

# DNA EXTRACTION

Name: \_\_\_\_\_

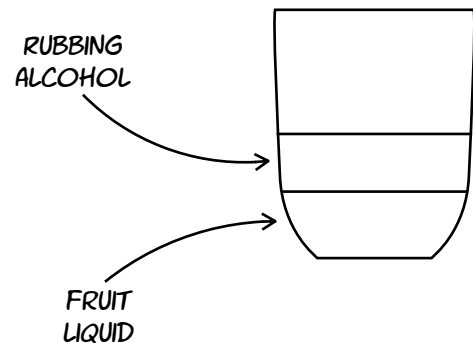
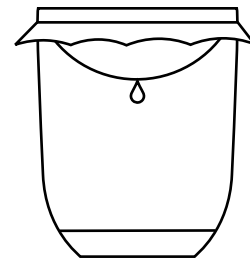
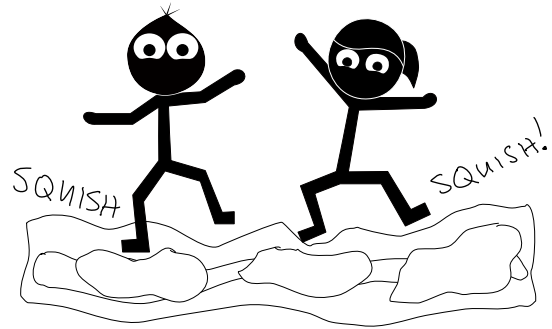
## MATERIALS

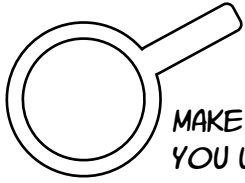
Fruit (strawberry or blueberries)  
Warm water  
Salt  
Concentrated dish soap

Rubbing alcohol  
Coffee filter  
Cup or glass jar  
Plastic bag for squishing fruit (optional)

## METHOD - ALSO CALLED THE PROTOCOL OR THE INSTRUCTIONS!

1. Place your rubbing alcohol in the fridge or freezer.
2. Squish the fruit thoroughly.
3. Make your extraction solution by mixing together:
  - 1/2 cup warm water
  - 1 tsp salt
  - 2 tsp concentrated dish soap
4. Add 2 to 3 teaspoons of extraction solution to your squished fruit and stir gently for one minute.
5. Pour the fruit mixture into a coffee filter and let sit for 5 minutes. **VERY GENTLY** close the bag and press to extract more liquid. Be careful not to press too hard. If the bag breaks you will need to strain the liquid again.
6. Take the rubbing alcohol out from the freezer and carefully pour a layer of rubbing alcohol on top of the layer of fruit liquid. The goal is for the amount of rubbing alcohol to be roughly equal to the amount of fruit liquid. But it does not need to be exact.
7. Observe the container and watch for a white foamy substance to form on the surface of the rubbing alcohol. This is your DNA!





# OBSERVATIONS



MAKE NOTES ABOUT WHAT YOU SAW AND DID! WHAT TYPE OF FRUIT(S) DID YOU USE? DID YOU SEE DNA FLOAT UP INTO THE RUBBING ALCOHOL LAYER?

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WHAT DID YOU LEARN FROM DOING THIS EXPERIMENT? ANY IDEAS FOR WHAT YOU WOULD TRY IF YOU DID THIS EXPERIMENT AGAIN? DID IT TURN OUT HOW YOU EXPECTED OR DID SOMETHING SURPRISE YOU?

