Kentucky Summative Assessments

Grade 8 Reading
Released Items
2024

Directions: Read the excerpt from "Bricks Alive! Scientists Create Living Concrete." Then answer the questions.

from "Bricks Alive! Scientists Create Living Concrete"

by Amos Zeeberg

Originally published in The New York Times*, Jan. 15, 2020*

1 For centuries, builders have been making concrete roughly the same way: by mixing hard materials like sand with various binders, and hoping it stays fixed and rigid for a long time to come.

2 Now, an interdisciplinary team of researchers at the University of Colorado, Boulder, has created a rather different kind of concrete—one that is alive and can even reproduce.

3 Minerals in the new material are deposited not by chemistry but by cyanobacteria, a common class of microbes that capture energy through photosynthesis. The photosynthetic process absorbs carbon dioxide, in stark contrast to the production of regular concrete, which spews huge amounts of that greenhouse gas.

4 Photosynthetic bacteria also give the concrete another unusual feature: a green color. "It really does look like a Frankenstein material," said Wil Srubar, a structural engineer and the head of the research project. (The green color fades as the material dries.)

5 Other researchers have worked on incorporating biology into concrete, especially concrete that can heal its own cracks. A major advantage of the new material, its creators say, is that instead of adding bacteria to regular concrete—an inhospitable environment—their process is oriented around bacteria: enlisting them to build the concrete, and keeping them alive so they make more later on.

6 The new concrete, described Wednesday in the journal Matter, "represents a new and exciting class of low-carbon, designer construction materials," said Andrea Hamilton, a concrete expert at the University of Strathclyde, in Scotland.

7 To build the living concrete, the researchers first tried putting cyanobacteria in a mixture of warm water, sand and nutrients. The microbes eagerly absorbed light and began producing calcium carbonate, gradually cementing the sand particles together. But the process was slow—and DARPA, (Defense Advanced Research Projects Agency), the Department of Defense's speculative research arm and the project's funder, wanted the construction to go very quickly. Necessity, happily, birthed invention.

8 Dr. Srubar had previously worked with gelatin, a food ingredient that, when dissolved in water and cooled, forms special bonds between its molecules. Importantly, it can be used at moderate temperatures that are gentle on bacteria. He suggested adding gelatin to strengthen the matrix being built by the cyanobacteria, and the team was intrigued.

9 The researchers bought Knox brand gelatin at a local supermarket and dissolved it in the solution with the bacteria. When they poured the mixture into molds and cooled it in a refrigerator, the gelatin formed its bonds—"just like when you make Jell-O," Dr. Srubar said. The gelatin provided more structure, and worked with the bacteria to help the living concrete grow stronger and faster.

10 After about a day, the mixture formed concrete blocks in the shape of whatever molds the group used, including two-inch cubes, shoe box-size blocks and truss pieces with struts and cutouts. Individual two-inch cubes were strong enough for a person to stand on, although the material is weak compared to most conventional concretes. Blocks about the size of a shoe box showed potential for doing real construction.

Source: CU Boulder College of Engineering & Applied Science

An arch made from living building materials in Dr. Srubar's lab.

11 "The first time we made a big structure using this system, we didn't know if it was going to work, scaling up from this little-bitty thing to this big brick," said Chelsea Heveran, a former postdoc with the group—now an engineer at Montana State University—and the lead author of the study. "We took it out of the mold and held it—it was a beautiful, bright green and said 'Darpa' on the side." (The mold featured the name of the project's funder.) "It was the first time we had the scale we were envisioning, and that was really exciting."

12 When the group brought small samples to a regular review meeting with officials from Darpa, they were impressed, Dr. Srubar said: "Everyone wanted one on their desk."

13 Stored in relatively dry air at room temperature, the blocks reach their maximum strength over the course of days, and the bacteria gradually begin to die out. But even after a few weeks, the

blocks are still alive; when again exposed to high temperature and humidity, many of the bacterial cells perk back up.

14 The group can take one block, cut it with a diamond-tipped saw, place half back in a warm beaker with more raw materials, pour it in a mold, and begin concrete formation anew. Each block could thus spawn three new generations, yielding eight descendant blocks.

15 The Department of Defense is interested in using the reproductive ability of these "L.B.M.s"—living building materials—to aid construction in remote or austere environments. "Out in the desert, you don't want to have to truck in lots of materials," Dr. Srubar said.

