the wolf and moose populations on isle Royale. The figure shows the relationship between the number of predators and prey over time, Study

it and then answer the question

What was the approximate ratio of moose to wolves in 1985?

الشكل أدناه يوضح الدراسة طويلة المدى التي أُجريت على الجماعات الأحيائية للموظ والذئاب في جزيرة رويال. يوضح الرسم العلاقة بين أعداد الكائنات المفترسة والفرائس مع مرور الوقت، أدرسه ثم أجب عن السؤال:

كم كانت نسبة عدد حيوان الموظ إلى عدد الذئاب عام 1985؟



a. 18:1 approx. — 1:18 تقريباً

b. 50:1 approx. — 1:50 تقريباً

c. 3:1 approx. — 1:3 تقريباً

d. 20:1 approx. — 1:20 تقريباً

Question 6

Figure 5

Page 132

Figure 4 on the last page shows an example of the effects that fire can have on a population. The ponderosa pines have been damaged by a crown fire, a fire that advances to the tops of the trees. In this example, the fire limits the population of ponderosa trees by killing many of the trees. However, smaller but more frequent ground fires have the opposite effect on the population. By thinning lower growing plants that use up nutrients, a healthier population of mature ponderosa pines is produced.

Populations can be limited by the results of human interference. For example, over the last 100 years, building dams and other human activities on the Colorado River have significantly reduced the river's water flow and changed its temperature. In addition, the introduction of nonnative fish species altered the river's biotic factors. Because of the changes in the river, the number of small fish called humpback chub was reduced. During the 1960s, the number of humpback chub dropped so low that they were in danger of disappearing from the Colorado River altogether. Air, land, and water pollution are the result of human activities that also can limit populations. Pollution reduces the available resources by making some of the resources toxic.

Density-dependent factors

Any factor in the environment that depends on the number of members in a population per unit area is a **density-dependent factor.** Density-dependent factors are often biotic factors such as predation, disease, competition, and parasites.

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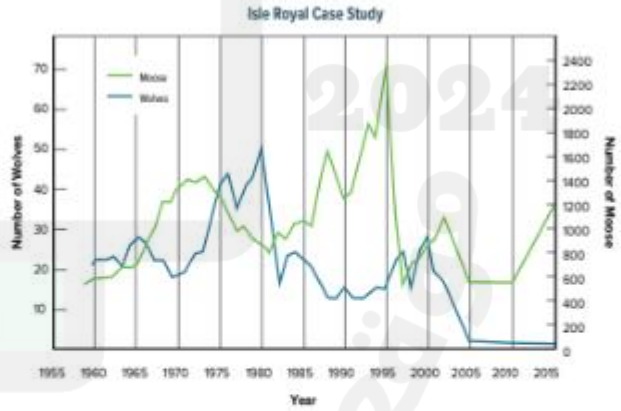


Figure 5 The long-term study of the wolf and moose populations on Isle Royale shows the relationship between the number of predators and prey over time.

Infer *what might have caused the increase in the number of moose between 1990 and 1995.*

Question 6

Figure 5

المخرجات التعليمية المرتبطة

BIO.3.4.01.032

a. 35:1 approx — 1:35 تقريباً

b. 50:1 approx — 1:50 تقريباً

c. 20:1 approx — 1:20 تقريباً

d. 15:1 approx — 1:15 تقريباً

Question 7

Page 133,134, 135

Prior to the winter of 1947–48 there were apparently no wolves on Isle Royale. During that winter, a single pair of wolves crossed the ice on Lake Superior, reaching the island. During the next ten years the population of wolves reached about twenty individuals. Notice that the graph in **Figure 5** on the previous page shows that the rise and fall of the numbers of each group was dependent on the other group. For example, follow the wolves' line on the graph. As the number of wolves decreased, the number of moose increased.

Disease Another density-dependent factor is disease. Outbreaks of disease tend to occur when population size has increased and population density is high. When population density is high, disease is transmitted easily from one individual to another because contact between individuals is more frequent. Therefore, the disease spreads easily and quickly through a population. This is just as true for human populations as it is for populations of protists, plants, and other species of animals.

Competition Competition between organisms also increases when density increases. When the population increases to a size where resources such as food or space become limited, individuals in the population must compete for the available resources. Competition can occur within a species or between two different species that use the same resources. For example, the foxes fighting over the squirrel in **Figure 6** also compete with other species, such as coyotes, for the same food source.

Figure 6 A decrease in the food supply can trigger competition between members of the same species.

Competition for insufficient resources might result in a decrease in population density in an area due to starvation or to individuals leaving the area in search of additional resources. As the population size decreases, competition becomes less severe.

Parasites Like disease, parasitic organisms can place limits on a population. The presence of parasites is a density-dependent factor that can negatively affect population growth at higher densities.

Population growth rate

An important characteristic of any population is its growth rate. The **population growth rate** (PGR) explains how fast a given population grows. One of the characteristics of the population ecologists must know, or at least estimate, is natality. The natality of a population is the birthrate, or the number of individuals born in a given time period. Ecologists also must know the mortality—the number of deaths that occur in the population during a given time period.

The number of individuals emigrating or immigrating also is important. **Emigration** (em uh GRAY shun) is the term ecologists use to describe the number of individuals moving away from a population.

Immigration (ih muh GRAY shun) is the term ecologists use to describe the number of individuals moving into a population. In most instances, emigration is about equal to immigration. Therefore, natality and mortality usually are the most important factors in determining the population growth rate.

Some populations tend to remain approximately the same size from year to year. Other populations vary in size depending on conditions within their habitats. To better understand why populations grow in different ways, you should understand two mathematical models for population growth—the exponential growth model and the logistic growth model.

Exponential growth model Look at **Figure 7** to see how a population of mice would grow if there were no limits placed on it by the environment.

Assume that two adult mice breed and produce a litter of two young. Also assume the two offspring are able to reproduce in one month. If all of the offspring survive to breed, the population grows slowly at first. This slow growth period is defined as the lag phase. The rate of population growth soon begins to increase rapidly because the total number of organisms that are able to reproduce has increased. After only two years, the experimental mouse population would reach more than three million mice.

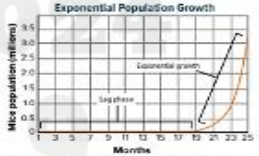


Figure 7 If mice were allowed to reproduce unhindered, the population would grow slowly at first but would accelerate quickly.

Infer *why mice or other populations do not continue to grow exponentially*

MATH Connection Notice in **Figure 7** that once the mice begin to reproduce rapidly, the graph becomes J-shaped. A J-shaped growth curve illustrates exponential growth. Exponential growth, also called geometric growth, occurs when the growth rate is proportional to the size of the population. All populations grow exponentially until some limiting factor slows the population's growth. It is important to recognize that even in the lag phase, the use of available resources is exponential. Because of this, the resources soon become limited and population growth slows.

Logistic growth model Most populations grow like the model shown in **Figure 8** rather than the model shown in **Figure 7**. Notice that the graphs look exactly the same through some of the time period: the number of individuals begins very low, then increases very rapidly. During this period, competition for resources among individuals in the population is low.

The second graph, however, curves into the S-shape typical of logistic growth. Population growth stops increasing when an environment's carrying capacity has been reached.

Figure 8 When a population exhibits growth that results in an S-shaped graph, it exhibits logistic growth. The population levels off at a limit called the carrying capacity.

