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QUESTION 1

Read the text attached.

Passage 1

Critical information needed in fight to save wildlife

With global temperatures rising, an international group of 22 top biologists is calling for a coordinated effort to gather important species information that is urgently needed to improve predictions for the impact of climate change on future

biodiversity. Current predictions fail to account for important biological factors like species competition and movement that can have a profound influence on whether a plant or animal survives changes to its environment, the scientists say in

the September 9 issue of the journal Science. While more sophisticated forecasting models exist, much of the detailed species information that is needed to improve predictions is lacking.

"Right now, we\\'re treating a mouse the same way as an elephant or a fish or a tree. Yet we know that those are all very different organisms and they are going to respond to their environment in different ways," says University of Connecticut

Ecologist Mark Urban, the Science article\\'s lead author. "We need to pull on our boots, grab our binoculars, and go back into the field to gather more detailed information if we are going to make realistic predictions."

The 22 top biologists affiliated with the article identify six key types of biological information, including life history, physiology, genetic variation, species interactions, and dispersal, that will significantly improve prediction outcomes for individual

species. Obtaining that information will not only help the scientific community better identify the most at-risk populations and ecosystems, the scientists say, it will also allow for a more targeted distribution of resources as global temperatures

continue to rise at a record rate.

Current climate change predictions for biodiversity draw on broad statistical correlations and can vary widely, making it difficult for policymakers and others to respond accordingly. Many of those predictions tend not to hold up over time if they

fail to account for the full range of biological factors that can influence an organism\\'s survival rate: species demographics, competition from other organisms, species mobility, and the capacity to adapt and evolve.

"We haven\\'t been able to sufficiently determine what species composition future ecosystems will have, and how their functions and services for mankind will change," says co-author Dr. Karin Johst of the Helmholtz Centre for Environmental

Research and the German Centre for Integrative Biodiversity Research. "This is because current ecological models often do not include important biological processes and mechanisms: so far only 23 percent of the reviewed studies have

taken into account biological mechanisms."

Generating more accurate predictions is essential for global conservation efforts. Many species are already moving to higher ground or toward the poles to seek cooler temperatures as global temperatures rise. But the capacity of different

organisms to survive varies greatly. Some species of frog, for instance, can traverse their terrain for miles to remain in a habitable environment. Other species, such as some types of salamander, are less mobile and capable of moving only a

few meters over generations.

"New Zealand\\'s strong foundation in ecological research will help," explains study co-author Dr. William Godsoe, a Lincoln University lecturer and member of New Zealand\\'s Bio-Protection Research Centre. "One of our hopes is to build on

these strengths and highlight new opportunities to improve predictions by explicitly considering evolution, interactions among species, and dispersal." This will aid in the development of strategies to manage impacts on species and

ecosystems before they become critical.

With more than 8.7 million species worldwide, gathering the necessary biological information to improve predictions is a daunting task. Even a sampling of key species would be beneficial, the authors say, as the more sophisticated models

will allow scientists to extrapolate their predictions and apply them to multiple species with similar traits.

The researchers are calling for the launch of a global campaign to be spearheaded by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services or IPBES. The IPBES operates under the auspices of four United

Nations entities and is dedicated to providing scientific information to policymakers worldwide. One thousand scientists from all over the world currently contribute to the work of IPBES on a voluntary basis. The scientists are also encouraging

conservation strategies to support biodiversity such as maintaining dispersal corridors, and preserving existing natural habitats and genetic diversity.

"Our biggest challenge is pinpointing which species to concentrate on and which regions we need to allocate resources," says UConn Associate Professor Urban. In an earlier study in Science, Urban predicted that as many as one in six

species internationally could be wiped out by climate change. "We are at a triage stage at this point. We have limited resources and patients lined up at the door."

Passage 2

Forecasting climate change\\'s effects on biodiversity hindered by lack of data

An international group of biologists is calling for data collection on a global scale to improve forecasts of how climate change affects animals and plants. Accurate model predictions can greatly aid efforts to protect biodiversity from

disturbances such as climate change and urban sprawl by helping scientists and decision-makers better understand, anticipate and respond to threats that imperil species and ecosystems.

In a paper published in Science on Thursday (Sept. 8), biologists cite a critical lack of data on key biological mechanisms ?such as how animals and plants spread during their lifetime and how they evolve in response to changes in the

environment - as the main obstacle to improving models\\' ability to forecast species\\' response to climate change.

