

# 1

# BIOMIMICRY

## Vocabulary 360°

heal	לרפא	resident	תושב
pond	מאגר מים קטן, בריכה קטנה	roll off	להתגלגל מ-, להחליק מ-
precise	מדויק	tightly	בחוזקה, בצורה הדוקה
remarkable	יוצא דופן, מרשים	wound (n, v)	פצע, לפצוע

### A Choose the best ending for each sentence.

- The children ran toward the **pond** to ...
  - feed the ducks.
  - warm their hands.
- The young pianist gave a **remarkable** performance, so the audience ...
  - left early.
  - stood up and clapped.
- Look at my **wound**. It is still ...
  - quiet.
  - painful.
- The **residents** complained that ...
  - the streets were not clean.
  - the homework was not clear.
- Snow started to **roll off** the roof as the temperature ...
  - rose.
  - went down.
- The package was wrapped so **tightly** that ...
  - it became much lighter.
  - it was difficult to open.
- Her knee began to **heal** after ...
  - she rested for several days.
  - she ran long distances.
- Please give me the **precise** time of the meeting. I need to know ...
  - if it is in the morning.
  - the exact hour.

artificial	מלאכותי	inspiration	השראה
as a result	כתוצאה מכך	lesson	לקח, שיעור
cell	תא	manufacture	לייצר
explore	לחקור	overall (adj)	כולל, מקיף
glue (n)	דבק	place (v)	למקם, להניח

## B Match A to B to make sentences.

### A

1. **Artificial** flowers can look very real ...
2. **As a result** of the strong winds, ...
3. Red blood **cells** are very important ...
4. You need to use very strong **glue** ...
5. We learn important **lessons** ...
6. The **overall** cost of the trip ...
7. You should **place** the plant ...
8. The artist got the **inspiration** for his colorful painting ...
9. Scientists are trying to **explore** the ocean floor ...
10. The company will **manufacture** school bags ...

### B

- ..... a. was higher than we had expected.
- ..... b. and stay beautiful for years.
- ..... c. near the window so it gets enough sunlight.
- ..... d. to fix this wooden chair.
- ..... e. because they carry oxygen to all parts of the body.
- ..... f. from the mistakes we make.
- ..... g. a large tree fell and blocked the main road.
- ..... h. that are both light and strong.
- ..... i. using special robots that can survive underwater.
- ..... j. from watching the sunset.

**A** Read the following article.

## LEARNING FROM NATURE

**I** For thousands of years, plants and animals have developed remarkable ways to survive in their environments. Scientists and engineers have long looked to nature for new ideas, but today this practice has become a serious area of modern research. The approach is called biomimicry, which means imitating life. "In biomimicry, researchers explore how living things solve problems and then get inspiration for technological advances from those solutions," says Janine Benyus, a leading expert on biomimicry.

**II** One of the clearest examples of biomimicry comes from the lotus flower, which grows in muddy ponds. Even in dirty water, its leaves stay perfectly clean. Scientists were curious how this was possible. When they looked at a lotus leaf under a powerful microscope, they found something surprising. The surface of each leaf is covered with thousands of tiny bumps. Because of these bumps, muddy water touches only a very small part of the leaf and cannot stick to it easily. As a result, the muddy drops of water quickly roll off the leaf instead of making it dirty. This discovery has been used to develop special windows with surfaces that work in a similar way. When it rains, the water rolls off the glass and actually helps to remove dust and dirt from the windows.

**III** Biomimicry has also given doctors new ways to heal wounds. Mussels are small sea animals that hold tightly to rocks in the ocean by producing a special glue. This glue sticks strongly to wet surfaces and even kills harmful bacteria. Spanish scientists at the ICN2 Institute analyzed the mussels' glue and created a thin artificial skin with similar qualities. When doctors place it on a burn or a cut, it sticks tightly, fights bacteria, and helps the body create new healthy skin cells. To find out how effective the artificial skin was, scientists carried out a series of tests. The tests showed that wounds treated with the artificial skin healed twice as fast as wounds treated with traditional methods.