16 The blocks also have the advantage of being made from a variety of common materials. Most concrete requires virgin sand that comes from rivers, lakes and oceans, which is running short worldwide, largely because of the enormous demand for concrete. The new living material is not so picky. "We're not pigeonholed into using some particular kind of sand," Dr. Srubar said. "We could use waste materials like ground glass or recycled concrete."

17 The research team is working to make the material more practical by making the concrete stronger; increasing the bacteria's resistance to dehydration; reconfiguring the materials so they can be flat-packed and easily assembled, like slabs of drywall; and finding a different kind of cyanobacteria that doesn't require the addition of a gel.

18 Eventually, Dr. Srubar said, the tools of synthetic biology could dramatically expand the realm of possibilities: for instance, building materials that can detect and respond to toxic chemicals, or that light up to reveal structural damage. Living concrete might help in environments harsher than even the driest deserts. . . .

19 "There's no way we're going to carry building materials to space," Dr. Srubar said. "We'll bring biology with us."

1

RE009453413_1

In paragraph 14, why does the author use the words "spawn", "generations", and "descendant" to describe the blocks of material?

A To show that the concrete blocks reproduce

B To suggest that the concrete blocks are human

C To show how to begin concrete block formation

D To point out how long it takes to create concrete blocks

Released Item Performance

Kentucky Summative Assessments

Spring 2024
Grade 8
Reading

Item: RE009453413
Book Question Number: 1

Standard: RI.8, RI.8.4

Item Type: MC
Key: A

Student Group	Number of Students	Percent Correct	Average Item Score	Item Breakout Statistics - Answer Choice Options			
				A (%)	B (%)	C (%)	D (%)
All Students	**46,978**	62%	0.62	62%	5%	21%	12%
Gender							
Female	**22,568**	63%	0.63	63%	4%	20%	12%
Male	**24,410**	61%	0.61	61%	5%	21%	12%
Ethnicity							
African American	**5,073**	51%	0.51	51%	7%	26%	15%
American Indian or Alaska Native	**65**	71%	0.71	71%	3%	18%	8%
Asian	**924**	69%	0.69	69%	2%	19%	9%
Hispanic or Latino	**4,419**	54%	0.54	54%	6%	25%	15%
Native Hawaiian or Pacific Islander	**91**	56%	0.56	56%	2%	20%	22%
White (non-Hispanic)	**34,010**	65%	0.65	65%	4%	19%	12%
Two or more races	**2,396**	60%	0.60	60%	6%	22%	13%
Migrant	**241**	48%	0.48	48%	7%	30%	15%
English Learner	**2,358**	37%	0.37	37%	9%	32%	22%
Economically Disadvantaged	**28,392**	57%	0.57	57%	6%	24%	14%
Students with Disabilities	**5,769**	42%	0.42	42%	9%	29%	19%

2

RE009731522_3

What does the photograph illustrate that is not portrayed in the passage text?

A The strength of the living concrete

B How living concrete can reproduce itself

C How living concrete can be formed into shapes

D The effectiveness of living concrete in a dry environment

Released Item Performance

Kentucky Summative Assessments

Spring 2024
Grade 8
Reading

Item: RE009731522
Book Question Number: 2

Standard: RI.8, RI.8.7

Item Type: MC
Key: C

Student Group	Number of Students	Percent Correct	Average Item Score	Item Breakout Statistics - Answer Choice Options			
				A (%)	B (%)	C (%)	D (%)
All Students	**46,981**	56%	0.56	14%	12%	56%	17%
Gender							
Female	**22,569**	57%	0.57	15%	12%	57%	17%
Male	**24,412**	56%	0.56	14%	13%	56%	17%
Ethnicity							
African American	**5,075**	44%	0.44	16%	18%	44%	22%
American Indian or Alaska Native	**66**	44%	0.44	21%	11%	44%	24%
Asian	**924**	58%	0.58	15%	11%	58%	16%
Hispanic or Latino	**4,419**	47%	0.47	17%	16%	47%	21%
Native Hawaiian or Pacific Islander	**91**	47%	0.47	12%	18%	47%	23%
White (non-Hispanic)	**34,010**	60%	0.60	14%	11%	60%	16%
Two or more races	**2,396**	55%	0.55	13%	13%	55%	19%
Migrant	**241**	39%	0.39	20%	17%	39%	24%
English Learner	**2,358**	34%	0.34	19%	23%	34%	25%
Economically Disadvantaged	**28,395**	51%	0.51	16%	14%	51%	19%
Students with Disabilities	**5,770**	42%	0.42	16%	19%	42%	23%

3

RE009453051_3

Which detail in paragraph 15 helps the reader understand the meaning of the word “austere”?