"This paper is a call to arms," said Patrick Zollner, article co-author and Purdue associate professor of wildlife science. "The world is in dire circumstances. We\\'re losing a lot of species, and we\\'re largely unaware why. How do we need to

rethink the kind of data we\\'re collecting so we can take advantage of modern modeling tools to understand the outcomes of climate change for ecological systems? This could help us forestall losing wildlife that we later deeply regret."

The group outlines two key problems that hinder the capability of current models to make realistic predictions about biological responses to climate change.

Most models are descriptive, based on statistical correlations and observations, and fail to capture the underlying processes that produce observed changes. For example, a descriptive model might show that lynx in the northern U.S. are

declining while bobcat populations in the same region are on the rise. Understanding what is driving this change requires a different sort of model, one that incorporates biological mechanisms. A mechanistic model that accounts for how

warming temperatures affect snow depth, for instance, could provide insights into why bobcats - better adapted to habitats with less snow - are gaining a competitive edge over lynx. But 77 percent of current models of climate change\\'s

impacts on wildlife do not include biological mechanisms.

Another challenge is that as models have grown in sophistication, they have far outpaced data collection. Put another way, a model is like a state-of-the-art kitchen, but the cupboards are bare.

"We can now build videogame-like environments with computers where we can create multiple versions of Earth and ask what the implications under different scenarios are," Zollner said. "But our ability to learn from these tools is constrained

by the kinds of data we have."

The group advanced several proposals on how to improve models, collect missing data and leverage available data to make broader predictions.

They identified six biological mechanisms that influence wildlife\\'s responses to climate change: physiology; demography and life history; evolutionary potential and adaptation; interactions between species; movement over land or water; and

responses to changes in the environment. They ranked the information needed to account for these mechanisms in models and suggested proxies for data that are missing or hard to collect.

A globally coordinated effort to fill data gaps could greatly advance improvements in models and informed conservation approaches, the researchers wrote. They point to the Intergovernmental Panel on Climate Change and its consistent

improvements in climate change modeling as a valuable blueprint for such a project.

But local and regional conservation groups need not wait for a global body to coalesce to start using a mechanistic approach in their own region, Zollner said "If the ideas put forth in this paper start to be adopted and integrated into climate

change work in a grass roots way, that could make a big difference in a region and could scale up over time," he said.

Citizen scientists also have an important role to play in pitching in with data collection, he said.

Working with citizen scientists offers "an opportunity to get huge amounts of data, and it\\'s foolish not to take advantage of it," Zollner said. "The data might not be as rigorous and needs to be treated differently, but it\\'s one more source of

valuable information.

Reread this excerpt from Passage 2 in the attached text.

"Working with citizen scientists offers "an opportunity to get huge amounts of data and it\\'s foolish not to take advantage of it," Zollner said. "The data might not be as rigorous and needs to be treated different, but it\\'s one more source of

valuable information." Which statement best describes what the phrase "citizen scientists" most likely means?

A. Citizens of the United States or other country belonging to the UN and who work as scientists in their own or another country.

B. Trained scientists who may not currently work in the field of science but who have a university degree in a scientific field and whose research can therefore be relied upon by current scientists.

C. People with a passion for science who may not have specific scientific training but who can gather information that can be used by trained scientists in their research and study of environment.

D. Students who have not yet earned their degrees in science, but who are training for a career in science and who understand the basics of scientific research.

Correct Answer: C

QUESTION 2

Read the paragraph attached.

