

Fun with Fullerenes

Name _____

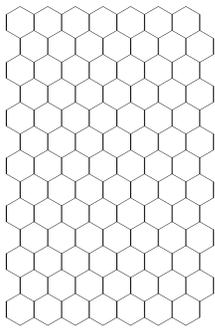
Name _____

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It's time to learn more about the forms of carbon! Look at the plastic graphite model. Pick up a single sheet in the graphite model. Except for the bonds sticking up, is the sheet flat?



Yes No

Each sheet is called a layer of GRAPHENE. What shape is repeated in this sheet?

Draw a hexagon in the box below.
(If you need a hint, ask your teacher for hint #1)

Now you're going to explore what happens when you add a pentagon to the graphene model. Draw a pentagon in the box below.

(If you need a hint, ask your teacher for hint #2)



To see what happens when we add pentagons to the graphene pattern, you will now make a model! Break your group into two pairs. Each pair will put together a model of the picture found on the poster board in front of you. You should end up with **TWO** models total. BEFORE you get started, place a BLUE X in each of the pentagons and a RED X in each of the hexagons on the poster. You can find the pieces (black plastic pieces, tubing, and a starting pentagon) needed to make the model in your team box.

Spend some time putting the models together. If you have some trouble, ask your teacher for help!

Are the two models that you have put together flat?
(Circle yes or no)

Yes	No
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Take the two models that you made and put them together to create a larger model of one of the forms of carbon.

Which form of carbon do you have in front of you?



How many carbon atoms do you think are in your model (each black plastic piece is a carbon atom)? Try counting!

Total # of Atoms =

If you'd like to check your answer, ask your teacher for hint #3.

It's now time for your team to create a poster to teach the rest of class about what you just learned. Remember that you will present this to your classmates. If you have trouble coming up with ideas on what to include on your poster, ask your teacher for hint #4.

Hint #1

A hexagon has 6 sides.

Hint #2

A pentagon has 5 sides.

Hint #3

The total number of carbon atoms in your model is 20×3 or **60**. There are 20 hexagons and 12 pentagons. Fullerenes come in other sizes too.

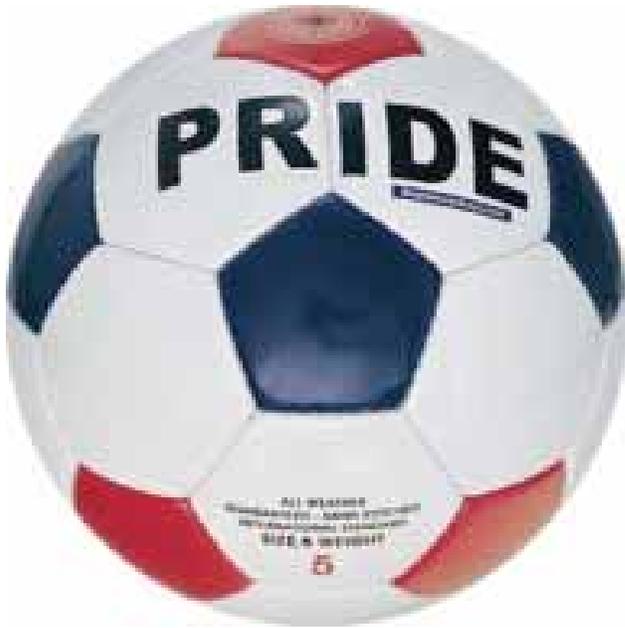
Hint #4

Here are some helpful hints that you can use in your poster. Don't feel like you need to use all or any of these ideas. These hints are only suggestions.

First, you may want to try to answer the following questions in your poster:

Which form(s) of carbon did your group learn about?
What shape is your form of carbon?
How is your form of carbon unique?
Could you have the class put together paper models?

Attached are some pictures of objects that you can include on your poster, but feel free to include your own drawings and words.