A reproductive ability

B living building materials

C in the desert

D lots of materials

Released Item Performance

Kentucky Summative Assessments

Spring 2024
Grade 8
Reading

Item: RE009453051
Book Question Number: 3

Standard: RI.8, RI.8.4

Item Type: MC
Key: C

Student Group	Number of Students	Percent Correct	Average Item Score	Item Breakout Statistics - Answer Choice Options			
				A (%)	B (%)	C (%)	D (%)
All Students	**46,976**	61%	0.61	14%	17%	61%	9%
Gender							
Female	**22,565**	59%	0.59	15%	18%	59%	8%
Male	**24,411**	62%	0.62	13%	16%	62%	9%
Ethnicity							
African American	**5,073**	45%	0.45	19%	26%	45%	10%
American Indian or Alaska Native	**66**	62%	0.62	8%	23%	62%	8%
Asian	**924**	73%	0.73	10%	10%	73%	6%
Hispanic or Latino	**4,418**	49%	0.49	17%	23%	49%	11%
Native Hawaiian or Pacific Islander	**91**	52%	0.52	16%	16%	52%	15%
White (non-Hispanic)	**34,008**	65%	0.65	12%	15%	65%	8%
Two or more races	**2,396**	59%	0.59	15%	18%	59%	9%
Migrant	**241**	39%	0.39	22%	28%	39%	12%
English Learner	**2,356**	29%	0.29	22%	33%	29%	16%
Economically Disadvantaged	**28,391**	54%	0.54	16%	20%	54%	10%
Students with Disabilities	**5,767**	37%	0.37	20%	28%	37%	15%

4

RE009453774_4

Read the sentence from paragraph 16.

> Most concrete requires virgin sand that comes from rivers, lakes and oceans, which is running short worldwide, largely because of the enormous demand for concrete.

Which describes the role of this sentence in the paragraph?

A To teach the reader how concrete is made

B To suggest that concrete is rare and valuable

C To emphasize how closely concrete is linked with nature

D To demonstrate the necessity for a new type of concrete

Released Item Performance

Kentucky Summative Assessments

Spring 2024
Grade 8
Reading

Item: RE009453774
Book Question Number: 4

Standard: RI.8, RI.8.5

Item Type: MC
Key: D

Student Group	Number of Students	Percent Correct	Average Item Score	Item Breakout Statistics - Answer Choice Options			
				A (%)	B (%)	C (%)	D (%)
All Students	**46,969**	45%	0.45	11%	26%	19%	45%
Gender							
Female	**22,567**	45%	0.45	9%	26%	20%	45%
Male	**24,402**	46%	0.46	12%	25%	17%	46%
Ethnicity							
African American	**5,072**	30%	0.30	16%	28%	26%	30%
American Indian or Alaska Native	**66**	32%	0.32	14%	33%	21%	32%
Asian	**924**	54%	0.54	7%	22%	16%	54%
Hispanic or Latino	**4,416**	40%	0.40	13%	26%	21%	40%
Native Hawaiian or Pacific Islander	**91**	42%	0.42	12%	25%	21%	42%
White (non-Hispanic)	**34,003**	48%	0.48	10%	25%	17%	48%
Two or more races	**2,397**	42%	0.42	11%	27%	20%	42%
Migrant	**241**	34%	0.34	16%	24%	25%	34%
English Learner	**2,355**	26%	0.26	20%	26%	28%	26%
Economically Disadvantaged	**28,385**	39%	0.39	13%	27%	21%	39%
Students with Disabilities	**5,763**	31%	0.31	19%	26%	24%	31%

5

RE009727543_2

Which describes why the author likely included the information in paragraph 17 in the article?