Carrying capacity Ecosystems have limits to the numbers of organisms and populations they can support. The maximum number of individuals in a species that an environment can support for the long term is the **carrying capacity**. You will notice in **Figure 8** on the last page that logistic growth levels off at the line on the graph identified as the carrying capacity.

Carrying capacity is limited by such factors as the availability of living and nonliving resources and from such challenges as predation, competition, and disease. Organisms would have the capacity to produce populations of great size were it not for the fact that environments and resources are finite. This fundamental tension affects the abundance (number of individuals) of species in any given ecosystem. When populations develop in an environment with plentiful resources, there are more births than deaths. The population soon reaches or passes the carrying capacity. As a population nears the carrying capacity, resources become limited.

If a population exceeds the carrying capacity, deaths outnumber births because adequate resources are not available to support all of the individuals. The population then falls below the carrying capacity as individuals die. The concept of carrying capacity is used to explain why many populations tend to stabilize.

Reproductive patterns

The graph in **Figure 8** shows the number of individuals increasing until the carrying capacity is reached. The graph is a useful population model, and can be used to predict how a population's number might change over time.

However, there are several additional factors that must be considered for real populations. Species of organisms vary in the number of births per reproduction cycle, in the age that reproduction begins, and in the life span of the organism. Both plants and animals are placed into groups based on their reproductive factors. However, not all organisms fit under a specific reproductive strategy.

Members of one of the groups are called the *r*-strategists. The rate strategy, or *r*-strategy, is an adaptation for living in an environment where fluctuation in biotic or abiotic

Fluctuating factors might be availability of food, peratures, or migrating animals. An *r*-strategist is nall organism such as a fruit fly, a mouse, or the in **Figure 9**. *r*-strategists usually have short life duce many offspring.

tive strategy of an *r*-strategist is to produce as many ossible in a short time period in order to take some environmental factor. Organisms classified as pically expend little or no energy in raising their thood. Populations of *r*-strategists are usually density-independent factors, and they usually do a population near the carrying capacity.

Figure 9 Locusts, which are an example of *r*-strategists, produce many offspring in their short lifetimes.

Infer *what specific factors might fluctuate in a locust's environment*

Question 7

Page 133,134, 135

If a population grows larger than its environmental carrying capacity, then:

إذا كان عدد السكان ينمو أكبر من القدرة الاستيعابية للبيئة:

a. قد يرتفع معدل المواليد بشكل ملحوظ
birth rate may rise significantly

b. قد يرتفع معدل الوفيات
death rate may rise

c. قد يزيد معدل الهجرة الداخلية
immigration rate may increase

d. قد ينخفض معدل الوفيات بشكل ملحوظ
death rate may fall significantly

1. A new species of mouse is introduced into an environment. These mice reproduce and the population grows. As the population grows, food resources diminish and predation by hawks increases. Eventually, the number of mice in the environment levels off so that the rate of birth equals the rate of death. What is this nearly constant number of organisms called?

A carrying capacity
B exponential growth
C linear growth
D competitive edge

Question 7

Page 133,134, 135

A population reaches the carrying capacity: تصل الجماعة الأحيائية الى القدرة الاستيعابية:

a. تكون في استراتيجية r
is reached in r–selected populations

b. تصل اليها عندما تكون الموارد محدودة
is reached as resources become limiting

c. تصل اليها بنهاية النمو الأسي
is reached at the end of exponential growth

d. تصل لها عندما تكون البيئة متضررة
is reached when the environment begins to be harmed

Based on the table below, which letter of the following corresponds to the correct definition of carrying capacity? استناداً إلى الجدول أدناه، أي حرف مما يلي يقابل تعريفاً صحيحاً للقدرة الاستيعابية؟

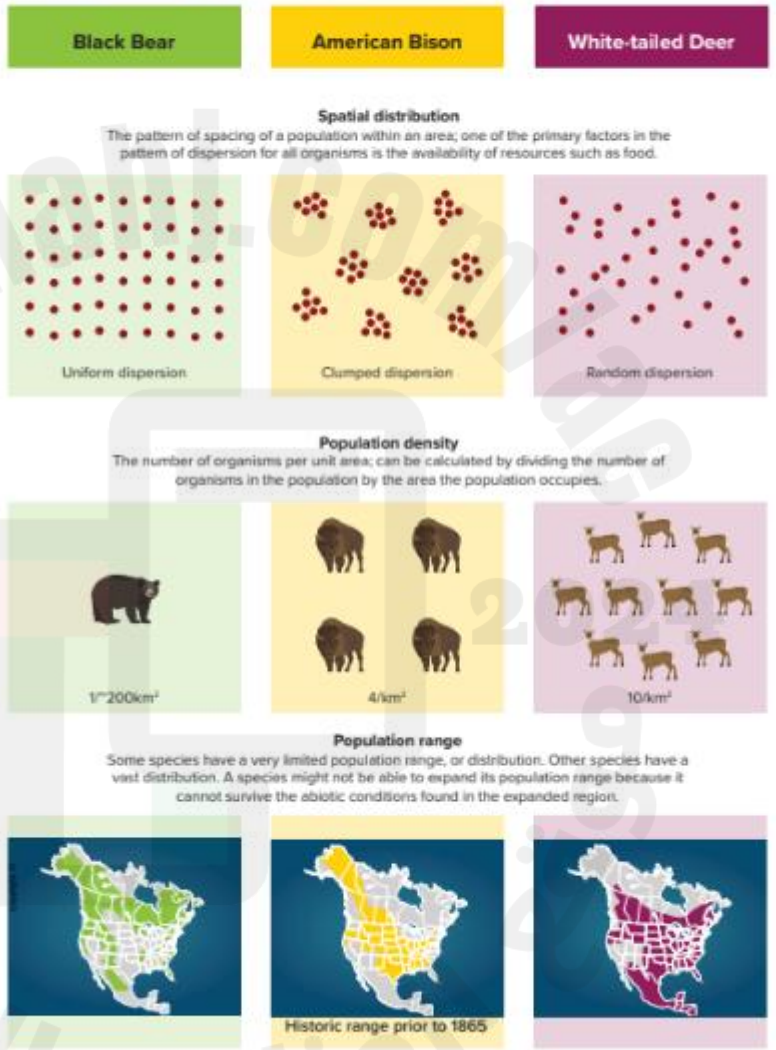
A	The number of organism per unit area. عدد الكائنات الحية في كل وحدة مساحة.
B	The number of individuals moving away from a population. عدد الأفراد الذين يغادرون الجماعة الأحيائية.
C	The number of individuals moving into population عدد الأفراد الذين ينضمون إلى الجماعة الأحيائية.
D	The maximum number of individuals in a species that an environment can support for the long term أكبر عدد من أفراد نوع ما تستطيع البيئة دعمه على المدى الطويل.

Question 8,9

Figure 2

Page 129

Figure 2 Visualizing Population Characteristics



Question 8,9

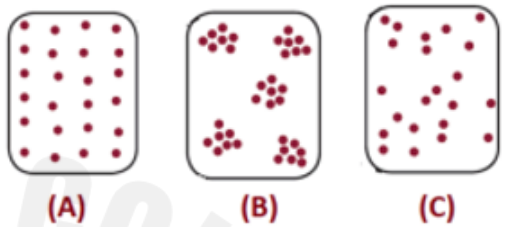
Figure 2

Page 129

The figure below shows dispersion of a population within an area. study it and then answer the question:

Which letter(s) of the following indicates uniform dispersion?