**IV** Nature has also inspired train designers. Japan's Shinkansen bullet train was very fast, but every time it came out of a tunnel, it made a loud noise that disturbed nearby residents. The chief engineer, Eiji Nakatsu, was an amateur birdwatcher. He thought about the kingfisher, a small bird that dives from the air into water to catch fish. The kingfisher's long beak helps it cut smoothly through both air and water. As a result, the bird can enter the water quietly, making almost no noise or splash. The engineer took this idea and gave the front of the bullet train a similar "beak" shape. This shape helped the train leave tunnels much more quietly, so nearby residents were no longer bothered by the loud noise. In addition, the new design improved the train's overall performance. The train became 10% faster and used 15% less electricity.

**V** However, copying nature is harder than it seems. Living animals and plants use materials that scientists cannot easily copy in the laboratory. Spider silk, for example, is stronger than steel, but no factory in the world has been able to manufacture it successfully. Sometimes scientists also discover that they do not fully understand how the natural system works. "Nature is very complex, and trying to create a precise copy of it is a great challenge," says Janine Benyus. However, scientists believe that nature still has many more lessons to teach us. The inspiration for the next great invention may be somewhere in nature — just waiting to be discovered.

## B Answer the questions.

1. What do we learn in paragraph I?
  - i) What new ideas scientists have found.
  - ii) How the natural world helps scientists.
  - iii) What problems scientists cannot solve.
  - iv) How biomimicry helps living things survive.
2. What do we learn from paragraph II about the lotus flower? Give ONE answer.  
COMPLETE THE SENTENCE.  
We learn why .....
3. The writer refers to “special windows” in line 13. What makes these windows special?
  - i) Their strong structure.
  - ii) The material they are made of.
  - iii) The way their surface is designed.
  - iv) The company that makes them.
4. What is true about the mussels' glue? (paragraph III)  
Put a ✓ by the TWO correct answers.
  - ..... i) It contains bacteria.
  - ..... ii) It is part of the mussels' skin.
  - ..... iii) It is strong.
  - ..... iv) It helps mussels heal.
  - ..... v) It is artificial.
  - ..... vi) It works on surfaces covered with water.
5. What advantage did the artificial skin have over traditional treatments? (paragraph III)  
COMPLETE THE SENTENCE.  
The healing process took .....
6. What do we learn about the kingfisher in paragraph IV?
  - i) Why it disturbed nearby residents.
  - ii) When it makes a loud splash.
  - iii) How it enters the water.
  - iv) How its beak helps it stay underwater.
7. Why did the train's new shape benefit the residents living near the tunnels? (paragraph IV)  
COMPLETE THE SENTENCE.  
Because the train became .....
8. Why is spider silk mentioned in paragraph V?  
COMPLETE THE SENTENCE.  
To show that biomimicry .....

## Wh- Options

In the Bagrut exam, some multiple-choice questions are written as “mini-questions” that begin with question words such as *why, where, how*, etc.

**To answer these questions accurately, follow these steps:**

1. Identify the paragraph the question refers to and read it carefully.
2. Treat each answer choice as a separate open question and imagine a question mark at the end.
3. Go back to the paragraph and try to answer each choice. It is recommended to write a short answer next to each option.
4. On the right side, put a  $\checkmark$  if you found the answer in the paragraph, or an X if you did not find the answer.
5. Only after checking all the options carefully, circle the correct answer.

בבחינת הבגרות מופיעות שאלות רב ברירה (שאלות אמריקאיות) שבהן האפשרויות מנוסחות כ"מיני-שאלות" המתחילות במילות שאלה, כגון: why, where, how וכדומה.

### לעבודה מדויקת, פעלו לפי השלבים הבאים:

1. זהו את הפסקה שאליה השאלה מפנה וקראו אותה היטב.
2. התייחסו לכל אפשרות כאל שאלה פתוחה העומדת בפני עצמה והוסיפו לה סימן שאלה דמיוני.
3. חזרו לפסקה ונסו לענות על כל אחת מהאפשרויות. מומלץ לכתוב "תשובה קצרה" ליד כל סעיף.
4. בצד ימין, סמנו  $\checkmark$  אם מצאתם את התשובה, או X אם לא מצאתם את התשובה.
5. רק לאחר שבדקתם את כל האפשרויות, הקיפו את התשובה הנכונה.

