NAME _____ CLASS _____ DATE _____

AP BIOLOGY · 1.5 AND 1.6

Lipids and nucleic acids

Notes to fill in alongside the guide. Each numbered block matches a chapter of the guide, and of the lesson slides. Write in the gaps, answer the cues, annotate the figures, and sum up each section in your own words.

BY THE END YOU CAN

- [ ] Explain why lipids are nonpolar and hydrophobic, and describe a triglyceride and the water released in making one 1.5.A
- [ ] Explain how saturated and unsaturated fatty acids differ in structure, and how that sets the melting point of a fat 1.5.A
- [ ] Explain how the polar head and nonpolar tails of phospholipids make them form a bilayer in water 1.5.A
- [ ] Describe the three parts of a nucleotide and the sugar-phosphate backbone with its 5′ and 3′ ends 1.6.A
- [ ] Describe complementary base pairing, its hydrogen bonds, and the antiparallel strands of the double helix 1.6.A
- [ ] Compare DNA and RNA: sugar, bases, and number of strands 1.6.A

01 The molecules water will not touch 1.5.A

CUES

Predict: You have salted butter but need it unsalted. What could you do?

What is meant by lipids?

What is meant by nonpolar?

What is meant by hydrophobic?

What is meant by triglycerides?

What is meant by glycerol?

NOTES

1 _____ are not grouped by a shared monomer, as the other three classes are.

2 They are grouped by how they behave: they are _____, so they mix with oils and solvents such as hexane but not with water.

3 Lipids are mostly carbon and hydrogen, and C–H bonds share electrons almost evenly, so water molecules have nothing to attract. They bond to each other and squeeze the lipid out into droplets or a layer: lipids are _____.

4 Fats and oils are mostly _____: one _____ joined to three _____.

5 _____ and hydrophobic, because they are mostly C–H.

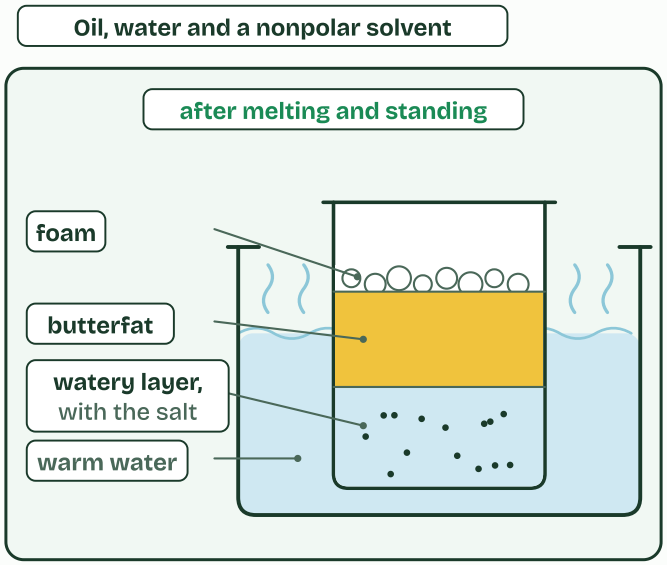
6 A triglyceride: _____ and three fatty acids, three waters released.

Your own notes

What is meant by fatty acids?

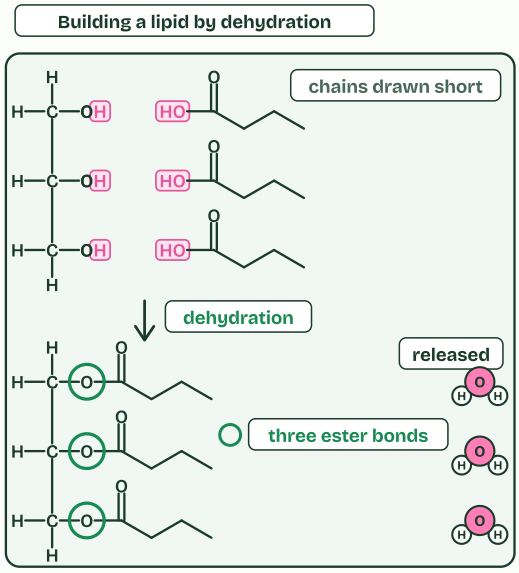
ANNOTATE THE FIGURE

Number the 5 steps on the figure and note what happens at each.