الشكل أدناه يبين أنواع انتشار الجماعات الأحيائية في منطقة محددة،
أدرسه ثم أجب عن السؤال:
أي حرف(أحرف) مما يلي يشير إلى الانتشار المنتظم؟



المخرجات التعليمية المرتبطة

- BIO.3.4.03.012

a. Only A — A فقط

b. B and C — B و C

c. Only C — C فقط

d. A and B — A و B

Question 8,9

Figure 2

Page 129

9-What is the dispersion pattern of herding animals, birds that flock together, and fish that form schools?

A. -clumped
B. -uniform
C. -random
D. -unpredictable

Question 10

Page 128

LESSON 1

POPULATION DYNAMICS

FOCUS QUESTION

What are characteristics of populations and how are they determined?

Population Characteristics

All species occur in groups called populations. There are certain characteristics that all populations have, such as population density, spatial distribution, and growth rate. These characteristics are used to classify all populations of organisms, including bacteria, animals, and plants.

Population density

One characteristic of a population is its **population density**, which is the number of organisms per unit area. For example, the population density of cattle egrets, shown with the Cape buffalo in **Figure 1**, is greater near the buffalo than farther away. Near the Cape buffalo, there might be three birds per square meter. Fifty meters from the Cape buffalo, the density of birds might be zero.

Figure 1 The population density of the cattle egrets is greater near the Cape buffalo.

Suggest *the type of dispersion you would expect these birds to have.*

3D THINKING DCI Disciplinary Core Ideas CCC Crosscutting Concepts SEP Science & Engineering Practices

COLLECT EVIDENCE

Use your Science Journal to record the evidence you collect as you complete the readings and activities in this lesson.

INVESTIGATE

GO ONLINE to find these activities and more resources.

Applying Practices: Local Ecosystem Dynamics

HS-LS2-1. Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.

Question 10

Page 128

An ecologist estimates a population density of 2.3 lemmings per square meter of tundra. What would be the approximate number of lemmings over 1000 square meters of tundra?

A. 0.23
B. 23
C. 230
D. 2300

What is population density?

A. pattern of spacing of a population in an area
B. number of organisms in an area
C. characteristics of a population
D. manner in which a population grows

Question 10

Page 128

12-If an aquarium holds 80 L of water and contains 170 guppies, what is the approximate density of the guppy population?

A. 1 guppy/L

✓ B. 2 guppy/L

C. 3 guppy/L

D. 4 guppy/L

Which of the following is the best example of the concept of population density?	أي مما يلي يشكل مثالاً على مفهوم الكثافة السكانية؟

المخرجات التعليمية المرتبطة

- BIO.3.4.03.012

a. Country with a large population — دولة ذات عدد سكان كبير

b. Maximum number of wolves in a forest — عدد الذئاب في الغابة يبلغ حده الأقصى

c. Total number of alligators in Florida — العدد الإجمالي للتماسيح في فلوريدا

d. Two jaguars per thousand hectares — غزالان اثنان في كل ألف هكتار

Question 11

Page 131

You may have learned that organisms adapt to the biotic and abiotic factors in their environment. A species might not be able to expand its population range because it cannot survive the abiotic conditions found in the expanded region. A change in temperature range, humidity level, annual rainfall, or sunlight might make a new geographic area uninhabitable for the species. In addition, biotic factors, such as predators, competitors, and parasites, present threats that might make the new location difficult for survival.

Get It?

Describe two reasons why a species might not be able to expand its range.

Population-Limiting Factors

Limiting factors are biotic or abiotic factors that keep a population from continuing to increase indefinitely. Decreasing a limiting factor, such as the available food supply, often changes the number of individuals that are able to survive in a given area. In other words, if the food supply increases a larger population might result, and if the food supply decreases a smaller population would likely result.

Density-independent factors

Any factor in the environment that does not depend on the number of members in a population per unit area is a **density-independent factor.** These factors usually are abiotic and include natural phenomena such as weather events. Weather events that limit populations include drought or flooding, extreme heat or cold, tornadoes, hurricanes, or fires (as shown in **Figure 4**).

Crown fire damage | Managed ground fire damage

Figure 4 A crown fire is a density-independent factor that can limit population growth. However, small ground fires can promote growth in a forest community.

Explain *why these two situations involving fire have different results on the tree populations.*

STEM CAREER Connection

Population Biologist

Why is it important to know the characteristics, such as size, growth, and distribution, of populations? How would you study a population to determine these characteristics? Would you like a job that requires you to be in the field studying organisms in their natural habitat? If these questions interest you, you might be a future population biologist. Population biologists use their findings to predict the future of populations and determine what can be done to lessen negative impacts.

ACADEMIC VOCABULARY

dominant

more powerful, successful, or in control than something else

The hand with which you write and do most other tasks is called your dominant hand.

Question 11

Page 131

Which is a density-independent factor?

A. severe drought
B. an intestinal parasite
C. a fatal virus
D. severe overcrowding

Which is a density–independent factor for a flock of Canada geese on a large lake?	ما العامل الذي لا يعتمد على الكثافة وراء تواجد قطيع من الإوز الكندي على بحيرة كبيرة؟

○	Intestinal worms	الديدان المعوية	a.
○	Infectious virus	فيروس معدٍ	b.
○	Dwindling food supply	إمداد غذاء متضائل	c.
○	Unusually cold winter	شتاء أبرد من العادة	d.

7. What are forest fires, temperature fluctuations, and floods all examples of?

A biotic, density-dependent factors
B biotic, density-independent factors
C abiotic, density-dependent factors
D abiotic, density-independent factors

Question 12

Page 132 133

Figure 4 on the last page shows an example of the effects that fire can have on a population. The ponderosa pines have been damaged by a crown fire, a fire that advances to the tops of the trees. In this example, the fire limits the population of ponderosa trees by killing many of the trees. However, smaller but more frequent ground fires have the opposite effect on the population. By thinning lower growing plants that use up nutrients, a healthier population of mature ponderosa pines is produced.

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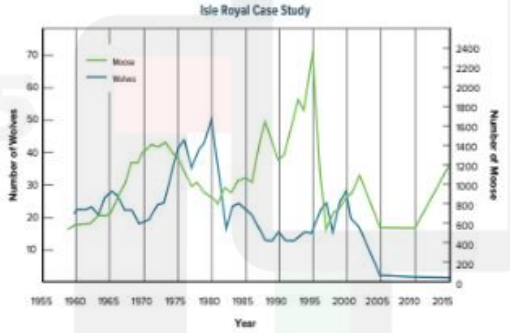

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Infer *what might have caused the increase in the number of moose between 1990 and 1995.*

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Figure 6 A decrease in the food supply can trigger competition between members of the same species.

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Question 12

Page 132 133

Which of the following is a density-dependent limiting factor?

- winter frost (thin layer of ice) destroying most of the year's grape crops in Italy
- drought in the Kalahari, threatening the life of kudu, wildebeest, and lions
- drastic changes in water pH, causing fish to die
- a decline in the moose population after wolves move into the area ✓

A limiting factor is a factor that controls the growth of a population. Factors that depend on population density are called density-dependent limiting factors. Identify the density-dependent limiting factors.

- [ ] flooding
- [ ] forest fires
- [x] competition ✓
- [x] parasitism ✓
- [ ] pollution
- [ ] cold weather

Question 12

Page 132 133

Which statement describes the crown fire effect on the population ?