## CONCLUSIONS

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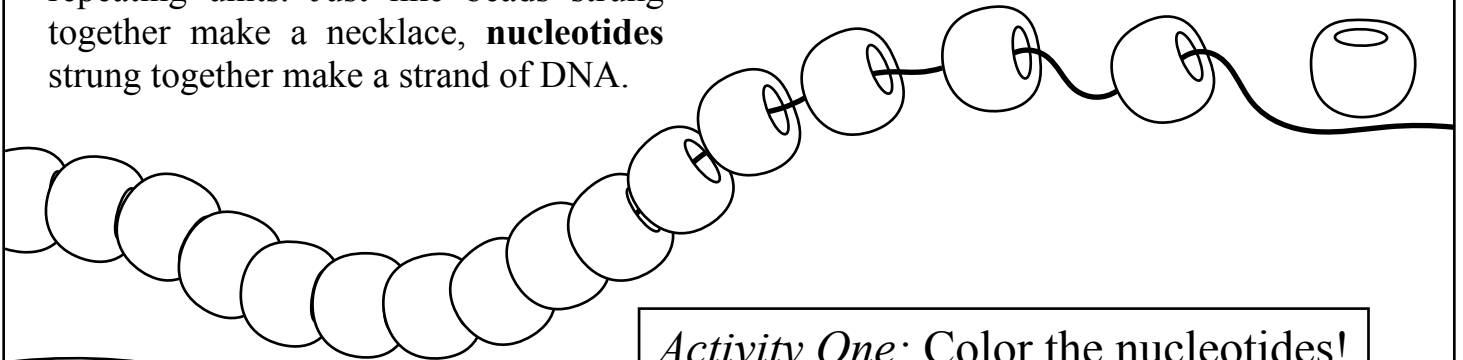
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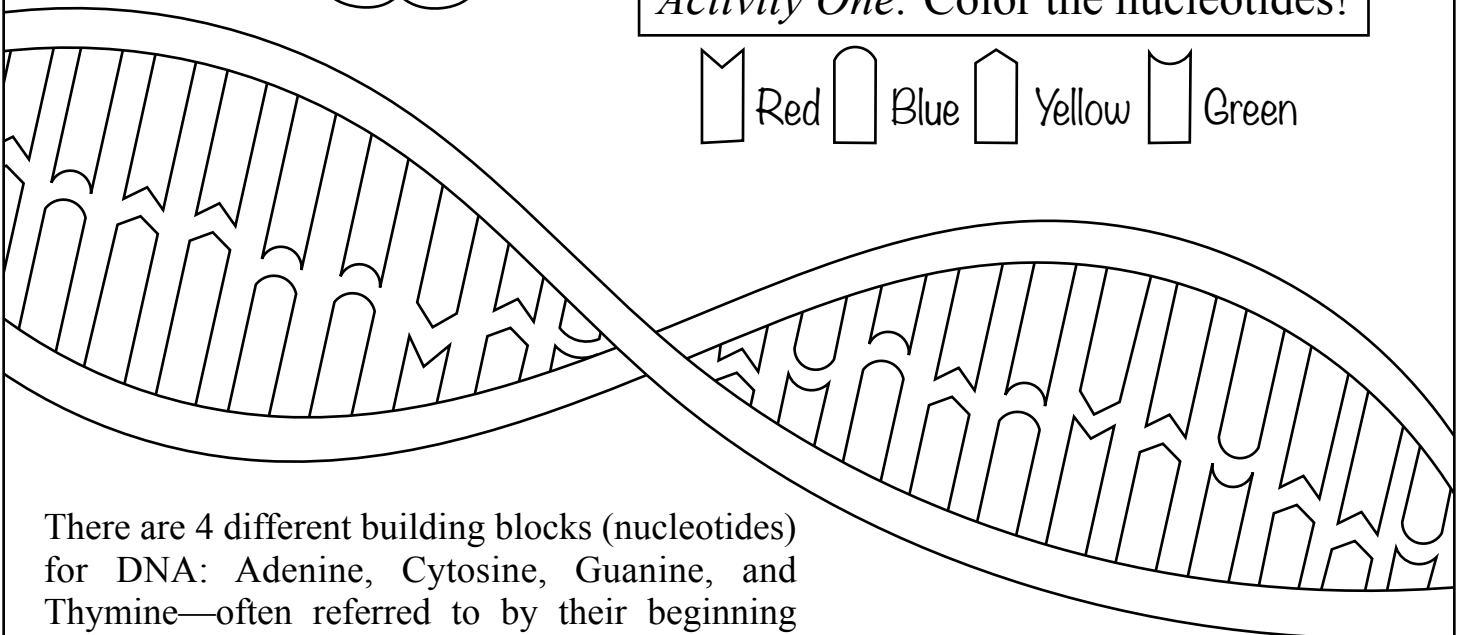
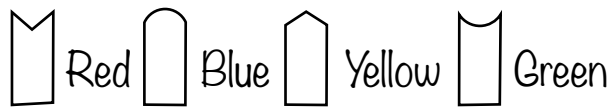
# DNA THE STUFF INSIDE ALL LIVING THINGS!