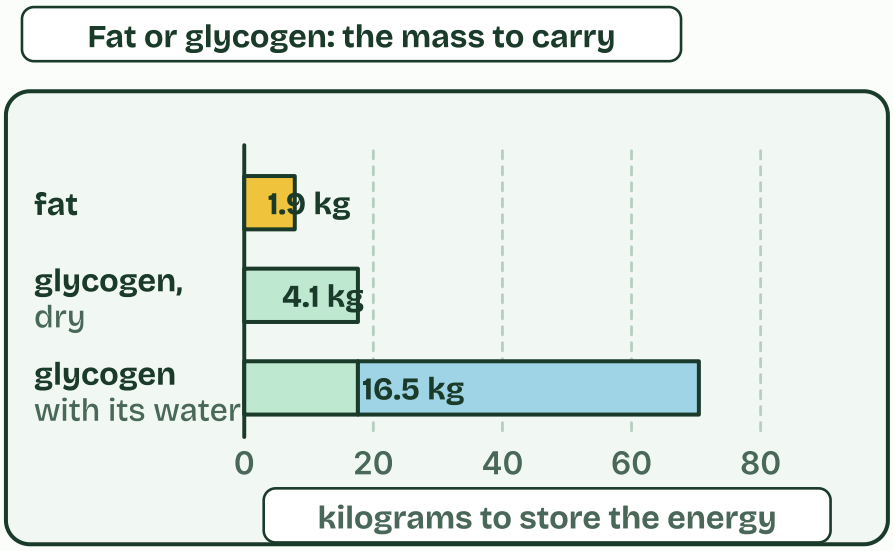
ANNOTATE THE FIGURE

The figure shows it as Triglyceride and Phospholipid. Note what changes each time.



ANNOTATE THE FIGURE

Label the key parts and add a note on what it shows.



SPOT THE MISTAKE

A student writes: "A fat is a polymer of fat molecules." Spot the mistake, then put it right.

The mistake

Put it right

SUMMARY

Sum up section 01 in two or three sentences of your own.

02 Every double bond puts a kink in the tail

1.5.A

CUES

Predict: Olive oil's fatty acids mostly have one double bond, and sunflower oil's mostly two or more. Both are liquid at room temperature. You put a bottle of each in the fridge at 5 °C. Which turns cloudy and thick?

What is meant by saturated?

What is meant by unsaturated?

NOTES

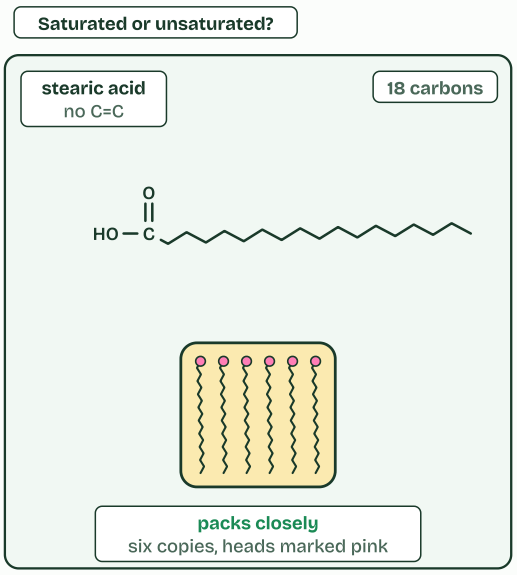
1 In a _____ fatty acid every bond between carbons is single, so each carbon holds as many hydrogens as it can: the chain is saturated with hydrogen.