Teeth Grinding Can Be A Real Headache

Did you know that if you suffer from nagging headaches ?including migraines, tension headaches and behind-the-eye pain ?your teeth could be the root of your problem? Involuntary and excessive clenching and grinding of the teeth (known in medical terms as bruxism) is a common condition, so prevalent that it affects 1 in 5 adults in the U.S. And this number continues to increase. It\\'s probably no surprise to learn that bruxism can result in significant tooth wear and enamel erosion, leading to tooth surface sensitivity, chipped and fractured teeth, as well as a host of other dental issues that may require expensive treatment. But, what you may not realize is that over 90 percent of bruxism sufferers also experience headache pain caused by their teeth grinding. If you think about it, the link between teeth and jaw clenching, and headaches caused by teeth grinding, makes a lot of sense. Because the jaw is capable of exerting more than 250 pounds of force when clenching, this amount of force can crack a walnut. This extreme tooth-on-tooth force helps explain tooth wear caused by teeth grinding and may also lead to temporomandibular joint (TMJ) pain and potential TMJ issues from teeth grinding. The temporomandibular joints are flexible joints found on each side of your head in front of the ear. Responsible for all jaw movements including eating and talking, they are the most active joints in your body and thus endure a lot of wear and tear. They connect the lower jaw to the temporal bone of the skull. Excessive teeth clenching and grinding, which generally occurs during sleep, puts pressure on these joints and as a result can cause far-reaching pain in your temples, behind the eyes, in the back of your neck and through your cheeks and ears. The exact cause of bruxism is not known, but it is widely believed that stress is a primary trigger and once the stressful event has passed, the clenching and grinding usually subsides. However, the amount of damage and tooth wear caused by teeth grinding that can be done within a brief period can be significant. That is why it is so important that you seek treatment once you realize you are a teeth grinder, not only to stop your nagging headache pain, but also to prevent any further damage to your teeth. While there is no medication currently available to treat bruxism, dental experts recommend wearing a dental grind guard to protect the teeth from further damage and potentially help alleviate TMJ pain.

Which of these sentences from the attached text would best support the claim that teeth clenching or grinding should not be ignored as it can cause lasting damage?

A. While there is no medication currently available to treat bruxism; dental experts recommend wearing a dental grind guard to protect the teeth from further damage and potentially help alleviate TMJ pain.

B. Involuntary and excessive clenching and grinding of the teeth (known in medical terms as bruxism) is a common condition, so prevalent that it affects 1 in 5 adults in the U.S.

C. It\\'s probably no surprise to learn that bruxism can result in significant tooth wear and enamel erosion, leading to tooth surface sensitivity, chipped and fractured teeth, as well as a host of other dental issues that may require expensive treatment.

D. Because the jaw is capable of exerting more than 250 pounds of force when clenching, this amount of force can crack a walnut.

Correct Answer: C

QUESTION 3

A certain sequence is defined this way:

f(1) = 2 and f(n) = f(n ? 1) +3

Which of the following statements are true?

a) The sequence is arithmetic.

b) The sequence is geometric.

c) The definition is explicit.

d) The definition is recursive.

e) The 7th term is 20.