### קעת נפתור שוב שאלה 1 בעמוד 9 לפי האסטרטגיה הזו:

1. What do we learn in paragraph I?
  - i) What new ideas scientists have found.  
איזה רעיונות חדשים מדענים גילו? אין לכך תשובה בפסקה. **נסמן X**
  - ii) How the natural world helps scientists.  
איך עולם הטבע עוזר למדענים? יש תשובה לכך בפסקה:  
חוקרים בוחנים כיצד יצורים חיים פותרים בעיות ומקבלים השראה מהפתרונות הללו. **נסמן  $\checkmark$**
  - iii) What problems scientists cannot solve.  
אילו בעיות מדענים לא יכולים לפתור? אין לכך תשובה בפסקה. **נסמן X**
  - iv) How biomimicry helps living things survive.  
כיצד ביומימיקרי עוזר ליצורים חיים לשרוד? אין לכך תשובה בפסקה. **נסמן X**

## Strategy in Practice

1. What are we told about mussels in paragraph III?
  - i) What helps them stick to wet surfaces.
  - ii) Why they cannot survive on dry rocks.
  - iii) How scientists discovered them.
  - iv) How they produce healthy skin cells.
2. What are we told about nature in paragraph V?
  - i) Why it remains a source of new ideas.
  - ii) How it became more complex over time.
  - iii) What inventions it has already created.
  - iv) Why it is easier to study than technology.

## Extra Vocabulary 360°

**A** Complete the nouns in the chart below. Use the Hebrew meanings to help you.

Verb	Noun
beg                      להתחנן	1. <i>beggar</i> .....              קבצן, פושט יד
civilize                      להפוך למתורבת, לעדן	2. ....                      ציוויליזציה, תרבות
classify                      לסווג, למיין	3. ....                      סיווג, מיון
dispose of                      להיפטר מ-, להשליך	4. ....                      סילוק, השלכה
possess                      להחזיק, להיות בעלים של	5. ....                      בעלות, החזקה, רכוש
qualify                      להכשיר, לעמוד בדרישות	6. ....                      הכשרה, כישורים
propose                      להציע (רעיון, תוכנית)	7. ....                      הצעה
resist                      להתנגד, לעמוד בפני	8. ....                      התנגדות, עמידה בפני
ship                      לשלוח	9. ....                      משלוח
widen                      להרחיב	10. ....                      רחב

**B** Choose the correct meaning for the sentence in purple.

1. The little boy **begged** his father for one more story.
  - a. He really wanted to hear another story.
  - b. He didn't want to hear more stories.
2. Our teacher believes reading **civilizes** children.
  - a. It improves their memory.
  - b. It improves their behavior.
3. The store's **classification** system makes shopping easier.
  - a. Customers can find shirts, shoes, and bags in separate areas.
  - b. Customers can find the popular items in one large area.
4. The school taught students about proper waste **disposal**.
  - a. Students learned how to handle waste in a safe and responsible way.
  - b. Students learned how to reduce the amount of waste they create.
5. The **width** of the table is perfect for our small room.
  - a. The table is easy to carry.
  - b. The table fits the space well.
6. Only students who **possess** a special card can enter the computer room.
  - a. Students need to have the card with them.
  - b. Students get a card after they enter.
7. The new plan met unexpected **resistance** from workers.
  - a. Not everyone heard about it.
  - b. Not everyone agreed with it.
8. He practiced for months to **qualify** for the music program.
  - a. He hoped to be good enough to enter the program.
  - b. He hoped to become one of the best students in the program.
9. The company uses strong boxes for **shipping**.
  - a. The boxes help workers sell more products.
  - b. The boxes protect the products while they are sent.
10. She **proposed** a new idea for the school project.
  - a. She completed a new plan.
  - b. She suggested a new plan.