A. thickening lower growing plants .
B. new plants grow from seeds that the wind carries to the area.
C. healthier population of mature ponderosa pines is produced.
D. limits the population of ponderosa trees by killing many of the trees.

Which statement describes the ground fire effect on the population ?

A. thickening lower growing plants .
B. new plants grow from seeds that the wind carries to the area.
C. healthier population of mature ponderosa pines is produced.
D. limits the population of ponderosa trees by killing many of the trees.

Question 12

Page 132 133

Which is a density-independent factor for a flock of Canada geese on a large lake?	ما هو العامل الذي لا يعتمد على الكثافة وراء تواجد قطيع من الإوز على بحيرة كبيرة في كندا؟

المخرجات التعليمية المرتبطة

- BIO.3.4.03.012

a.	Dwindling food supply	إمداد غذاء متضائل
b.	Infectious virus	فيروس معدٍ
c.	Intestinal worms	الديدان المعوية
d.	Unusually cold winter	شتاء أبرد من العادة

Question 12

Page 132 133

Which limiting factor is dependent on the density of the population?

A. contagious fatal virus
B. dumping toxic waste in a river
C. heavy rains and flooding
D. widespread forest fires

Lemmings are mammals that produce offspring in large numbers when food is plentiful. When the food supply diminishes, lemmings starve and many die. Which of the following factors influences Lemmings population size?

إن قوارض اللاموس هي ثدييات تتكاثر بأعداد كبيرة عند توفر الغذاء، وعندما يشح هذا الأخير، يموت العديد منها جوعا. أي عامل مما يلي يؤثر في حجم جماعة القوارض؟

Predation	الافتراس
Disease	المرض
Parasites	الطفيليات
Competition	التنافس

Question 13,14

Page 138

Notice **Figure 11** on the last page shows a relatively stable number of individuals over thousands of years—until recently. Notice also the recovery of the human population after the outbreak of the bubonic plague in the 1300s when an estimated one-third of the population of Europe died. Perhaps the most significant feature in this graph is the increase in the population in recent times. In 1804, the population of Earth was an estimated one billion people. Earth reached a milestone in 2011, when our population was recorded at seven billion people. With the current growth rate at just over 83 million people per year we are expected to reach a population of 9.8 billion by 2050.

Technological advances

For thousands of years, environmental conditions kept the size of the human population at a relatively constant number below the environment's carrying capacity. More recently, however, humans have altered the environment in ways that appear to have changed its carrying capacity. Agriculture and domestication of animals have increased the human food supply. Technological advances and medicine have improved the chances of human survival by reducing the number of deaths from parasites and disease. In addition, improvements in shelter have made humans less vulnerable to climatic impacts.

Get It?

Explain the factors that have contributed to an increase in the survival rate of the human population. Have these factors contributed to the homeostasis of the population within its enviroment? Explain.

Human population growth rate

Although the human population is still growing, the rate of its growth has slowed. **Figure 12** shows the percent increase in human population from the late 1940s through 2016. The graph also includes the projected population increase through 2050.

Notice the sharp dip in human population growth in the 1960s. This was due primarily to a famine in China in which about 60 million people died. The graph also shows that human population growth reached its peak at over 2.2 percent in 1963. By 2016, the percent increase in human population growth had dropped to less than 1.2 percent.

Population models predict the overall population growth rate to be below 0.6 percent by 2050. The decline in human population growth is due primarily to diseases such as AIDS and voluntary population control.

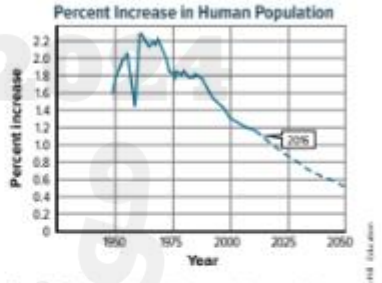


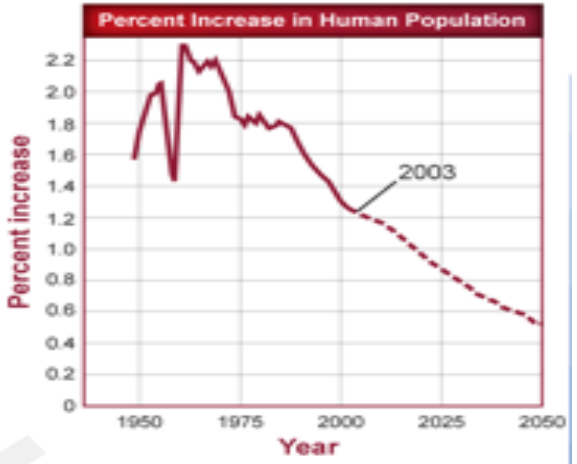
Figure 12 This graph shows the percent increase in the global human population using data from the late 1940s through 2016 and the projected percent increase to 2050.

Determine *the approximate population increase in the year 2025.*

Question 13,14

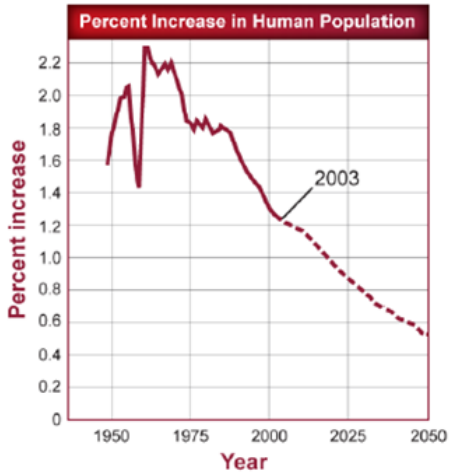
Page 138

16-Which is a primary reason for the decline in the percent growth of the human population after 1962?



A. decreased agriculture
B. famine and wars
C. setbacks in medicine
D. voluntary population controll

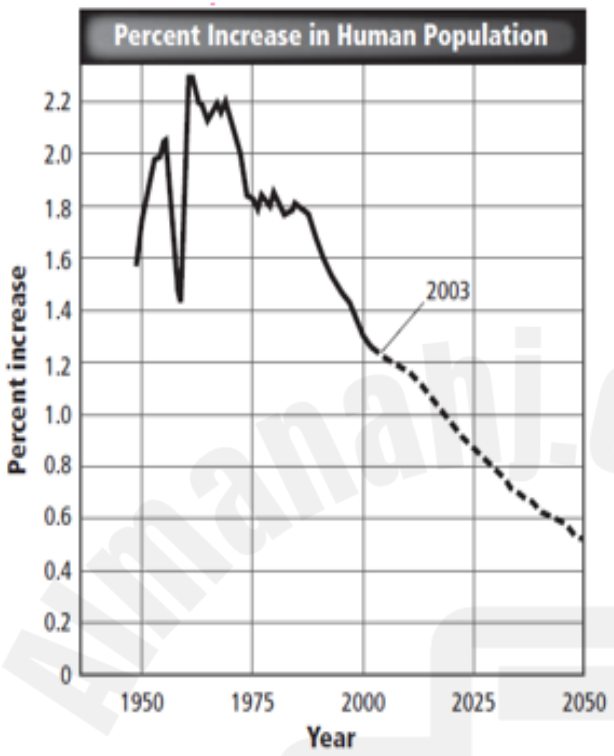
Which is a primary reason for the sharp dip in human population growth in the 1960s ?