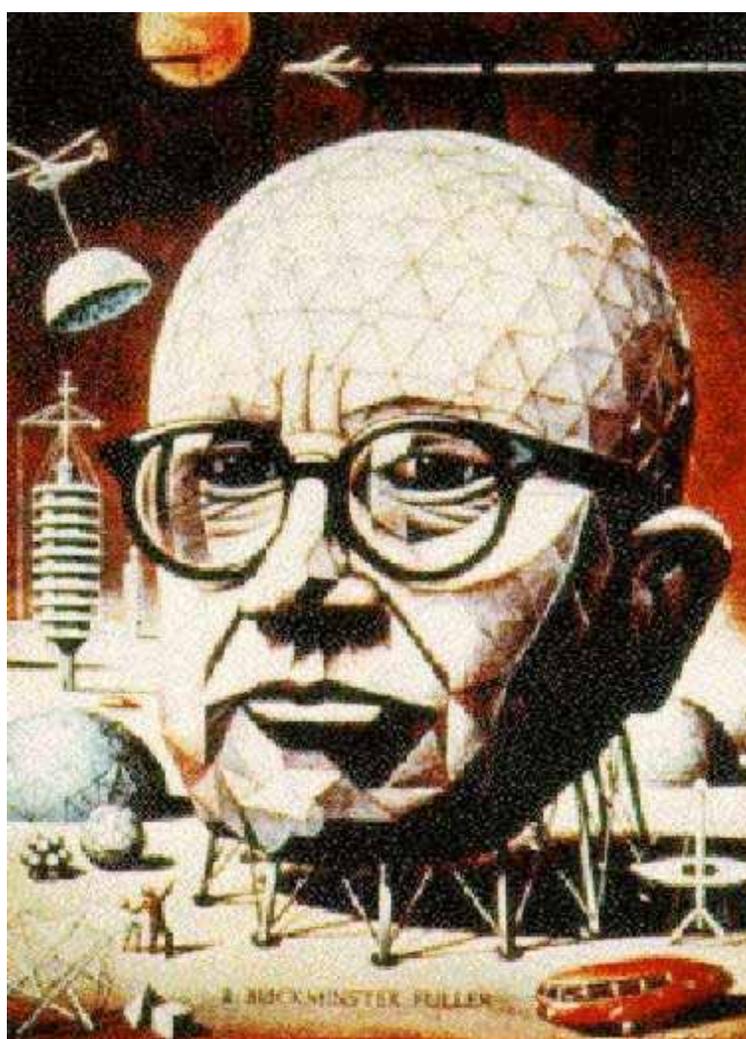


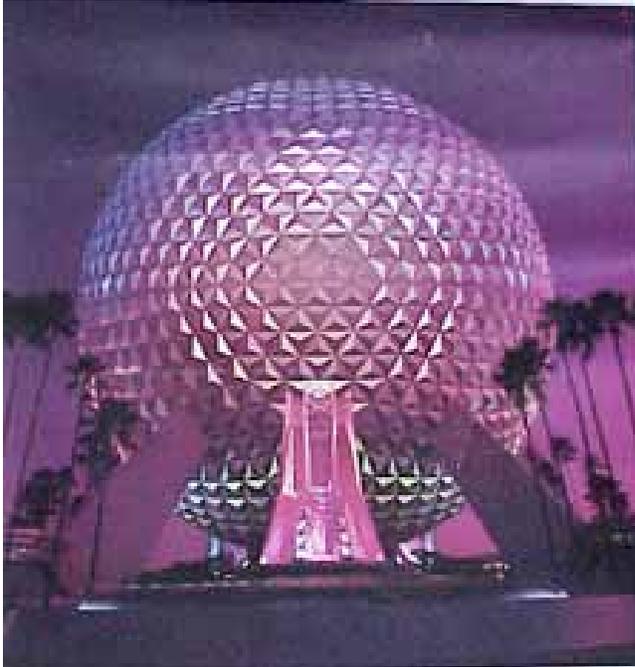
Soccer balls have the same shape as fullerenes.

Fullerenes also have the same shape as these new golf balls. Look really carefully, and you'll see hexagons and pentagons on the balls.



These molecules, fullerenes, were actually named after a man, Buckminster Fuller, who was responsible for designing geodomes. This is a Time magazine cover showing the head of Fuller as a geodome.





You may have seen several geodomes before. Here are two examples: SpaceShip Earth at Epcot Center in Disney World and the Mitchell Domes in Milwaukee.