**C** Complete the sentences with words from page 9. Make necessary changes.

1. Librarians ..... books into sections so readers can find them easily.
2. Workers had to ..... the tunnel so that larger trucks could pass through it.
3. To save money, you should learn to ..... buying unnecessary things.
4. Cars, factories, and computers are all important parts of modern .....
5. A kind man stopped to give the ..... some money.
6. The store will ..... your order next week.
7. Before moving to their new apartment, they ..... their broken furniture.
8. The committee accepted his ..... after a short discussion.
9. He did not have the right ..... for the job.
10. During the terrible storm, the family lost all their personal .....

<b>develop</b>	לפתח	<b>hook (n)</b>	וו, קרס
<b>experiment (n, v)</b>	ניסוי, לערוך ניסוי	<b>innovation</b>	חידוש, חדשנות
<b>fabric</b>	בד	<b>massive</b>	עצום, גדול מאוד
<b>fasten</b>	לחבר, להדק	<b>observe</b>	להתבונן ב-, לצפות ב-

**D** Complete the passage with the words above. Make necessary changes.

## The Invention of Velcro<sup>\*</sup>

In 1941, a Swiss man named George de Mestral went for a walk. When he returned home, he saw that many small seeds from wild plants were stuck to the <sup>1</sup>..... of his pants.

He wanted to know how these seeds stayed attached to his pants and didn't fall off. He decided to <sup>2</sup>..... the seeds more closely under a microscope. He saw that each seed had a tiny <sup>3</sup>..... at the end. It acted like a small finger that caught the cloth of his pants so it wouldn't fall.

This gave de Mestral a great idea. He decided to <sup>4</sup>..... an invention that worked in the same way. For years, he <sup>5</sup>..... with different materials. Finally, he managed to create an artificial material that worked like the seeds. De Mestral's idea became the famous invention we call Velcro.

Today, millions of people use Velcro every day to <sup>6</sup>..... their bags, coats and shoes. This simple idea turned into a <sup>7</sup>..... success around the world. De Mestral's <sup>8</sup>..... demonstrated how nature can offer simple solutions to complex problems.



\* Velcro - וקרוס

## OPINION COMPOSITION

**Childhood is the most important time of a person's life. Do you agree or disagree with this statement? Write a composition stating and explaining your opinion.**

**A** Read the model composition below. Pay attention to the words in bold.

	Model
Opening Paragraph	<p><b>It has long been debated whether</b> childhood is the most important stage of a person's life. <b>As far as I'm concerned,</b> childhood shapes people more than any other period of life <b>for two fundamental reasons.</b></p>
First Argument	<p><b>First and foremost,</b> childhood is the period when children develop their character and learn good behavior. <b>For example,</b> children who are taught responsibility and respect at a young age are more likely to become successful and independent adults. <b>Therefore,</b> childhood has a major influence on the type of person someone becomes.</p>
Second Argument	<p><b>Another important point is that</b> childhood strongly affects a person's emotional health. <b>Recent studies have shown that</b> children who grow up in supportive environments usually have lower levels of stress as adults. <b>In fact,</b> childhood can shape a person's well-being for many years.</p>
Concluding Paragraph	<p><b>In light of the arguments mentioned above, it's clear that</b> childhood is the most important period of a person's life. <b>There is no doubt that if</b> children grow up in a healthy environment, they <b>will</b> be able to build a better future for themselves.</p>