A. decreased agriculture انخفاض الزراعة
B. famine المجاعة
C. setbacks in medicine انتكاسة الطب
D. voluntary population control نشاط الانسان

Question 13,14

Page 138



complete the table :

Approximate Growth Rate			
1950	1975	2000	2025 (estimated)
1.7	1.8	1.3	0.9

What are the main reasons for the expected trend in human population between now and 2050?

diseases such as AIDS and voluntary population control

Question 15,24

Figure 12

Page 137

LESSON 2
HUMAN POPULATION

FOCUS QUESTION
What factors affect human population growth?

Human Population Growth

The study of human population size, density, distribution, movement, and birth and death rates is **demography** (de MAH gra fee). The graph in **Figure 11** shows demographers' estimated human population on Earth for several thousand years.

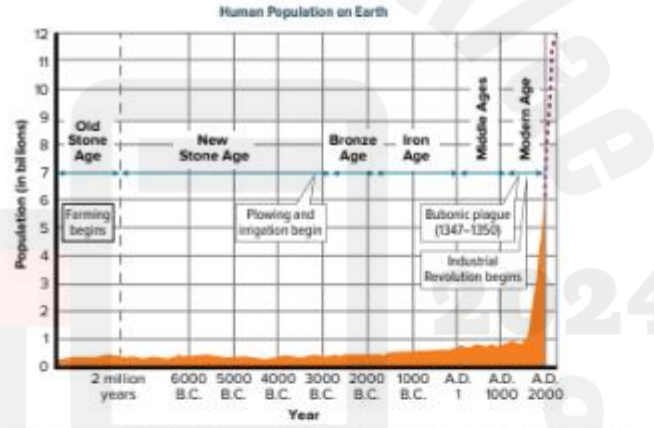


Figure 11 The human population on Earth was relatively constant until recent times, when the population began to grow at an exponential rate.

3D THINKING DCI Disciplinary Core Ideas CCC Crosscutting Concepts SEP Science & Engineering Practices

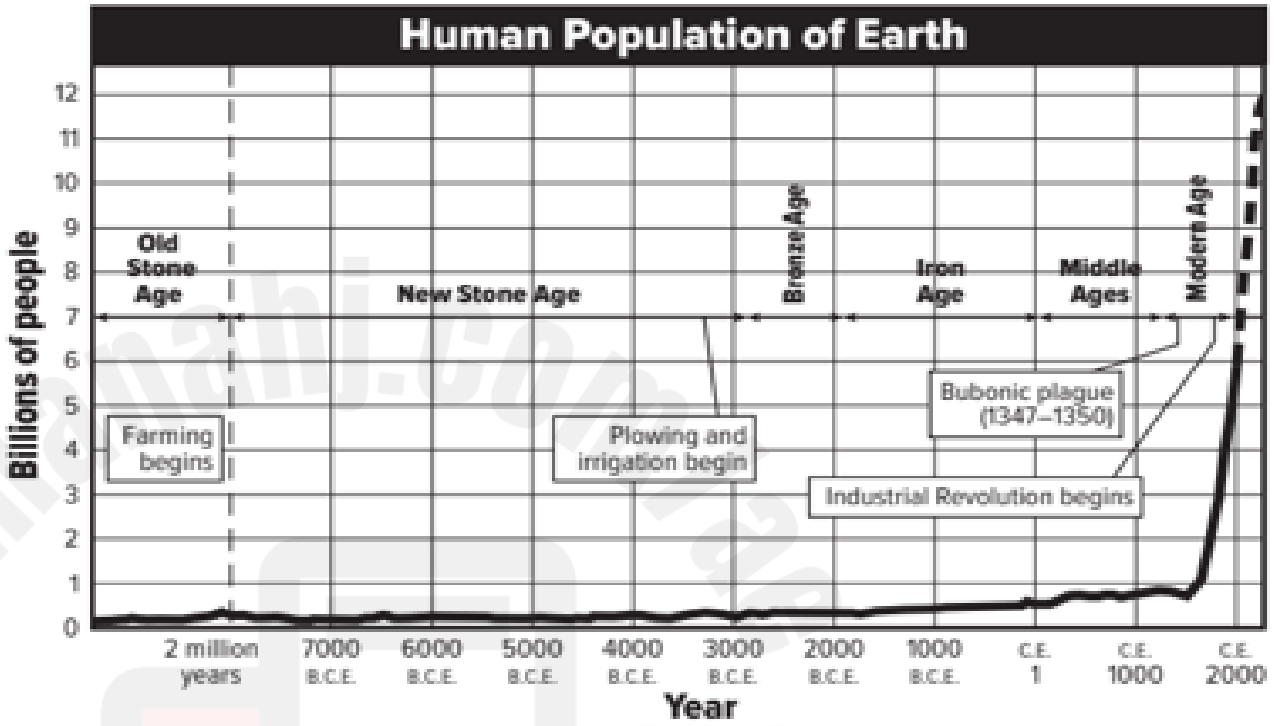
COLLECT EVIDENCE
Use your Science Journal to record the evidence you collect as you complete the readings and activities in this lesson.

INVESTIGATE
GO ONLINE to find these activities and more resources.
BioLab: How can you show a population trend?
Plan and carry out an investigation to determine the cause and effect of population trends.
Quick Investigation: Evaluate Factors
Analyze and interpret data to determine the factors that affect population growth.

Question 15,24

Figure 12

Page 137



6. Which event appears to coincide with a gradual increase in human population?

A. bubonic plague
B. farming
C. Industrial Revolution
D. plowing and irrigation

Question 16,17, 25

Page 139

Trends in Human Population Growth

The graph in **Figure 12** on the last page is somewhat deceptive. Population trends can be altered by events such as disease and war. **Figure 13** (next page) shows a few historical events that have changed population trends. **Figure 12** could also easily be misinterpreted because human population growth is not the same in all countries. However, population growth trends are often similar in countries that have similar economies.

For example, one trend that has developed during the previous century is a change in the population growth rate in industrially developed countries such as the United States. An industrially developed country is advanced in industrial and technological capabilities and has a population with a high standard of living. Criteria for determining developed countries include average national income, individual average health and education, and national export and import of goods.

In its early history, the United States had a high birthrate and a high death rate. It was not uncommon for people to have large families and for individuals to die by their early forties. Many children also died before reaching adulthood. Presently, the birthrate in the United States has decreased dramatically and the life expectancy is greater than seventy years. This change in a population from high birth and death rates to low birth and death rates is called a **demographic transition.**

MATH Connection How do population growth rates (PGR) compare in industrially developed countries and developing countries? As an example, we will compare the 2008 populations for the United States and Honduras, a small country in Central America. The calculation for PGR is

$$\frac{\text{birthrate} - \text{death rate} + \text{migration rate}}{10} = \text{PGR (\%)}$$

In our example, we'll have to divide the final answer by 10 to get a percentage because the rates are calculated per 1000. The United States has birthrate 14.1 (per 1000), death rate 8.3 (per 1000), and migration rate 2.9 (per 1000). This gives a PGR of 0.87 percent for the United States. Honduras has birthrate 26.9 (per 1000), death rate 5.4 (per 1000), and migration rate -1.3 (per 1000). This gives a PGR of 2.02 percent for Honduras.

Get It?

Compare the population growth rates in the United States and the United Kingdom, which has a birthrate of 12 (per 1000), death rate 8.8 (per 1000), and migration rate 2.5 (per 1000).