Name: \_\_\_\_\_

DNA is a **polymer**, a LONG strand of repeating units. Just like beads strung together make a necklace, **nucleotides** strung together make a strand of DNA.

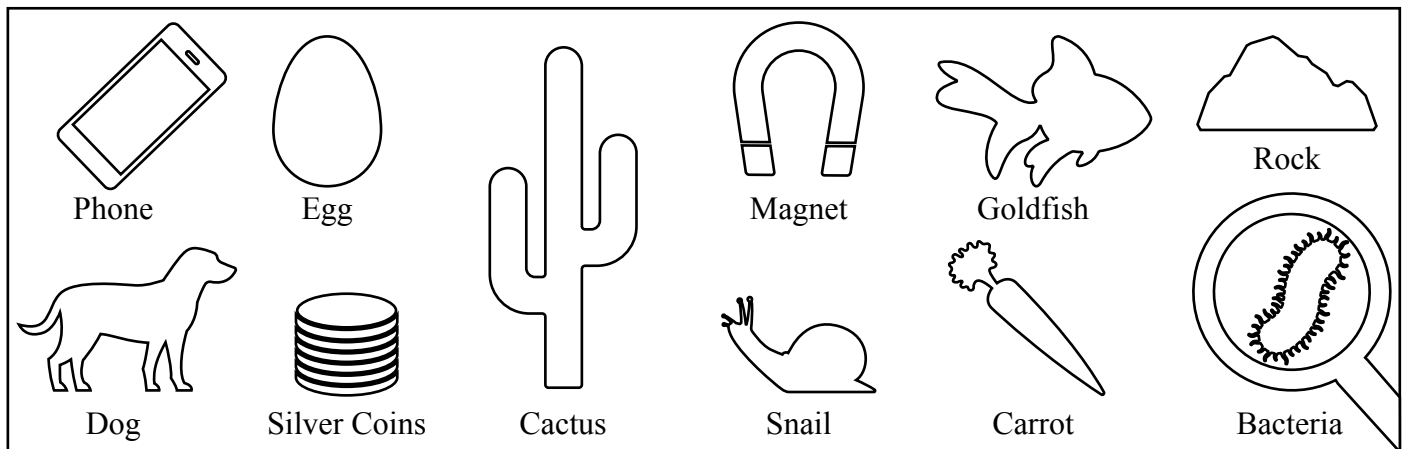


*Activity One: Color the nucleotides!*



There are 4 different building blocks (nucleotides) for DNA: Adenine, Cytosine, Guanine, and Thymine—often referred to by their beginning letters: **A**, **C**, **G**, and **T**. In the part you just colored, did you notice how the blue always paired with green and the red always paired with yellow? This is how things are in the cell too! **A** always pairs with **T**, and **G** always pairs with **C**.

*Activity Two: Circle the things that have DNA:*



# THINKING QUESTIONS

Name: \_\_\_\_\_

1. If you extracted DNA from a strawberry and planted it, could you grow a new strawberry? Why or Why not?

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2. If you extracted DNA from a strawberry and ate it, could you become a strawberry-growing human mutant?

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# DNA Deoxyribonucleic acid

Ribose is a 5 carbon sugar, often drawn as a pentagon. If this sugar loses one oxygen, then it's called a "deoxy ribose." The deoxyribose and phosphate make up the backbone of DNA.

