

### A 2nd-Grade Class and a Science Experiment

by Kenneth Chang



- 1 Back in 2015, students in Maggie Samudio’s second-grade class at Cumberland Elementary School in West Lafayette, Indiana, were contemplating an offbeat science question: If a firefly went to space, would it still be able to light up as it floated in zero gravity?
- 2 Ms. Samudio said she would ask a friend of hers, Steven Collicott, an aerospace professor at nearby Purdue University, for the answer. “He teaches a class on zero gravity, and he would be the perfect person to answer the question.” Ms. Samudio sent an email. A day later, Dr. Collicott replied, and Ms. Samudio was surprised by his answer: “Instead of guessing, why not 18”
- 3 Blue Origin, a rocket company, was planning to offer the ability for schools to fly small experiments on its New Shepard suborbital spacecraft for as little as \$8,000. Dr. Collicott, who had sent several fluid flow experiments on New Shepard launches, pointed Ms. Samudio and her second-graders to Blue Origin. “For half the cost of high school football uniforms we were able to do a space experiment,” Dr. Collicott said. “So really any school district now that affords football, and there are many of those, can afford spaceflight.”
- 4 Cumberland Elementary has not been the only school to see the value of paying for an experiment aboard the New Shepard rocket. A Montessori middle school in Colorado sent up a sensor package designed and programmed by the students. An Alabama high school launched an experiment to test temperature fluctuations in microgravity. And this past December, an elementary school in Ohio sent up baby jellyfish.

- 5 Following Dr. Collicott's suggestion, Ms. Samudio's children at Cumberland got to work, collaborating with Purdue students in Dr. Collicott's classes. "For the next two years, I had future aeronautical engineers in my second-grade classroom teaching mini-lessons on basic principles of flight and propulsion as well as the basic principles of 'firefly' chemistry," Ms. Samudio said.
- 6 On Dec. 12, 2017, the firefly experiment was on board New Shepard. It did not contain any actual fireflies. "It appears when scared, fireflies don't light up," Dr. Collicott said. "And we were concerned that the boost would scare them. And then there's also the problem that I don't know how to keep fireflies alive and keep them happy." Instead, the apparatus replicated the chemistry of how fireflies generate light, with syringes mixing the glow-creating substances together as the capsule reached the top of the trajectory more than 60 miles above West Texas. A video camera recorded what happened. Dr. Collicott attended the launch, and two days later, was back in Ms. Samudio's classroom presenting the results. The bugs can indeed glow in space.
- 7 "Several parents told me that the simple question of asking their child what they had done in school that day exploded into amazing family conversations, extra reading and research, and the contemplation of future personal pursuits and goals," Ms. Samudio said.

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## Tekst 7 A 2nd-Grade Class and a Science Experiment

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- 1p 17 'If a firefly went to space, would it still be able to light up as it floated in zero gravity?' (alinea 1)  
→ Welke zin geeft antwoord op deze vraag?  
*Citeer (= schrijf over uit de tekst) de eerste twee woorden van deze zin.*
- 1p 18 Kies bij 18 in alinea 2 het juiste antwoord uit de gegeven mogelijkheden.  
**A** allow children as passengers on board of a spacecraft?  
**B** attend a lecture on space discoveries with your class?  
**C** build the experiment and actually send it to space?  
**D** get more information by reading studies on space projects?
- 1p 19 Which of the following becomes clear from paragraph 3?  
**A** Approaching Blue Origin was somewhat challenging for Ms. Samudio.  
**B** Dr. Collicot built the rocket that is now used for space exploration.  
**C** Participating in a space project is less expensive than you would think.  
**D** Schools get a discount if they promote the New Shepard spacecraft.
- 1p 20 'Cumberland Elementary has not been the only school to see the value of paying for an experiment aboard the New Shepard rocket.' (alinea 4)  
→ In welke **andere** alinea wordt beschreven hoe inspirerend meedoen aan het ruimte experiment voor schoolkinderen kan zijn?  
*Noteer het nummer van deze alinea.*
- 2p 21 Geef aan of de volgende beweringen overeenkomen met alinea's 5 tot en met 7.  
*Omcirkel 'wel' of 'niet' achter elk nummer in de uitwerkbijlage.*
- 1 Studenten lucht- en ruimtevaarttechniek gaven les aan basisschoolkinderen.
  - 2 Er waren meerdere argumenten om te besluiten geen vuurvliegjes mee te nemen tijdens een ruimtevlucht.
  - 3 Ms. Samudio vond het experiment zo leuk dat ze erover denkt om zich te laten omscholen.

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### Bronvermelding

Een opsomming van de in dit examen gebruikte bronnen, zoals teksten en afbeeldingen, is te vinden in het bij dit examen behorende correctievoorschrift.