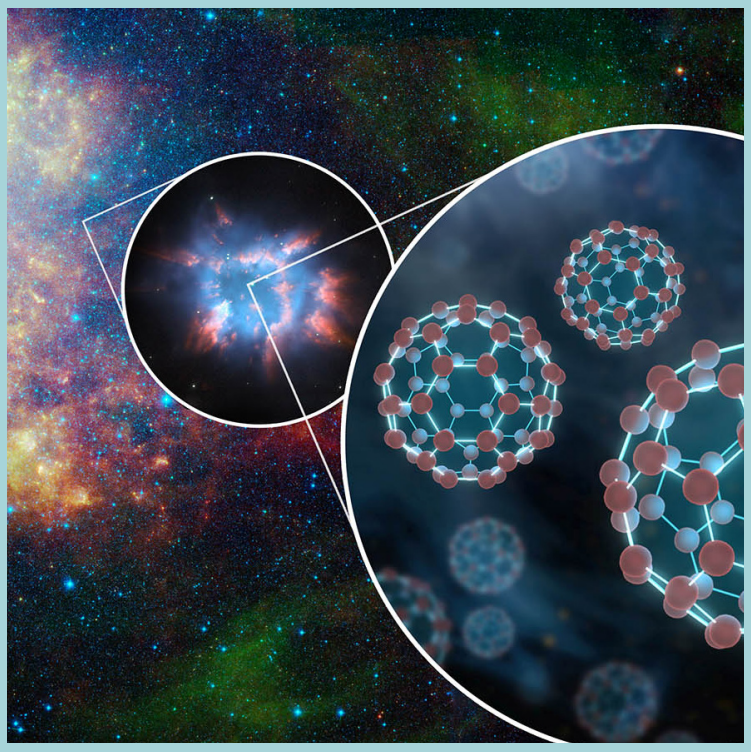
STEM Sims™

Buckyball



Buckyball

Do you need an idea for a scientific study?
Try out one of our ideas or make one of your own.

Start learning right now about carbon atoms. Take the following brief quiz to see how much you already know about buckminsterfullerenes. See the bottom of page 4 to check your answers.

1. Which theme park hosts a geodesic dome, similar to the buckyball?
   a. Six Flags
   b. Universal Studios
   c. Epcot
   d. Busch Gardens

2. How many carbon atoms make up a buckyball?
   a. 20
   b. 30
   c. 40
   d. 60

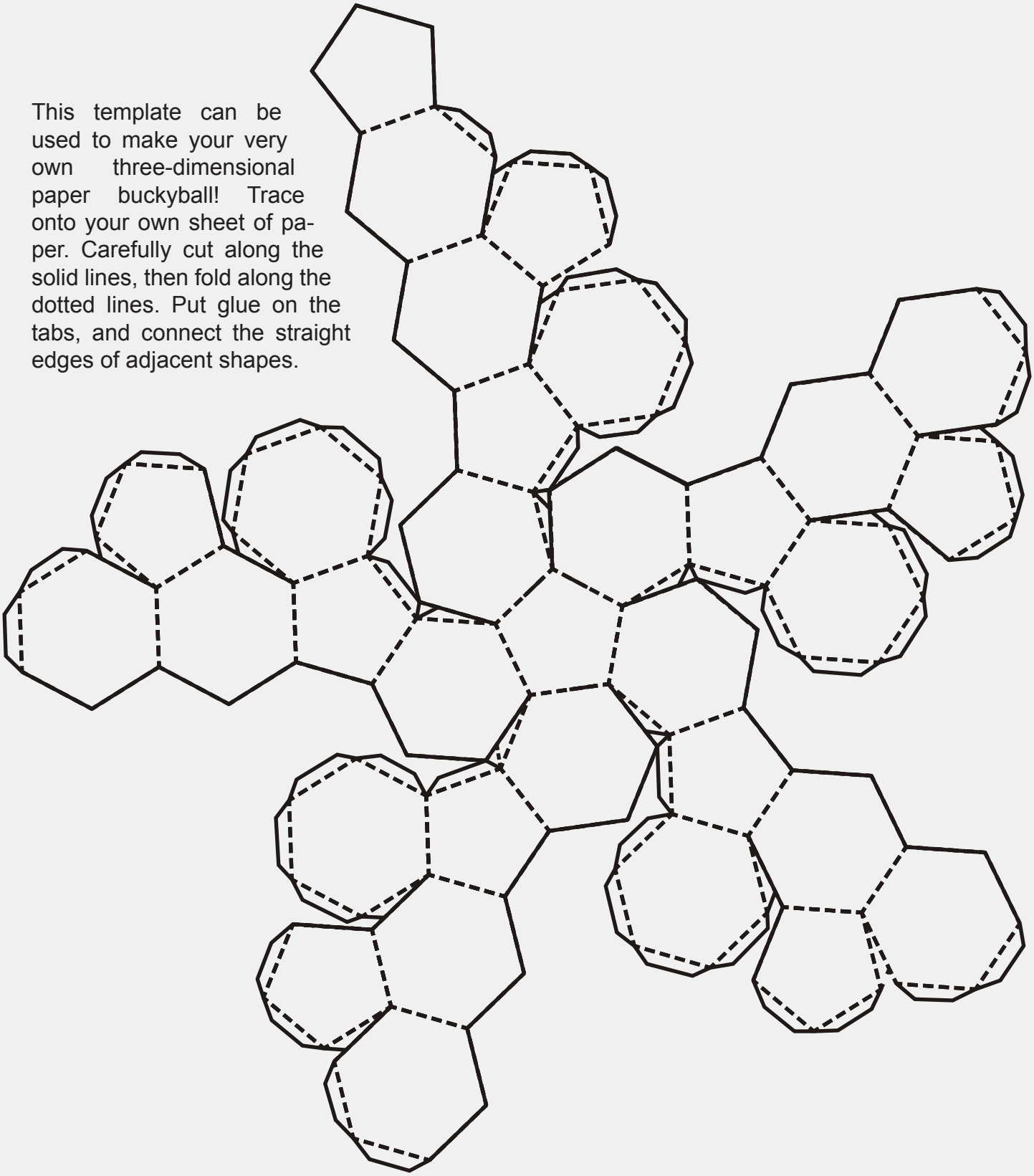
3. Which international sport uses a ball shaped like a buckyball?
   a. rugby
   b. soccer
   c. croquet
   d. cricket