A To evaluate the positive effects of living concrete

B To provide details about the next steps for the researchers

C To show the benefits of living concrete compared to regular concrete

D To compare and contrast various building materials the researchers use

Released Item Performance

Kentucky Summative Assessments

Spring 2024
Grade 8
Reading

Item: RE009727543
Book Question Number: 5

Standard: RI.8, RI.8.6

Item Type: MC
Key: B

Student Group	Number of Students	Percent Correct	Average Item Score	Item Breakout Statistics - Answer Choice Options			
				A (%)	B (%)	C (%)	D (%)
All Students	**46,975**	57%	0.57	12%	57%	17%	14%
Gender							
Female	**22,570**	59%	0.59	11%	59%	16%	14%
Male	**24,405**	56%	0.56	12%	56%	18%	14%
Ethnicity							
African American	**5,072**	47%	0.47	14%	47%	21%	18%
American Indian or Alaska Native	**66**	44%	0.44	14%	44%	24%	18%
Asian	**924**	67%	0.67	9%	67%	12%	12%
Hispanic or Latino	**4,418**	49%	0.49	13%	49%	21%	17%
Native Hawaiian or Pacific Islander	**91**	48%	0.48	15%	48%	18%	19%
White (non-Hispanic)	**34,007**	60%	0.60	11%	60%	16%	13%
Two or more races	**2,397**	56%	0.56	12%	56%	18%	14%
Migrant	**241**	45%	0.45	15%	45%	18%	22%
English Learner	**2,358**	32%	0.32	14%	32%	27%	27%
Economically Disadvantaged	**28,390**	51%	0.51	13%	51%	19%	16%
Students with Disabilities	**5,762**	36%	0.36	15%	36%	25%	25%

6

RE009732251

Short Answer Directions: Read the question carefully. Then enter your answer in the space provided.

In paragraph 6, the author quotes Andrea Hamilton, a concrete expert, who said that the new concrete "'represents a new and exciting class of low-carbon, designer construction materials.'" Explain how the claim is supported in the passage and whether the support is sufficient. Support your answer with evidence from the text.

Released Item Performance

Kentucky Summative Assessments

Spring 2024
Grade 8
Reading

Item: RE009732251
Book Question Number: 6

Standard: RI.8, RI.8.8

Item Type: SA
Key: Rubric

Student Group	Number of Students	Percent Correct	Average Item Score	Item Breakout Statistics - Score Percentages		
				Score 0 (%)	Score 1 (%)	Score 2 (%)
All Students	**24,238**	52.6%	1.05	24%	46%	30%
Gender						
Female	**11,552**	59.1%	1.18	18%	46%	36%
Male	**12,686**	46.8%	0.94	30%	46%	24%
Ethnicity						
African American	**2,561**	38.2%	0.76	39%	45%	16%
American Indian or Alaska Native	**36**	40.3%	0.81	31%	58%	11%
Asian	**500**	67.3%	1.35	15%	36%	49%
Hispanic or Latino	**2,374**	45.0%	0.90	32%	46%	22%
Native Hawaiian or Pacific Islander	**42**	45.2%	0.90	31%	48%	21%
White (non-Hispanic)	**17,477**	55.5%	1.11	21%	46%	32%
Two or more races	**1,248**	51.0%	1.02	26%	46%	28%
Migrant	**150**	36.0%	0.72	41%	45%	13%
English Learner	**1,454**	29.9%	0.60	47%	45%	7%
Economically Disadvantaged	**14,744**	46.3%	0.93	30%	47%	23%
Students with Disabilities	**3,879**	27.6%	0.55	52%	41%	7%

Rubric

Reading Short Response Rubric	
Score Point 2	• The student completes all components of the question and communicates ideas clearly. • The student demonstrates an understanding of the concepts and/or processes. • The student provides a correct answer using an accurate explanation as support.
Score Point 1	• The student provides a partially correct answer to the question and/or addresses only a portion of the question. • The student demonstrates a partial understanding of the concepts and/or processes.
Score Point 0	• The answer is totally incorrect or irrelevant.

Anchor Set

A1

this support isnt efficent because i cang find any evidence to back up the answer.

Anchor Annotation, Paper 1
Score Point 0

This response states that the claim lacks support because there is no evidence in the text (this support isnt efficent because i cang find any evidence to back up the answer), which is incorrect.

A2

The Arthor said in passage 7 the microbes eaglely absorbed light and began producing calcium carbonate gradually cementingth sand particals together

Anchor Annotation, Paper 2
Score Point 0

This response offers a quote from the text that is not connected to the prompt question (The Arthor said in passage 7 the microbes eaglely absorbed light and began producing calcium carbonate gradually cementingth sand particals togerther), and no explanation is provided.

A3

It is suppoted in the passege because it goes on finishing the story backing up her reasoning. For example the rest of the story is supporting her. it is supported in senificant because the hole text is explaining and supporting her.

Anchor Annotation, Paper 3
Score Point 0

This response offers a vague answer to the prompt question as to how the claim is supported and sufficient (It is suppoted in the passege because it goes on finishing the story backing up her reasoning. For example the rest of the story is supporting her. it is supported in senificant because the hole text is explaining and supporting her). No understanding is demonstrated.

A4

The claim is supported by the text that states "two inch cubes were strong enough for a person to stand on".