Nucleobases or nitrogenous bases are nitrogen-containing rings that either have two rings (the Purines: Adenine and Guanine) or one ring (The Pyrimidines: Thymine, and Cytosine)

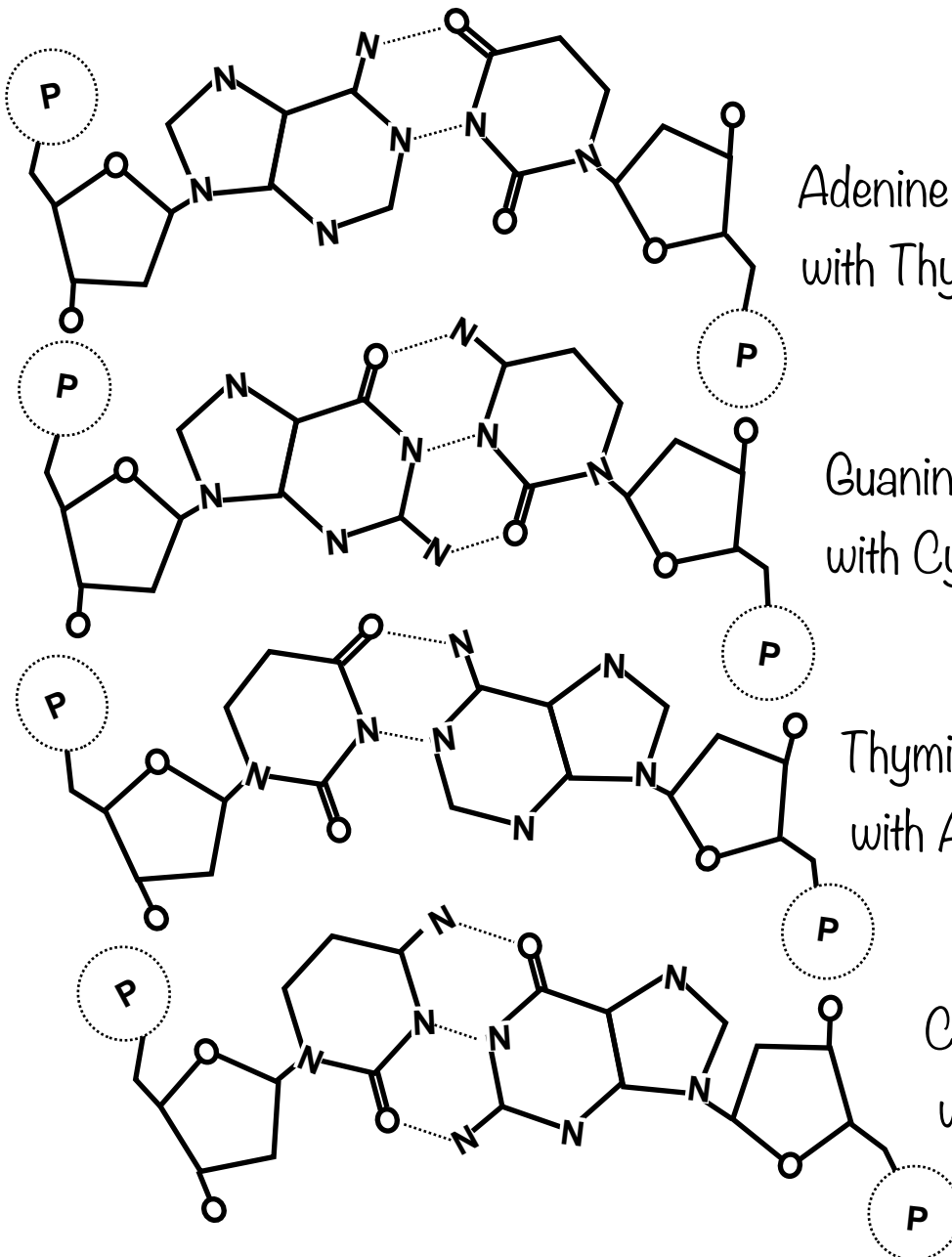
The Phosphate that makes up the backbone of the DNA is acidic.