2 An _____ fatty acid has one or more C=C double bonds.

Your own notes

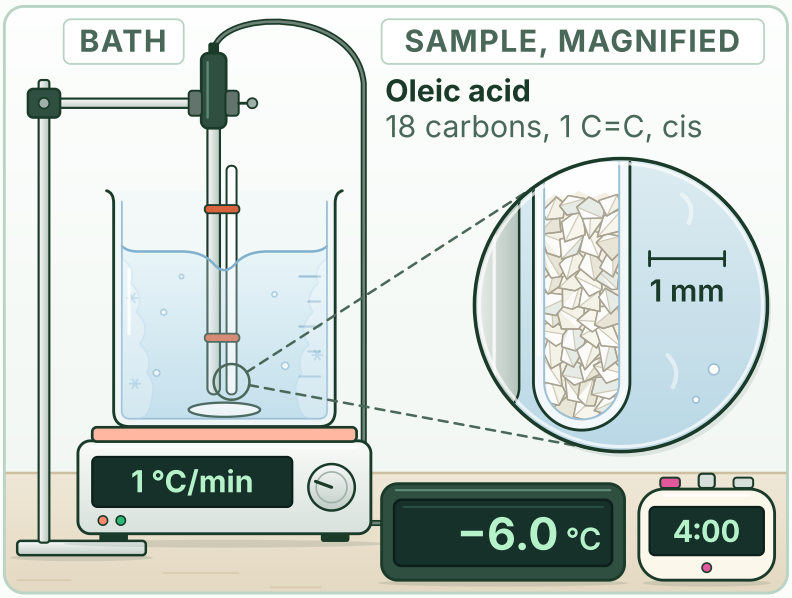
ANNOTATE THE FIGURE

The figure shows it as Saturated, Monounsaturated and Polyunsaturated. Note what changes each time.



ANNOTATE THE FIGURE

Label the key parts and add a note on what it shows.



REMEMBER IT

Why unsaturated fats are oils

D Double	K Kinks	L Leave	L Liquids
D	K	L	L

SPOT THE MISTAKE

What do students often get wrong about saturated and unsaturated? Write the mistake, then put it right.

The mistake

Put it right

SUMMARY

Sum up section 02 in two or three sentences of your own.

03 Half loves water, half does not

1.5.A

CUES

Predict: Phospholipids are shaken in oil instead of water. Which way do they turn?

What is meant by phospholipid?

What is meant by hydrophilic head?

What is meant by hydrophobic?

What is meant by amphipathic?

What is meant by bilayer?

NOTES

1 A _____ is built like a triglyceride, but one fatty acid is replaced by a phosphate group.

2 The phosphate end is charged and polar, a _____ that water is drawn to.

3 The two fatty acid tails stay nonpolar and _____.

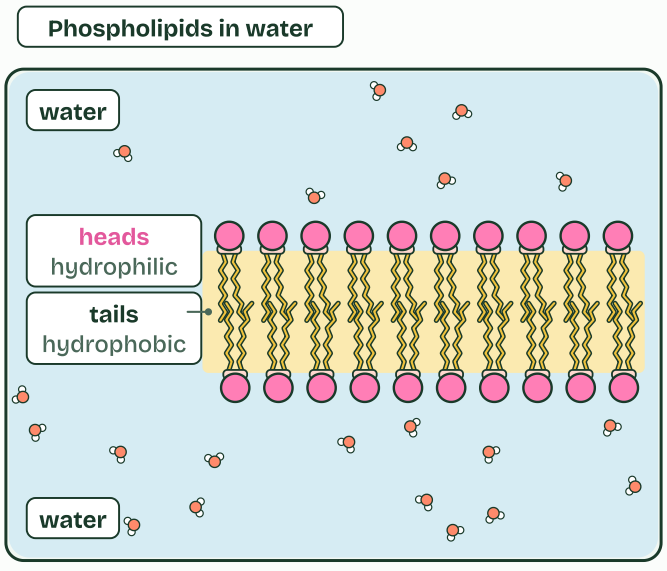
4 A molecule with a part of each kind is _____.

5 Water bonds to the heads and pushes the tails together, so the molecules gather into a _____: two sheets, heads out toward the water on both sides, tails in, out of the water's way.