f) The 5th term is 12 more than the first term

A. b, c, e, f

B. a, d, e, f

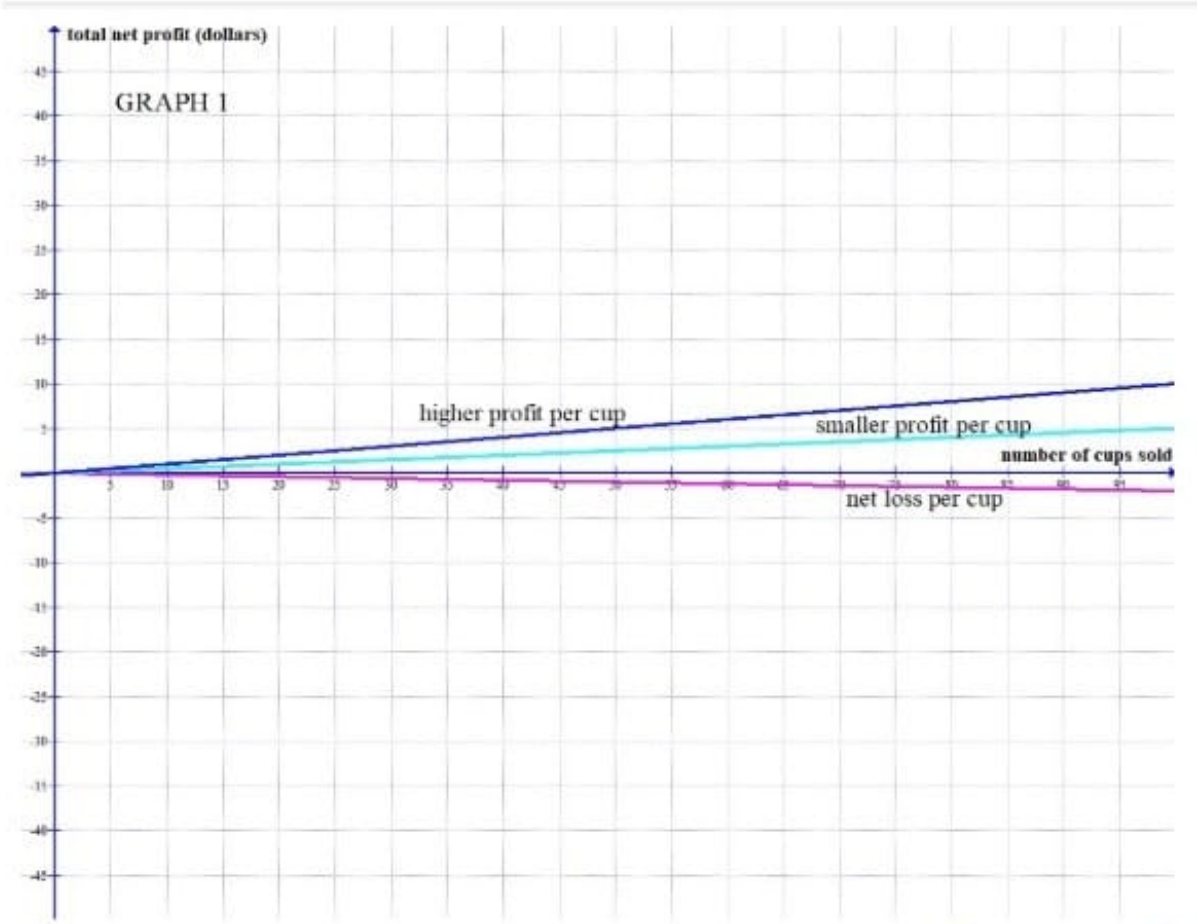
C. a, c, f

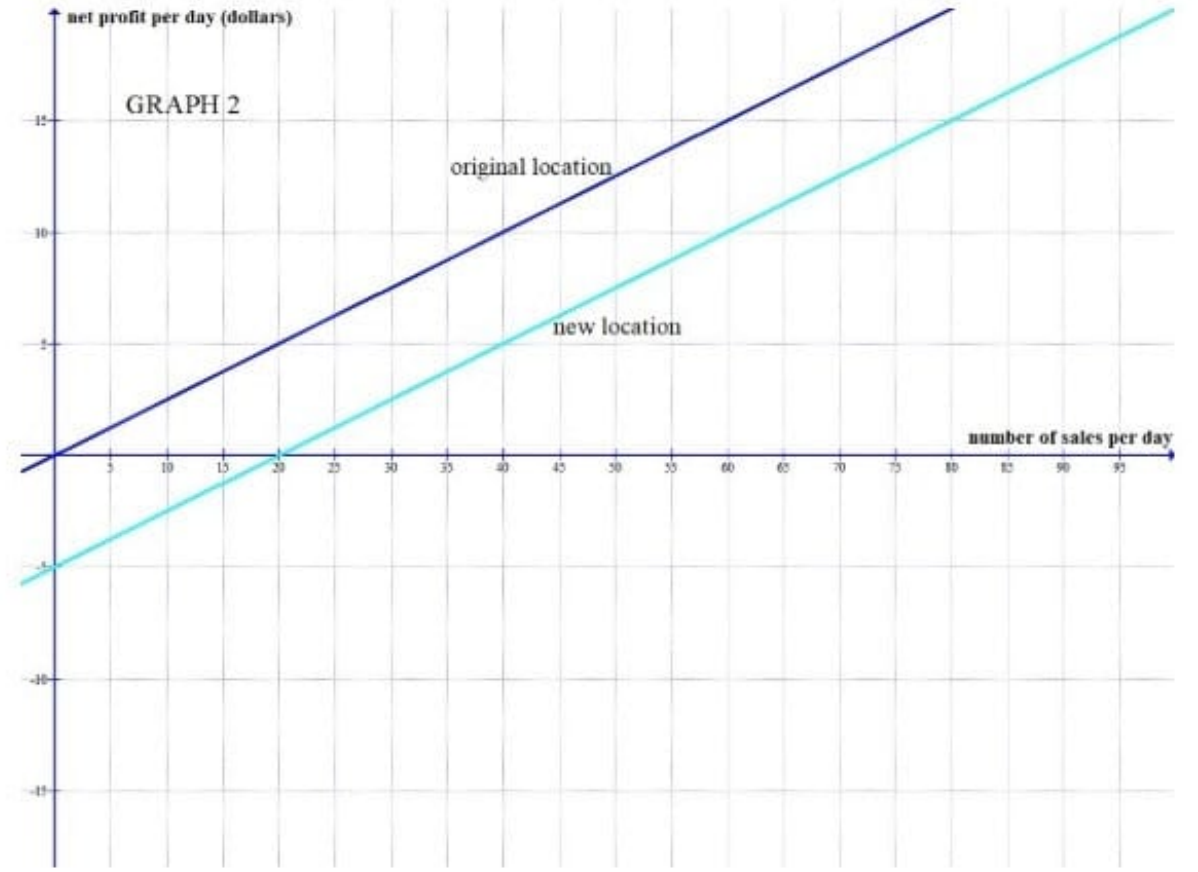
D. b, d, e

Correct Answer: B

QUESTION 4

Aimee plans to open a lemonade stand. She wants to determine whether to sell an 8 ounce or 10 ounce cup of lemonade. Each 8-ounce cup costs 2 cents and 10 ounce cups are 3 cents each. The lemons to make a half-gallon of lemonade cost 5 dollars and the sugar for the half-gallon costs 85 cents. She already has all the materials needed to make the stand and she can use the location at no cost. Aimee notices that about 150 people pass by the location of her stand each day and thinks that 20 percent of these people will buy a cup of lemonade. You have made the 2 accompanying graphs to help Aimee make business decisions.


total net profit (dollars)
GRAPH 1
higher profit per cup
smaller profit per cup