WORD ORIGINS

demography

demo– from the Greek word *demos*; meaning *people*

–agraphy from the French word *graphie*; meaning *writing*

Question 16,17, 25

Page 139

Population Growth Rate (PGR)

Calculated per 1000

The calculation for PGR

$$\frac{\text{Birth rate - death rate + migration rate}}{10} = \text{PGR (\%)}$$

Find PGR for the countries:

United States

The birthrate 14.1(per1000)
death rate 8.3 (per1000)
and migration rate 2.9 (per1000)

$$\frac{14.1 - 8.3 + 2.9}{10} = 0.87\ (\%)$$

Honduras

The birthrate 26.9(per1000)
death rate 5.4 (per1000)
and migration rate -1.3 (per1000)

$$\frac{26.9 - 5.4 + (-1.3)}{10} = 2.02\ (\%)$$

Question 16,17, 25

Page 139

The change in a population from high birth and death rates to low birth and death rates is called a.....

يسمى التغيير في عدد السكان من معدلات المواليد والوفيات المرتفعة إلى معدلات المواليد والوفيات المنخفضة بـ .....

A. demographic formation
B. demographic transition
C. demographic position
D. demographic illustration

Question 18

Figure 15

Page 143

Another important factor in keeping the human population at or below the carrying capacity is the amount of resources from the biosphere that are used by each person. Currently, individuals in industrially developed countries use far more resources than those individuals in developingv countries, as shown in **Figure 15**. This graph shows the estimated amount of land required to support a person through his or her life, including land used for production of food, forest products and housing, and the additional forest land required to absorb the carbon dioxide produced by the burning of fossil fuels. Countries such as India are becoming more industrialized, and they have a high growth rate. These countries are adding more people and are increasing their use of resources. At some point, the land needed to sustain each person on Earth might exceed the amount of land that is available. At that time the human population will likely have exceeded Earth's carrying capacity.

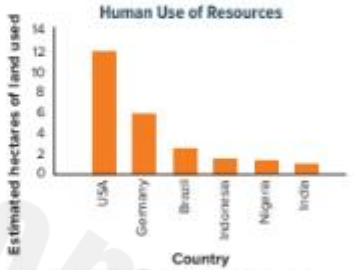


Figure 15 The amount of resources used per person varies around the world.

Check Your Progress

Summary

- Human population growth rates vary in industrially developing countries and industrialized countries.
- Zero population growth occurs when the birthrate and immigration rate of a population equals the death rate and the emigration rate.
- The age structure of the human population is a contributing factor to population growth in some countries.
- Earth has an undefined carrying capacity for the human population.

Demonstrate Understanding

1. **Describe** the change in human population growth over time.
2. **Describe** the differences between the age structure graphs of nongrowing, slowly growing, and rapidly growing countries.
3. **Assess** the consequences of exponential population growth of any population.
4. **Summarize** why the human population began to grow exponentially in the Modern Age.

Explain Your Thinking

5. **Analyze** how a newly emerging disease might affect the population size in an industrially developing and in an already developed country.
6. MATH Connection Construct an age-structure diagram using the following percentages: 0–19 years: 44.7; 20–44 years: 52.9; 45 years and over: 2.4. Which type of growth is this country experiencing?

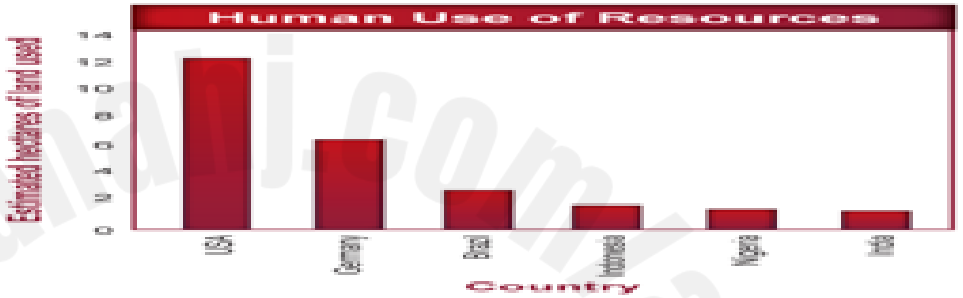
LEARNSMART Go online to follow your personalized learning path to review, practice, and reinforce your understanding.

Question 18

Figure 15

Page 143

19-Based on the information in the graph, infer which statement accurately represents the information provided.



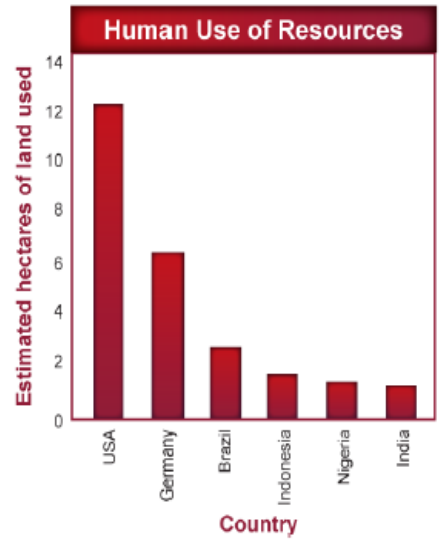
A. India has very little land for farming.
B. Germany is smaller per acre than the United States.
C. More land is used to support an individual in the United States.
D. A person in Indonesia requires more land than a person in Brazil.

Question 18

Figure 15

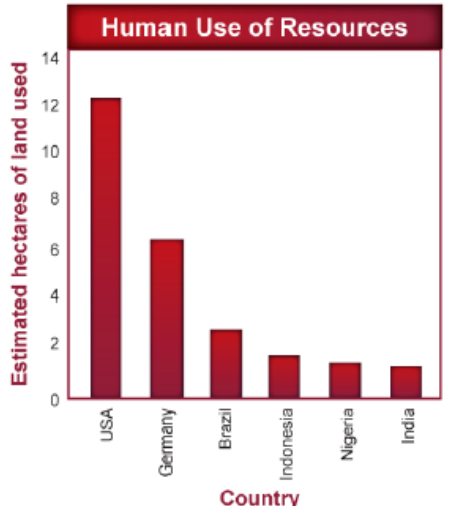
Page 143

Based on the information in the graph, infer which statement accurately represents the information provided.



A. Brazil is smaller per acre than the United States.
B. More land is used to support an individual in Nigeria.
C. A person in India requires less land than a person in Brazil.
D. Nigeria has very little land for farming

Based on the information in the graph, infer which statement accurately represents the information provided.



A. Germany has very little land for farming.
B. India is smaller per acre than the United States.
C. More land is used to support an individual in India.
D. A person in Indonesia requires less land than a person in Brazil.

Question 19,22

Figure 14

Page 142

Age structure

Another important characteristic of any population is its age structure. A population's **age structure** is the number of males and females in each of three age groups: pre-reproductive stage, reproductive stage, and post-reproductive stage. Humans are considered to be pre-reproductive before age 20 even though they are capable of reproduction at an earlier age. The reproductive years are considered to be between 20 and 44, and the post-reproductive years are after age 44.

Analyze the age structure diagrams for three different representative countries in **Figure 14**. The age structure diagrams are typical of many countries in the world. Notice the shape of the overall diagram for a country that is rapidly growing, one that is growing slowly, and one that has reached negative growth. The age structure for the world's human population looks more like that of a rapidly growing country.