*COLOR THE RIBOSE SUGARS YELLOW. THE RIBOSE SUGAR IS A PENTAGON WITH AN OXYGEN AT ONE OF ITS CORNERS (AN "O")*

*COLOR THE PURINES PURPLE. TO IDENTIFY THE PURINES, LOOK FOR THE PENTAGONS AND HEXAGONS THAT ARE JOINED BY SHARING ONE SIDE AND HAVE 4 NITROGENS.*

*COLOR THE PHOSPHATE GROUPS ORANGE. PHOSPHATE GROUPS HAVE ONE PHOSPHOROUS ATOM AND 4 OXYGEN ATOMS, BUT FOR SIMPLICITY, THEY ARE DRAWN HERE AS LARGE DASHED CIRCLES AROUND THE LETTER P.*

*COLOR THE PYRIMIDINES BLUE. THEY ARE A HEXAGON WITH TWO NITROGENS IN THEIR RING.*



Adenine pairs with Thymine

Guanine pairs with Cytosine

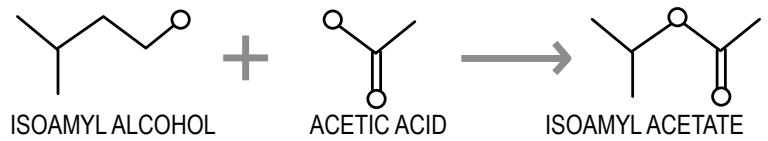
Thymine pairs with Adenine

Cytosine pairs with Guanine

# THINKING QUESTION

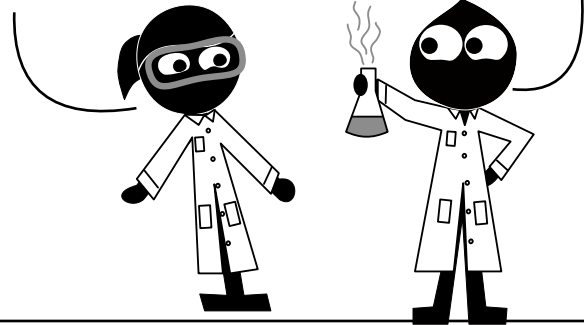
Name: \_\_\_\_\_

1. Isoamyl acetate, sometimes popularly called "banana oil" is one of the compounds responsible for banana flavor. If an enzyme called "bananase" makes Isoamyl acetate from isoamyl alcohol, could you make a strawberry taste like a banana by putting the DNA segment for the enzyme "bananase" into a strawberry?



WHY DOES THE ENTIRE SCIENCE LAB SMELL LIKE BANANA LAFFY TAFFY?!?!

BECAUSE I MADE ISOAMYL ACETATE!