Anchor Annotation, Paper 4
Score Point 1

This response demonstrates a partial understanding of the question, providing appropriate text evidence but no explanation as to its meaning (The claim is supported by the text that states "two inch cubes were strong enough for a person to stand on").

A5

The claim is being supported by giving information on how people made a switch for the environment from using bricks to using an ecofriendly concrete.

Anchor Annotation, Paper 5
Score Point 1

This response addresses only a portion of the question as to how the claim is supported and sufficient (The claim is being supported by giving information on how people made a switch for the environment from using bricks to using an ecofriendly concrete). There is no text support.

A6

To begin with, this section in the article, Bricks Alive! Scientist Create Living Concrete" by Amos Zeeberg, is suported in the passage. They back this statement up by providing an expert or professional. To explain, This support would be considered sufficient because people would believe a professional. To sum up, the section in the article is supported and sufficient bceause of a expert.

Anchor Annotation, Paper 6
Score Point 1

This response addresses only a portion of the question as to how the claim is supported and sufficient (They back this statement up by providing an expert or professional. To explain, This support would be considered sufficient because people would believe a professional. To sum up, the section in the article is supported and sufficient bceause of a expert). The explanation is repetitious and lacks specific evidence from the text.

A7

The claim of the new concrete 'represents a new and exciting class of low-carbon, designer construction materials.' is supported in the passage and weather the support is sufficient by the new concrete not 'being so picky' and being able to be made without all of the ingredients for the recent concrete. A piece of vidence to support this claim comes from paragraph 16, stating," Most concrete requires virgin sand that comes from rivers, lakes and oceans, which is running short worldwide, largely because of the enormous demand for concrete. The new living material is not so picky." This evidence supports the claim because it shows how the recent concrete had to be made but now with the new concrete not all of that is needed and it can be made alot easier.

Anchor Annotation, Paper 7
Score Point 2

This response provides an accurate explanation of how the claim is supported and sufficient, providing a quote from the text and clearly communicated ideas (A piece of vidence to support this claim comes from paragraph 16, stating," Most concrete requires virgin sand that comes from rivers, lakes and oceans, which is running short worldwide, largely because of the enormous demand for concrete. The new living material is not so picky." This evidence supports the claim because it shows how the recent concrete had to be made but now with the new concrete not all of that is needed and it can be made alot easier).

A8

The claim is supported in the passage by paragraph 6 because it talks about how the bacteria based concrete is earth friendly and won't negatively affect the greenhouse gasses. The text states,"The photosynthetic process absorbs carbon dioxide, in stark contrast to the production of regular conrete, which spews huge amounts of that greenhouse gas.". This shows how the claim is supported by pargraph 6 because using concrete that positively affects greenhouse gasses then it can help the environment. The support is sufficient because it explains how the conrete would help greenhouse gasses and our Earth.

Anchor Annotation, Paper 8
Score Point 2

This response provides an accurate explanation of how the claim is supported and sufficient (The claim is supported in the passage by paragraph 6 because it talks about how the bacteria based concrete is earth friendly and won't negatively affect the greenhouse gasses. The text states,"The photosynthetic process absorbs carbon dioxide, in stark contrast to the production of regular conrete, which spews huge amounts of that greenhouse gas" . . . The support is sufficient because it explains how the conrete would help greenhouse gasses and our Earth).

The new concrete is representing a new and exciting class of low-carbon, designer construction materials by making a more environment freindly concrete option. The texts supports this by saying "A major advantage of the new material, its creators say, is that instead of adding bacteria to regular concrete—an inhospitable environment—their process is oriented around bacteria: enlisting them to build the concrete, and keeping them alive so they make more later on." and "The blocks also have the advantage of being made from a variety of common materials. Most concrete requires virgin sand that comes from rivers, lakes and oceans, which is running short worldwide, largely because of the enormous demand for concrete." Thus, This new living concrete will be a major help in making the environment more livable and healthy.

Anchor Annotation, Paper 9
Score Point 2

This response provides an accurate explanation of how the claim is supported and sufficient (The texts supports this [claim] by saying "A major advantage of the new material, its creators say, is that instead of adding bacteria to regular concrete—an inhospitable environment—their process is oriented around bacteria: enlisting them to build the concrete, and keeping them alive so they make more later on." and "The blocks also have the advantage of being made from a variety of common materials"). Ideas are communicated clearly (Thus, This new living concrete will be a major help in making the environment more livable and healthy).

Investing in Kentucky's Future, One Student at a Time

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