Teacher version—with answers.

Questions from the Watson and Crick article from *Nature,* April 25 1953, "A Structure for Deoxyribose Nucleic Acid"

1. Watson and Crick first mention another model proposed by Pauling and Corey. What were the three main features of this previously proposed model?

(1)Three intertwined chains, 2) phophates near axis , 3)bases on the outside)

2. The Watson and Crick model was different in all three of these main features. Contrast the features of the Watson/Crick model to the three features of the Pauling/Corey model.

(Two chains instead of three

Phosphates on the outside

Bases on the inside)

3. Answering as specifically as you can and *in your own words*, tell how the two chains are held together as explained in the paper. [do not just copy the paragraph from the paper into your answer ☺]

(Hydrogen bonds form between the bases. One base must be a purine and one must be a pyrimidine so that two together will fit inside the structure of the helix .)

4. According to Watson and Crick, only specific pairs of bases can bond together. You know this, right? _____bonds to _____, and _____bonds to _____.

(Adenine-thymine, guanine-cytosine)

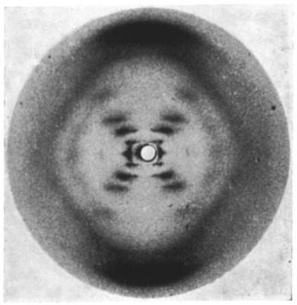
5. The pairing is specific, however, what do they say is NOT restricted in any way?

(The sequence of the bases)

6. Why doesn't the model work if ribose is used in place of deoxyribose?

(Ribose has an extra oxygen atom which would make a 'too close van der Waals contact')

BONUS! In discussing the "previously published X-ray data", Watson and Crick state they were "not aware of the details" when they devised their structure. In some opinions, this represents an inexcusable failure to give credit to another scientist.



Here is a picture of the X-ray data. Do you know who took this picture, and what specific evidence it supplied in regards to the structure of DNA?

(This is the famous 'photo 51' , taken by Rosalind Franklin, which showed the double helix.)

7. The last line of the article is a very famous line that is perhaps the understatement of the century because this knowledge started a scientific revolution: " It has not escaped our notice that the specific pairing we have postulated ….."

What do they say the specific pairing suggests?

(a possible copying mechanism)

8. This paper is short because it was intended only to announce Watson and Crick's discovery, since they believed they were in a race. They later published a paper with more details. Do you think this discovery was worthy of a Nobel Prize? Why or why not.

(accept any answers ☺

Speaking of Nobel Prizes and DNA, try playing this game:

http://www.nobelprize.org/educational/medicine/dna_double_helix/