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# **Answer Key**

# DNA Deoxyribonucleic acid

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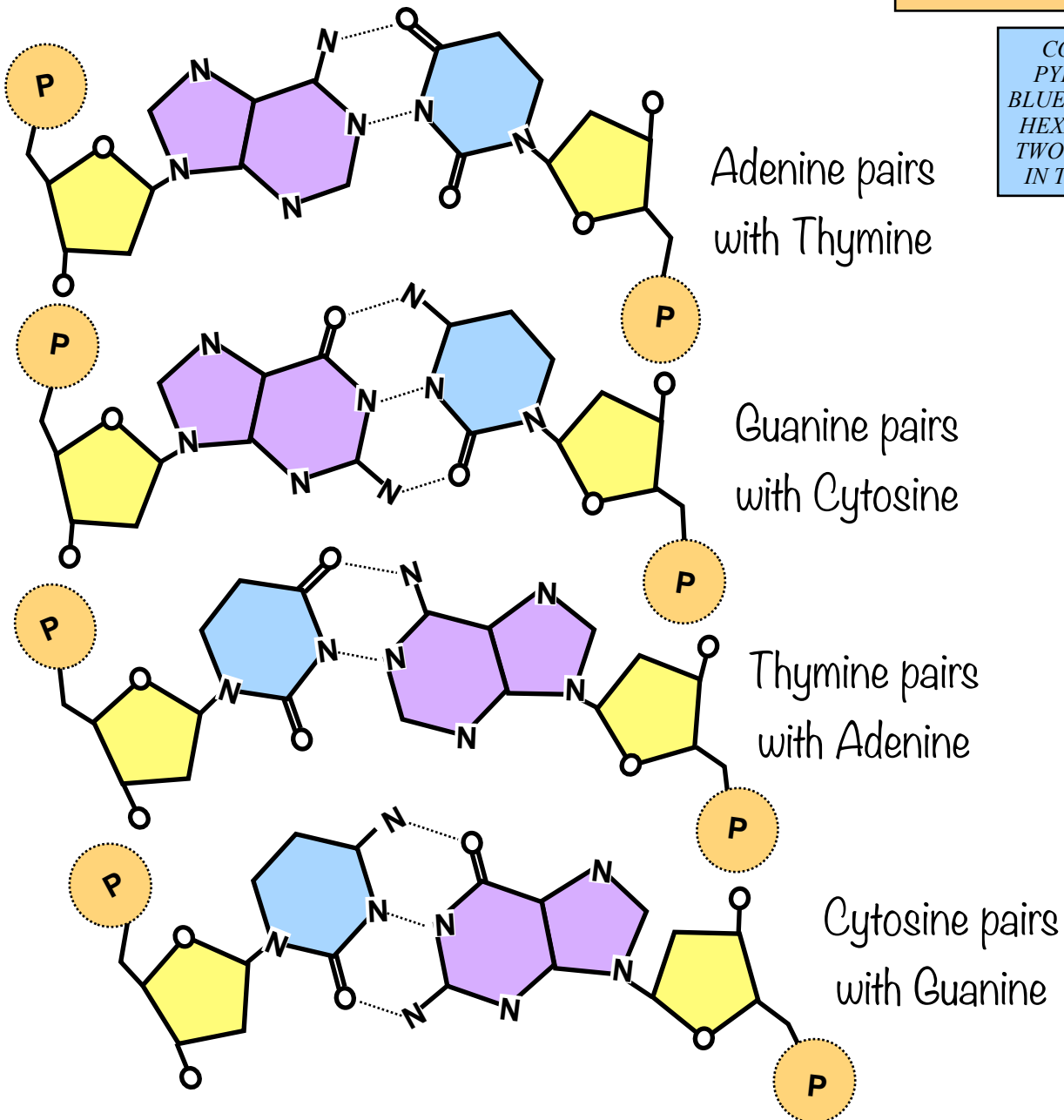
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Thymine pairs with Adenine

Cytosine pairs with Guanine



## THINKING QUESTIONS

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Strawberry DNA could not grow into a new strawberry after being planted in the ground. Just like a book with instructions for building a bicycle will only result in a bike if the tools and a person are available to read those instructions, the DNA of a strawberry will only produce a strawberry if the "machinery" of ribosomes and other parts of the plant are around.

2. If you extracted DNA from a strawberry and ate it, could you become a strawberry-growing human mutant?

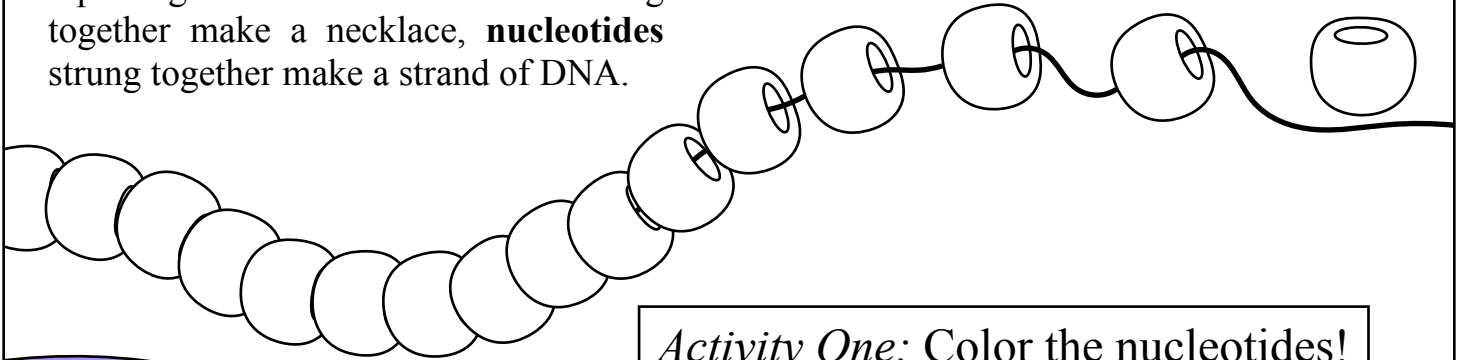
No.

