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PAPER
E

Practice
Questions



ICAS International
Competitions
and Assessments
for Schools

DO NOT OPEN THIS BOOKLET UNTIL INSTRUCTED.

STUDENT'S NAME:

Read the instructions on the **ANSWER SHEET** and fill in your **NAME, SCHOOL** and **OTHER INFORMATION**.

Use a 2B or B pencil.

Do **NOT** use a pen.

Rub out any mistakes completely.

You **MUST** record your answers on the **ANSWER SHEET**.

SCIENCE

Mark only **ONE** answer for each question.

Your score will be the number of correct answers.

Marks are **NOT** deducted for incorrect answers.

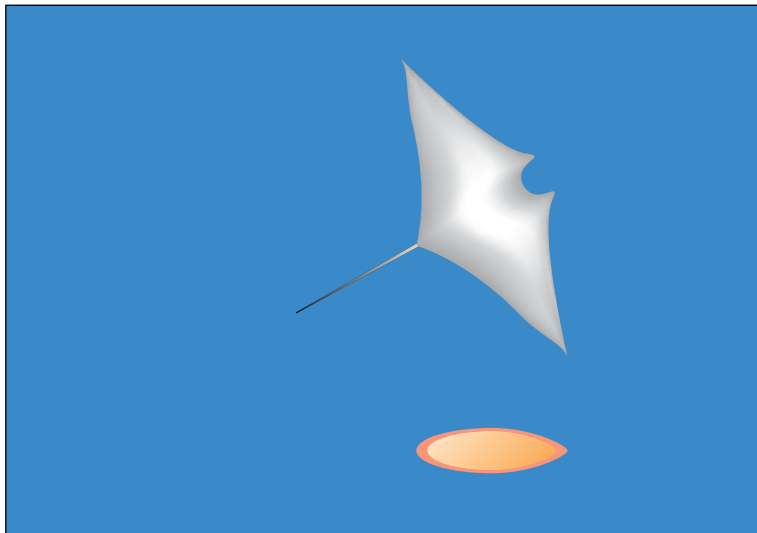
Use the information provided to choose the **BEST** answer from the four possible options.

On your **ANSWER SHEET** fill in the oval that matches your answer.

You may use a calculator and a ruler.

Educational
Assessment

1. The following is a false-coloured imaging photograph of a manta ray and a scientist's boat. The length of the scientist's boat is two metres.

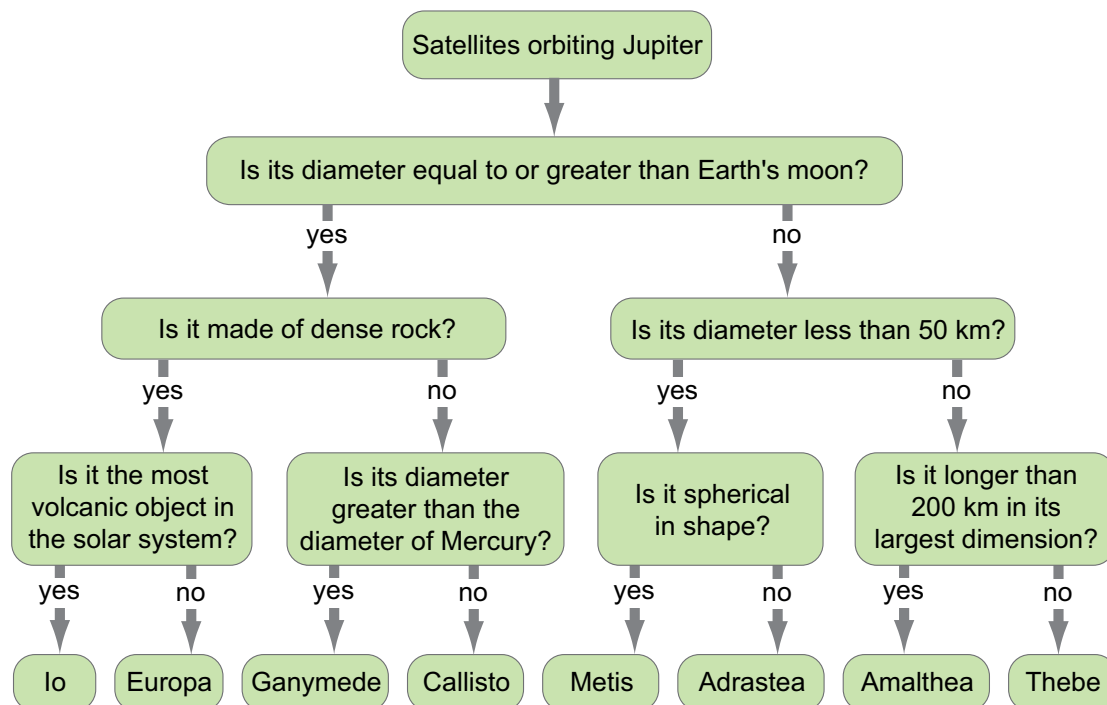


What is the wingspan in metres of the manta ray?