Your own notes

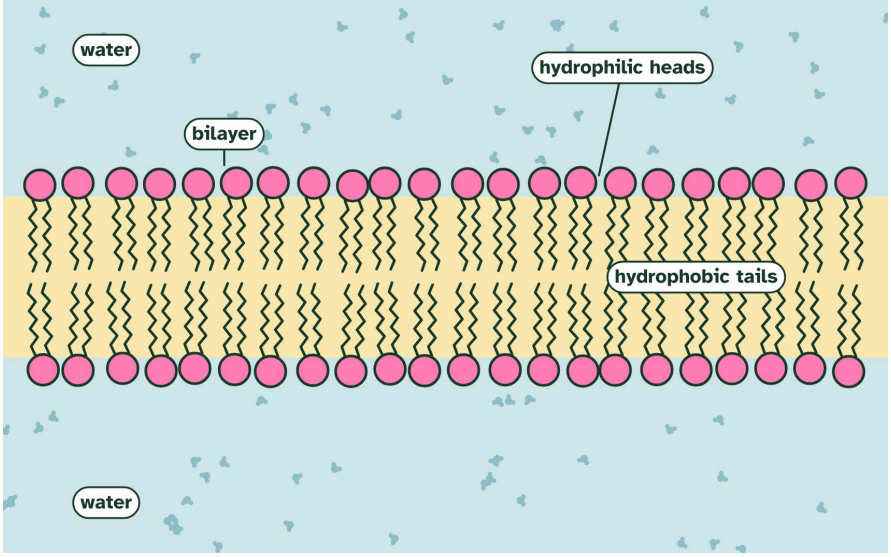
ANNOTATE THE FIGURE

Number the 4 steps on the figure and note what happens at each.



ANNOTATE THE FIGURE

Annotate this still from the animation (Watch it happen: a bilayer builds itself): what is happening, and why?



SPOT THE MISTAKE

What do students often get wrong about phospholipids? Write the mistake, then put it right.

The mistake

Put it right

SUMMARY

Sum up section 03 in two or three sentences of your own.

04 A sugar, a phosphate and a base

1.6.A

CUES

Predict: A strand of RNA 50 nucleotides long is made. How many water molecules are released?

What is meant by nucleotides?

What is meant by nitrogenous base?

What is meant by sugar-phosphate backbone?

What is meant by 5′ end?

What is meant by 3′ end?

NOTES

1 Their monomers are _____, and every nucleotide has three parts: a five-carbon sugar in the middle, a phosphate group on one side and a _____ on the other.

2 Repeat it and a chain grows with a _____ of strong covalent bonds, and the bases stick out to one side of it, at right angles.

3 The carbons of the sugar are numbered 1′ to 5′, and each phosphate links the _____ carbon of one sugar to the _____ carbon of the one before.

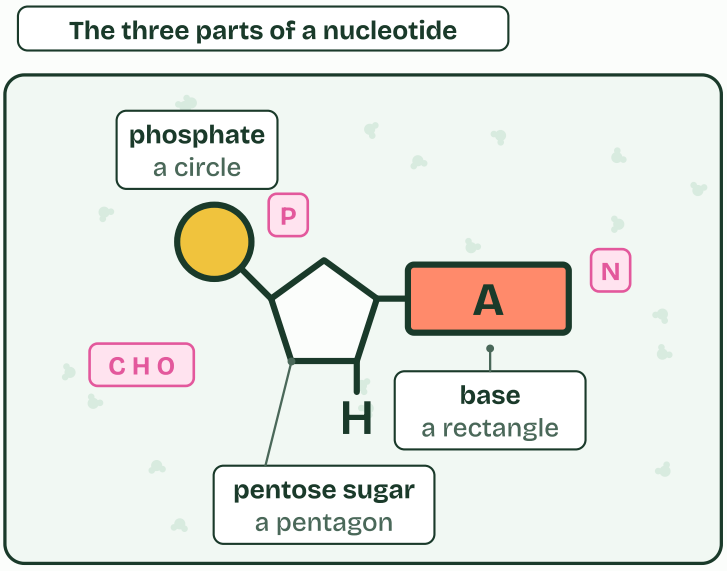
4 So one end of a strand has a free phosphate on a 5′ carbon, the _____, and the other a free OH on a 3′ carbon, the _____.