DNA that goes into your stomach is broken apart by stomach acid and enzymes. It does not become part of the DNA in the cells of your body.

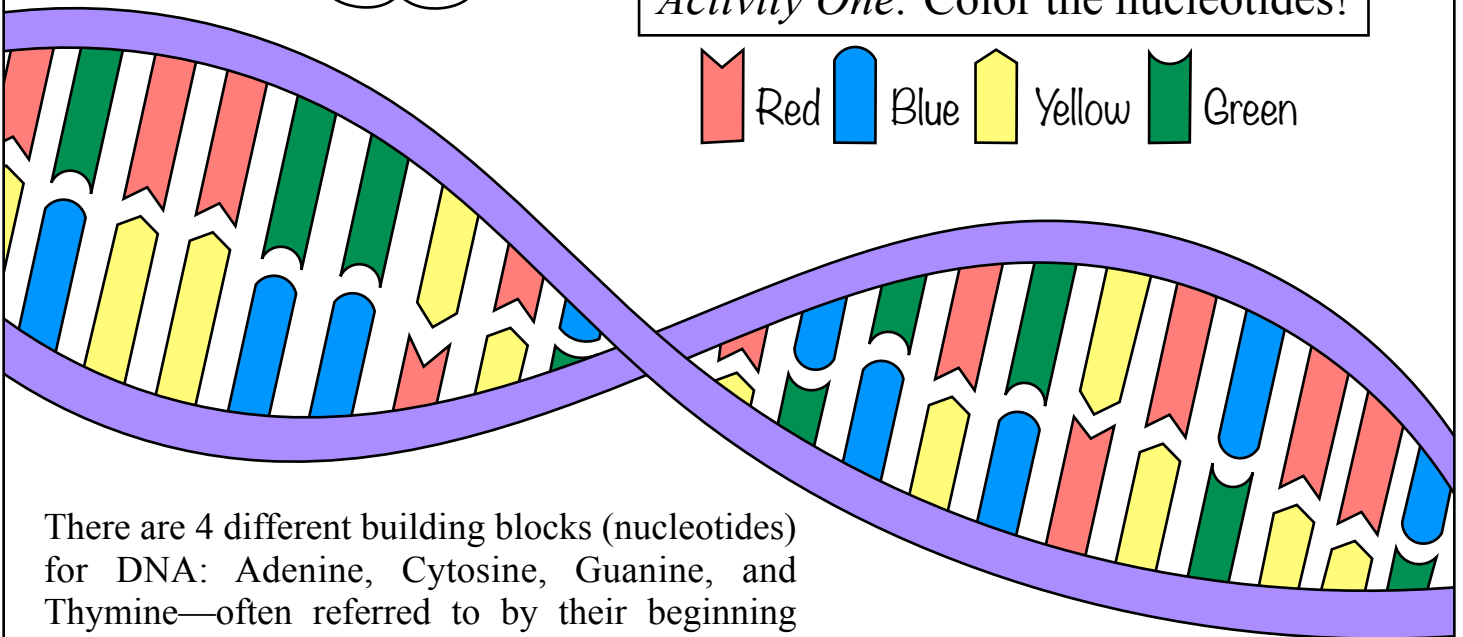
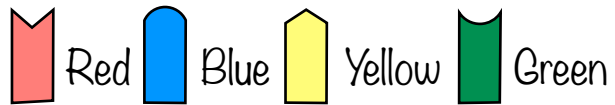
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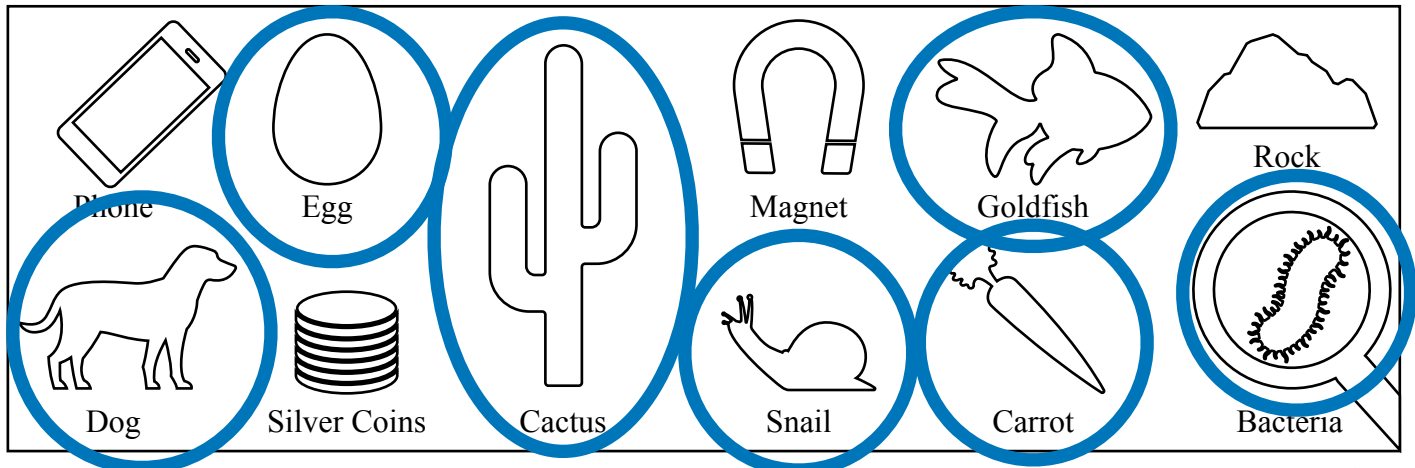