**B** Read the following chart that explains the purpose of each sentence in an opinion composition.

<p><b>It has long been debated whether</b> childhood is the most important stage of a person's life.</p>	<p>הצגת הנושא (השתמשו במילות המשימה בשינוי קל)</p>	<p><b>פסקת פתיחה</b></p>
<p><b>As far as I'm concerned,</b> childhood shapes people more than any other period of life <b>for two fundamental reasons.</b></p>	<p>נסחו את דעתכם (במילים שונות מהמשפט הראשון)</p>	
<p><b>First and foremost,</b> childhood is the period when children develop their character and learn good behavior.</p>	<p>נסחו את הנימוק הראשון</p>	<p><b>נימוק ראשון</b></p>
<p><b>For example,</b> children who are taught responsibility and respect at a young age are more likely to become successful and independent adults.</p>	<p>תנו דוגמא</p>	
<p><b>Therefore,</b> childhood has a major influence on the type of person someone becomes.</p>	<p>נסחו מסקנה לנימוק הראשון</p>	
<p><b>Another important point is that</b> childhood strongly affects a person's emotional health.</p>	<p>נסחו את הנימוק השני</p>	<p><b>נימוק שני</b></p>
<p><b>Recent studies have shown that</b> children who grow up in supportive environments usually have lower levels of stress as adults.</p>	<p>הציגו מחקר</p>	
<p><b>In fact,</b> childhood can shape a person's well-being for many years.</p>	<p>נסחו מסקנה לנימוק השני</p>	
<p><b>In light of the arguments mentioned above, it's clear that</b> childhood is the most important period of a person's life.</p>	<p>נסחו מחדש את דעתכם במילים אחרות.</p>	<p><b>פסקת סיום</b></p>
<p><b>There is no doubt that if</b> children grow up in a healthy environment, they <b>will</b> be able to build a better future for themselves.</p>	<p>כתבו מה יהיו התוצאות או ההשלכות של דעתכם.</p>	



## Grammar 360°

### THE PASSIVE VOICE

We use the **passive voice** when we want to focus on what is done, not on who does it.

When you are writing a composition, you should include at least **THREE** advanced grammatical structures. The **passive voice** can be one of them.

Below are useful forms of the **passive voice**.

Tense	Active	Passive	Passive Form
Present Simple	Students <b>take</b> exams every year.	Exams <b>are taken</b> every year.	am/is/are + V3
Past Simple	Students <b>took</b> exams last year.	Exams <b>were taken</b> last year.	was/were + V3
Future Simple	Students <b>will take</b> exams next year.	Exams <b>will be taken</b> next year.	will + be + V3
Modals	Students <b>should take</b> exams.	Exams <b>should be taken</b> on time.	Modal + be + V3
ADVANCED:			
Present Progressive	Students <b>are taking</b> exams now.	Exams <b>are being taken</b> now.	am/is/are + being + V3
Past Progressive	Students <b>were taking</b> exams at that time.	Exams <b>were being taken</b> at that time.	was/were + being + V3
Present Perfect	Students <b>have taken</b> exams this year.	Exams <b>have been taken</b> this year.	have/has + been + V3
Past Perfect	Students <b>had taken</b> exams before graduation.	Exams <b>had been taken</b> before graduation.	had + been + V3

**שימו לב:** במשפטי סביל אנו מתמקדים בפעולה או במה שקרה, ולכן בדרך כלל אין צורך לציין מי עשה את הפעולה.

The exams were taken **by students**. **לדוגמה:**

אם חשוב לנו לציין את מבצע הפעולה, נוסיף: מבצע הפעולה + by.

The winners were chosen **by the teacher**. **לדוגמה:**

## Grammar in Practice

### A Change the sentences from active to passive.

1. Schools **teach** important values.  
.....
2. Companies **will use** different kinds of robots in the future.  
.....
3. Teachers **should encourage** students to express their opinions.  
.....
4. Human activity **causes** many environmental problems.  
.....
5. People **can avoid** some mistakes with better planning.  
.....
6. Many schools around the world **require** uniforms.  
.....
7. My teacher **encouraged** me to participate in class discussions.  
.....
8. Technology **improved** communication during the pandemic.  
.....
9. A good friend **can motivate** you to work harder.  
.....
10. Scientists **will develop** new medicines to treat serious illnesses.  
.....

כאשר רוצים לומר באנגלית משפטים כמו "צריך...", "יש ל...", או "רצוי...", אפשר להשתמש ב- **passive voice**. לשם כך, התחילו את המשפט ב**מושא** (הדבר שעליו מבצעים את הפעולה), ולאחר מכן השתמשו במבנה הסביל. **Object + should + be + V3**.