5 A strand has a _____ and a 3′ end, and grows at the 3′ end.

Your own notes

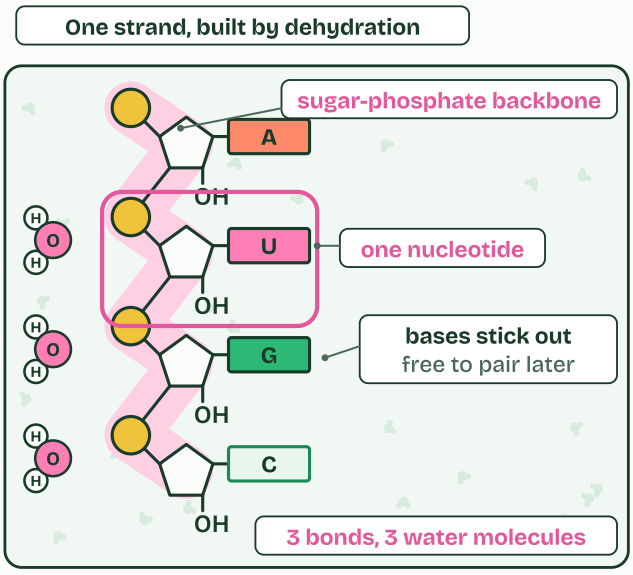
ANNOTATE THE FIGURE

Number the 4 steps on the figure and note what happens at each: 1 three parts; 2 sugar; 3 circle, pentagon, rectangle; 4 phosphorus.



ANNOTATE THE FIGURE

Number the 5 steps on the figure and note what happens at each: 1 nucleotide; 2 Dehydration synthesis; 3 water; 4 backbone; 5 together.



SPOT THE MISTAKE

What do students often get wrong about nucleotides and the backbone? Write the mistake, then put it right.

The mistake

Put it right

SUMMARY

Sum up section 04 in two or three sentences of your own.

05 Two strands, running opposite ways

1.6.A

CUES

Predict: Two stretches of DNA are the same length. One is 60% C and G, the other 60% A and T. Which needs more heat to separate its strands?

What is meant by complementary base pairing?

What is meant by hydrogen bonds?

What is meant by antiparallel?

What is meant by double helix?

NOTES

1 The bases pair by _____: adenine (A) with thymine (T), and cytosine (C) with guanine (G).

2 The pairs are held by _____: two between A and T, three between C and G.

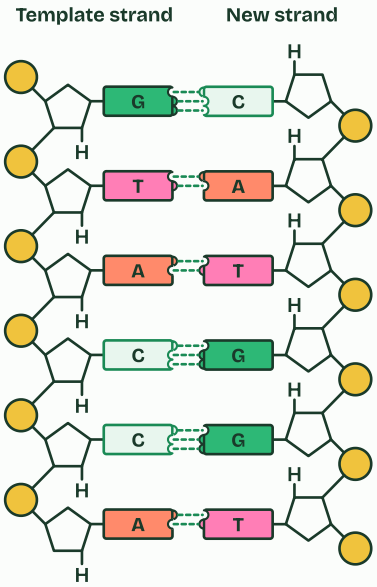
3 The two strands are _____: one runs 5′ to 3′, and its partner, beside it, runs 3′ to 5′.

4 Together the pair twists into a _____, with the backbones on the outside and the base pairs stacked like rungs inside.

Your own notes

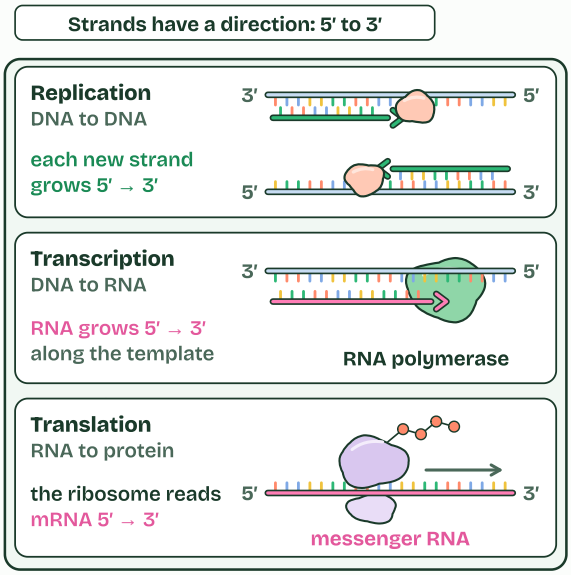
ANNOTATE THE FIGURE

The figure shows it as Which base fits each slot?, Paired: only A with T and G with C form hydrogen bonds, Copy it: two molecules with the same sequence and Read it: messenger RNA, read by a transfer RNA. Note what changes each time.