4. The addition of which ion makes a buckyball superconductive?
   a. Cl^{-1}
   b. Na^{+1}
   c. Br^{-1}
   d. K^{+1}

5. The Nobel Prize in Chemistry was awarded to three scientists in what year for the discovery of buckminsterfullerenes?
   a. 1985
   b. 1990
   c. 1996
   d. 2003

Make Your Own Buckyball

This template can be used to make your very own three-dimensional paper buckyball! Trace onto your own sheet of paper. Carefully cut along the solid lines, then fold along the dotted lines. Put glue on the tabs, and connect the straight edges of adjacent shapes.

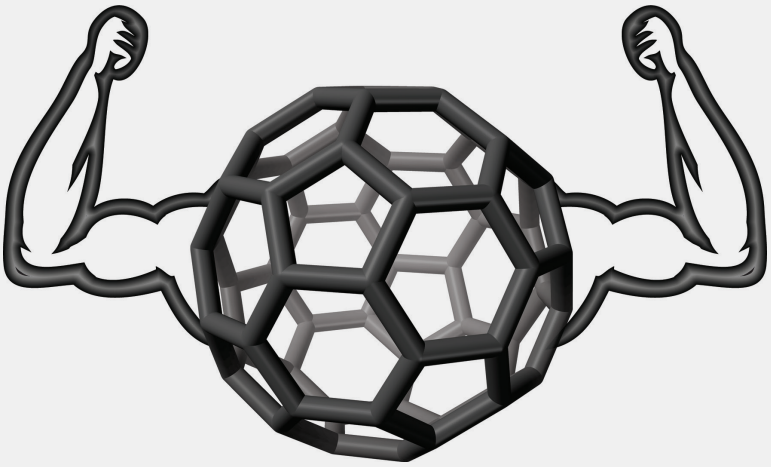


Buckyball

Pass the Buckyball

Before the 1980s, the only two structures of carbon known to man were graphite and diamond; then, in 1985, three scientists discovered the roundest and largest symmetrical molecular structure: the buckminsterfullerene. While graphite on a molecular level looks like stacked sheets of carbon and diamond has an intricate 3-D boxy structure, buckminster fullerenes (shortened to buckyballs) are nearly spherical. Buckyballs are shaped as 12 pentagons and 20 hexagons of carbon atoms that connect to form the hollow shape. Some of the interesting properties that buckyballs have demonstrated are: wave-particle duality, water insolubility, structural stability under high temperatures and high pressures, superconductivity, and superhard solidity when compressed.

The buckyballs' numerous interesting properties have led scientists to consider potential applications in innovative ways. The New Jersey Institute of Technology, for example, developed printable solar cells using fullerenes due to their conductive properties. Duke University engineers discovered that buckyballs diminish bacterial growth on water treatment plant membranes. Researchers in Virginia have used buckyballs to prevent mast cells from discharging histamine, thereby staving off allergic reactions. International researchers are also developing methods of using buckyballs to prevent deadly viruses from spreading. Rice University scientists also tapped into the hollow stable structure of the buckyball as a storage unit for hydrogen: this could be incredibly useful for hydrogen-powered vehicles. And best of all, buckyballs are non-toxic, so their applications will definitely be helpful to green engineers of the future; maybe you!



Please visit our site for more helpful information:
STEMsims.com

Answers: Page 2 Answers: 1) c. 2) d. 3) b. 4) d. 5) c.

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