דוגמה:

- **צריך** לשתול יותר עצים.
- More trees **should be planted**.
- **רצוי** לעודד תלמידים לקרוא.
- Students **should be encouraged** to read.
- **יש** להגן על הסביבה.
- The environment **should be protected**.

**B** Translate the sentences into English. Use the passive voice. You may use the word bank below to help you.

awards • encourage • environmental issues • first impression  
 judge (v) • luxuries • mental health • natural resources  
 philanthropists • plant (v) • throw away

1. יותר תשומת לב צריכה להינתן לבריאות הנפש של ילדים.

.....

2. בתי חולים רבים נבנו על ידי פילנתרופים.

.....

3. אנשים נשפטים לעיתים קרובות לפי הרושם הראשוני שהם יוצרים.

.....

4. רצוי לעודד תלמידים לקרוא באנגלית.

.....

5. בבתי ספר מסוימים, פרסים ניתנים לתלמידים שעובדים קשה.

.....

6. משרות חדשות רבות ייוצרו בעתיד.

.....

7. החלטות טובות יותר יכולות להיעשות כאשר אנשים עובדים יחד.

.....

8. בעבר, פחות חשיבות ניתנה לנושאים סביבתיים.

.....

9. צריך לשתול יותר עצים בערים גדולות.

.....

10. בעבר, פחות כסף בוזבז על מותרות.

.....

11. בעתיד, יותר אנרגיה תיוצר ממשאבים טבעיים.

.....

12. מיליוני בקבוקי פלסטיק מושלכים בכל שנה.

.....



## Review 360°

**A** Go over the new words from the unit again. Highlight the words that you remember.

artificial	experiment (n, v)	observe	resident
as a result	explore	overall (adj)	resist
beg	fabric	place (v)	resistance
beggar	fasten	pond	roll off
cell	glue (n)	possess	ship (v)
civilization	heal	possession	shipping
civilize	hook (n)	precise	tightly
classification	innovation	propose	widen
classify	inspiration	proposition	width
develop	lesson	qualification	wound (n, v)
disposal	manufacture	qualify	
dispose of	massive	remarkable	

**B** Give an example of the following.

1. a problem that occurred **as a result** of bad weather

.....

2. a skill that students usually **develop** at school

.....

3. an experience that taught you a **lesson**

.....

4. something that needs to be closed **tightly**

.....

5. something people may **classify** by color

.....

6. a part of the world that is difficult to **explore**

.....

7. something a new **resident** needs to know about the local area

.....

**C** Circle the correct answers.

1. The company plans to . . . a new type of electric bicycle next year.  
a. **manufacture**                      b. **observe**                      c. **heal**                      d. **place**
2. The instructions must be very . . . so that everyone can follow them correctly.  
a. **overall**                      b. **precise**                      c. **remarkable**                      d. **artificial**
3. The scientist repeated the . . . several times to confirm the results.  
a. **qualification**                      b. **beggar**                      c. **civilization**                      d. **experiment**
4. The model airplane fell apart because the . . . was too weak.  
a. **pond**                      b. **glue**                      c. **width**                      d. **resident**
5. The old castle is a reminder of a great . . . that existed hundreds of years ago.  
a. **civilization**                      b. **classification**                      c. **disposal**                      d. **resistance**
6. The doctor was pleased to see that the . . . was healing well.  
a. **pond**                      b. **hook**                      c. **wound**                      d. **innovation**
7. Good leaders provide . . . for others through their actions.  
a. **fabric**                      b. **possession**                      c. **width**                      d. **inspiration**
8. The jacket was made from a special . . . that keeps you warm in winter.  
a. **cell**                      b. **fabric**                      c. **lesson**                      d. **resident**
9. The hungry man . . . for food near the market.  
a. **begged**                      b. **civilized**                      c. **widened**                      d. **developed**
10. We must . . . the broken glass before someone gets hurt.  
a. **qualify**                      b. **explore**                      c. **possess**                      d. **dispose of**
11. Please . . . your coat before you go outside.  
a. **roll off**                      b. **resist**                      c. **fasten**                      d. **classify**