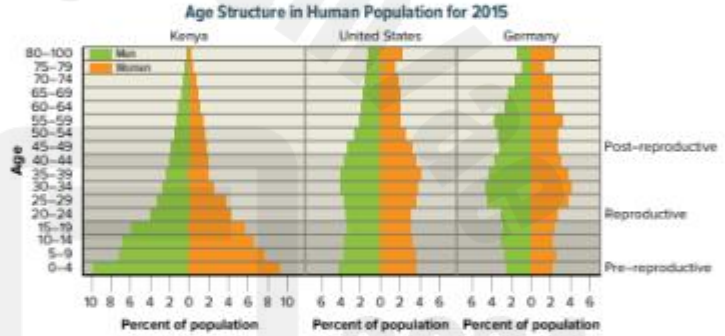


Figure 14 The relative numbers of individuals in pre-reproductive, reproductive, and post-reproductive years are shown for three representative countries.

Get It?

Compare and contrast the age structures of the countries shown in **Figure 14**.

Earth's carrying capacity for humans

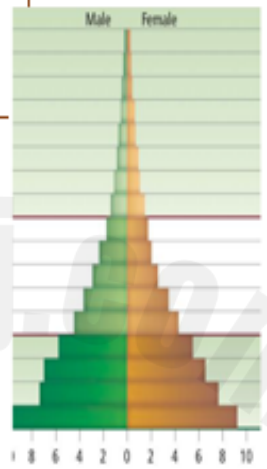
Calculating population growth rates is not just a mathematical exercise. Scientists are concerned about the human population reaching or exceeding the carrying capacity. As you learned in Lesson 1, all populations are limited by the carrying capacity of their ecosystems, and the human population is no exception. Many scientists suggest that human population growth needs to be reduced. In many countries, voluntary population control is occurring through family planning. Unfortunately, if the human population continues to grow—as most populations do—and areas become overcrowded, disease and starvation will occur. However, technology has allowed humans to increase the carrying capacity of Earth, at least temporarily. It might be possible for technology and planning to keep the human population at or below Earth's carrying capacity.

Question 19,22

Figure 14

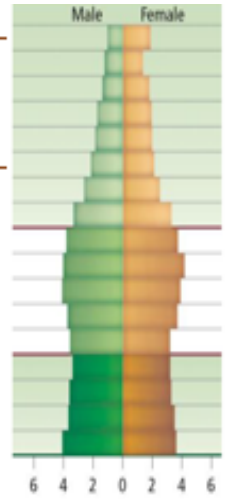
Page 142

9-What is the type of growth in human population?



A. Negative growth
B. Rapid growth
C. Slow growth
D. All of the above

10-What is the type of growth in human population?

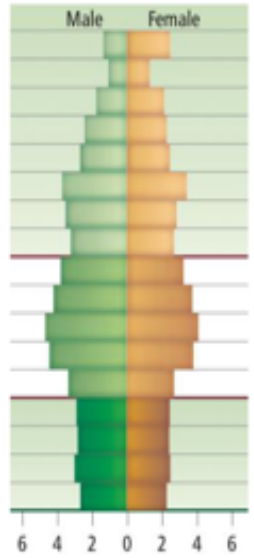


A. Negative growth
B. Rapid growth
C. Slow growth
D. All of the above

11-Describes the relative numbers of organisms of each age within a population and is often represented by a graph

A. Demographic transition
B. Population growth rate
C. Age structure diagram
D. Fertility rate

12-What is the type of growth in human population?



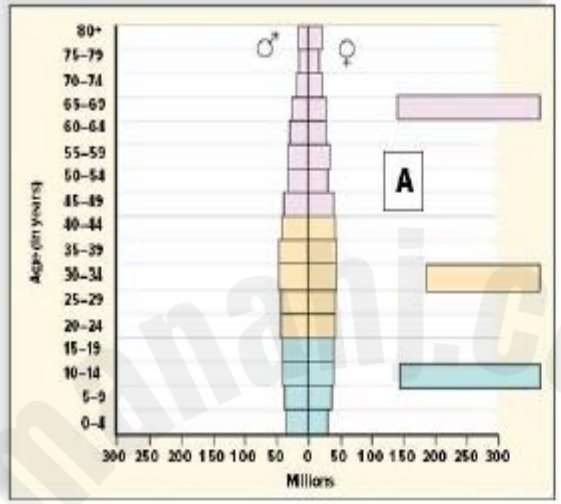
A. Negative growth
B. Rapid growth
C. Slow growth
D. All of the above

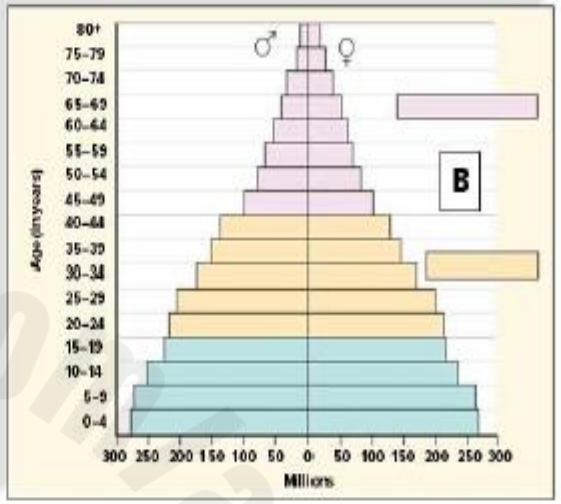
Question 19,22

Figure 14

Page 142

17) Which of these diagrams represents an age structure diagram of more-developed countries?





- A) Diagram A
- B) Diagram B

5) What is the age structure diagram for a population that has a birthrate higher than its death rate and larger population in prereproductive ages than in reproductive and postreproductive ages?

- A) This population can expect to see a pyramid-shaped diagram that will cause the population to grow in the near future.
- B) This population can expect to see an urn-shaped diagram that will cause the population to grow in the future.
- C) This population can expect to see a bell-shaped diagram that will cause the population to grow in the future.
- D) This population can expect to see a pyramid-shaped diagram that will cause the population to decrease in the future.
- E) This population can expect to move into a logistic growth curve in the near future.

Question 19,22

Figure 14

Page 142

In the age structure of the human population, the age group that has the working population is the .....

في الهيكل العمري للسكان ، فإن الفئة العمرية التي تضم السكان العاملين هي .....

A. Pre-reproductive stage
B. Reproductive stage
C. Post-reproductive stage

In the age structure of the human population, the age group that has the eldest population is the .....

A. Pre-reproductive stage
B. Reproductive stage
C. Post-reproductive stage

In the age structure of the human population, the age group that has the youngest population is the .....

A. Pre-reproductive stage
B. Reproductive stage
C. Post-reproductive stage

Question 20

Page 137

LESSON 2
HUMAN POPULATION

FOCUS QUESTION
What factors affect human population growth?

Human Population Growth

The study of human population size, density, distribution, movement, and birth and death rates is **demography** (de MAH grə fee). The graph in **Figure 11** shows demographers' estimated human population on Earth for several thousand years.

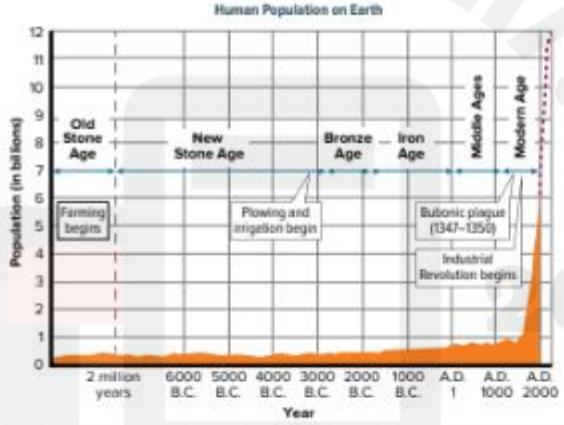


Figure 11 The human population on Earth was relatively constant until recent times, when the population began to grow at an exponential rate.