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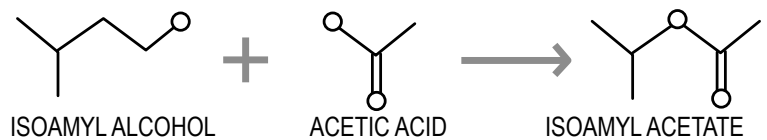
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# THINKING QUESTION

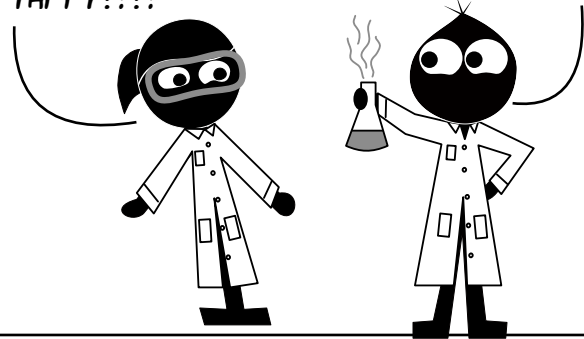
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Maybe! There are several interesting things that

happen when new DNA is inserted into another plant or animal (learn more by researching “genetically modified organism.”) Just because the DNA is there doesn’t mean it will be EXPRESSED. It would be possible for a strawberry to contain the gene to make “bananase” but for that enzyme to never be made. It would also be possible for “bananase” to be produced in a strawberry, but if there is no “isoamyl alcohol” and “acetic acid” in the strawberry then there won’t ever be any isoamyl acetate (banana oil) created. But if the DNA segment for “bananase” was put into a strawberry and a lot of isoamyl acetate was created, that strawberry would indeed taste and smell like banana laffy taffy.