number of cups sold
net loss per cup


net profit per day (dollars)
GRAPH 2
original location
new location
number of sales per day

Read the attached passage and consult the attached graphs. Joshua tells Aimee to sell at a small loss and people will like the deal so much that she will sell lots of cups and still make lots of money. Use one of the attached graphs to explain to him why this is wrong.

A. Graph 2 shows that even if profit starts below zero it will go above zero at some point.

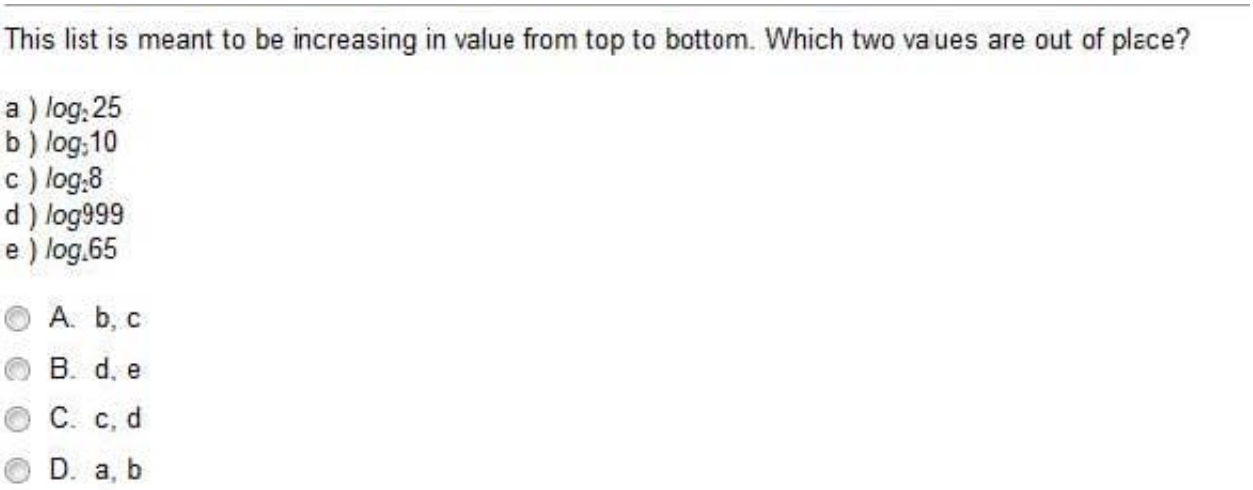
B. Graph 2 shows that a smaller profit eventually will give more income than a larger profit.

C. Graph 1 shows that selling at a net loss per cup will never reach a positive value no matter how many cups are sold.

D. Graph 1 shows that the amount lost is very small.

Correct Answer: C

QUESTION 5



A. Option A

B. Option B

C. Option C

D. Option D

Correct Answer: C