3D THINKING DCI Disciplinary Core Ideas CCC Crosscutting Concepts SEP Science & Engineering Practices

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Plan and carry out an investigation to determine the cause and effect of population trends.
Quick Investigation: Evaluate Factors
Analyze and interpret data to determine the factors that affect population growth.

Question 20

Page 137

6-The study of the size, density, distribution, and movement of the human population is _____.

A. bioinformatics
B. demography
C. ecology
D. ethnography

Question 21,23

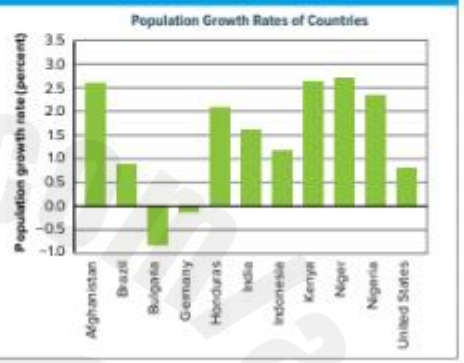
Table 1

Page 141

Table 1 Population Growth Rates of Countries

Country	Population Growth Rate (percent)
Afghanistan	2.63
Brazil	0.98
Bulgaria	−0.81
Germany	−0.04
Honduras	2.02
India	1.58
Indonesia	1.18
Kenya	2.76
Niger	2.88
Nigeria	2.38
United States	0.88

Location



Population growth models predict that the total number of people added to the world population in developing countries will be greater than the total number of people added in the industrially developed countries. For example, between now and 2050, the developing country Niger—shown in **Table 1**—will be one of the fastest growing countries. Assuming that the growth rate remains the same, its population is expected to expand from 13 to 53 million people. The industrially developed country Bulgaria is expected to have a population decline from seven to five million people in the same time period.

Zero population growth

Another trend that populations can experience is zero population growth. **Zero population growth** (ZPG) occurs when births plus immigration equals deaths plus emigration for a generation. This will mean that the population has stopped growing, because births and deaths occur at the same rate. Once the world population reaches ZPG, the age structure eventually should be more balanced with numbers at pre-reproductive, reproductive, and post-reproductive ages being approximately equal.

Zero population growth is a goal of many countries and societies. Many population planners and environmentalists believe that ZPG will contribute to the sustainability of Earth's ecosystems.

CCC CROSSCUTTING CONCEPTS

Scale, Proportion, and Quantity Carefully study the data presented in **Table 1**. Research to find the current population of each of these countries. Assuming that the growth rate remains the same, determine what the population of these countries will be in 10 years. Select a country that you think has a problematic trend and prepare a report for its government summarizing the population trend for the next decade. Use your evidence to identify potential problems and suggest solutions for these problems.

STUDY TIP

Interactive Reading As you read, write three questions about human population dynamics. The questions should begin with why, how, where, or when. Ask a partner the questions about the content in the module.

Question 21,23

Table 1

Page 141

8) The population growth rate is negative when

- A) birthrate is greater than death rate.
- B) death rate is greater than birthrate.
- C) all couples are married but average fewer than two children apiece.
- D) a country becomes poorer, because it is related to economic growth.
- E) better health care reduces the death rate and increases survivorship of newborns.

2-When does zero population growth occur?

A. when birth rate equals death rate
B. when death rate exceeds birth rate
C. when birth rate exceeds death rate
D. when there are zero births

Once the world population reaches ZPG, the age structure eventually should be.....

A. unbalanced with numbers at pre-reproductive, reproductive ages are less than the post-reproductive age group.
B. unbalanced with numbers at pre-reproductive, reproductive ages are more than the post-reproductive age group.
C. balanced with numbers at pre-reproductive, reproductive, and post-reproductive ages being approximately equal.

Question 21,23

Table 1

Page 141

8-What will happen to the human population when the birthrate equals the death rate?

A. CDC
B. HPG
C. PGR
D. ZPG

1-What term is used to describe the number of individuals moving into a population?

A. emigration
B. imitation
C. immigration
D. migration

Question 21,23

Table 1

Page 141

Countries that will add more people to the world population are the .....

A. developing countries
B. industrially developed countries.
C. large sized countries
D. Small sized countries

Population growth trends are often similar in countries that have similar.....

غالبًا ما تكون اتجاهات النمو السكاني متشابهة في البلدان التي لديها نفس .....

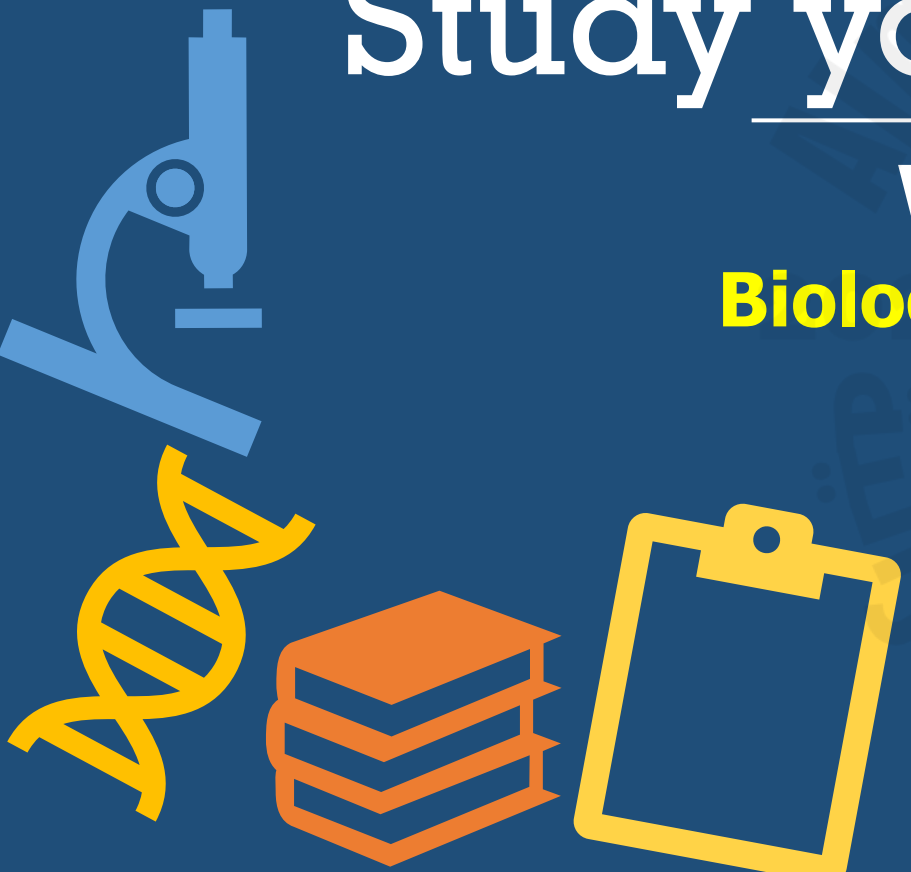
A. economies الاقتصاد
B. area
C. position
D. ethnicity عرق

الإمارات العربية المتحدة
وزارة التربية والتعليم

Remember…
Study your textbook First!

With my best wishes

Biology Teacher\ May Hossam



School Principal
Salama Khalfan Al Mazrouei