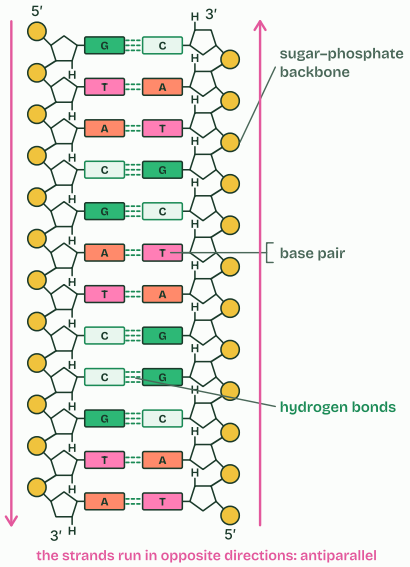
ANNOTATE THE FIGURE

Number the 5 steps on the figure and note what happens at each: 1 1′ to 5′; 2 5′, 3′; 3 3′ end; 4 antiparallel; 5 one direction.



ANNOTATE THE FIGURE

The figure shows it as Flat: the ladder the exam asks for and Twisted into a double helix. Note what changes each time.



REMEMBER IT

Which base pairs with which

A Apples	T Tree	C Cars	G Garage
A	T	C	G

SPOT THE MISTAKE

What do students often get wrong about base pairing and antiparallel strands? Write the mistake, then put it right.

The mistake

Put it right

SUMMARY

Sum up section 05 in two or three sentences of your own.

06 Two nucleic acids, two jobs

1.6.A

CUES

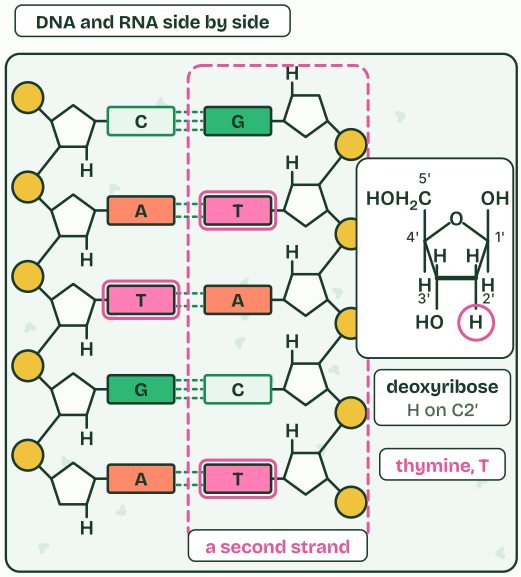
Predict: A sample of nucleic acid contains uracil, and its A and U are not present in equal amounts. What is it most likely to be?

NOTES

Your own notes

ANNOTATE THE FIGURE

The figure shows it as DNA and RNA. Note what changes each time.



SPOT THE MISTAKE

A student writes: “RNA has uracil instead of adenine.” Spot the mistake, then put it right.

The mistake

Put it right

SUMMARY

Sum up section 06 in two or three sentences of your own.

Check yourself

The check for this guide is online: a fresh paper of past-paper style questions from the exam bank on 1.5 and 1.6 each time, marked as you go, and saved to your Exam practice progress when you are signed in. Scan the code, or type the link.

biologybybradford.com/exam-maker/sit?program=ap&units=U1&ced=1.5,1.6&paper=quiz&marks=15&src=ep

How this was made. The course structure, the activities and the teaching choices come from my own classroom, my presentations and my years of teaching IB and AP Biology. I use Claude, an AI, to help write and build the interactive guides, lesson plans, slides and practice questions, and to draw the diagrams and code the interactives. I direct the work and review it against the IB and AP specifications before it goes live.