- (A) 2.1
(B) 2.3
(C) 3.1
(D) 4.5

2. Mercury has a diameter of 4 900 km.
Earth's moon has a diameter of 3 500 km.

The flow chart distinguishes between eight inner satellites of the planet Jupiter.

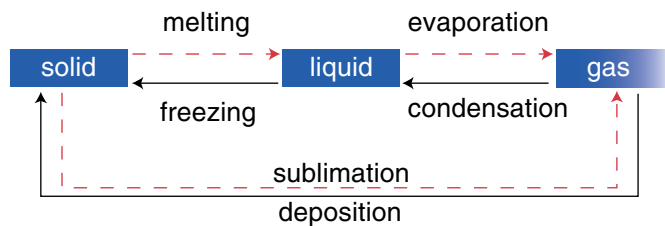


One of Jupiter's inner satellites has a diameter of 4 800 km and is **not** made of dense rock.

Which satellite is this?

- (A) Io (B) Europa (C) Ganymede (D) Callisto

3. Matter can exist as a solid, liquid or gas. The state can be changed by varying the temperature. For each change of state, different terms are used. These are shown in the diagram.



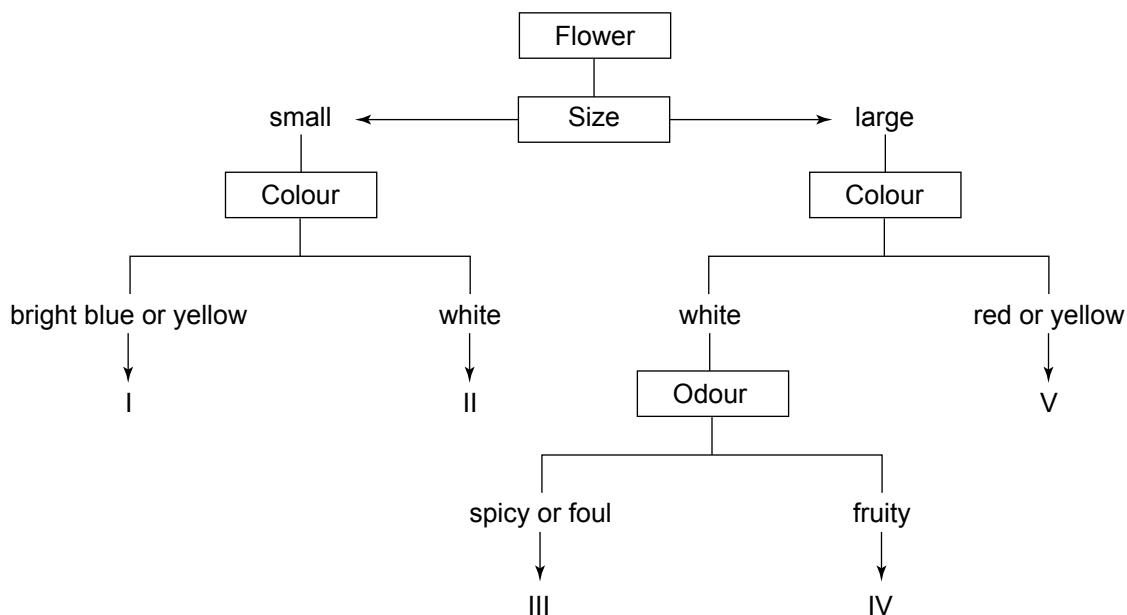
If dry ice (solid carbon dioxide) is heated and directly changed to carbon dioxide gas, this is called

- (A) melting then evaporation. (B) sublimation.
(C) evaporation. (D) deposition.

4. The table shows the characteristics that some flowers have to attract animals.

Animal	The characteristics of flowers that mainly attract the animal		
	Size	Colour	Smell/odour
bee	small	bright blue or yellow	–
beetle	large	white	spicy or foul
butterfly	small	white	–
bird	large	red or yellow	–
bat	large	white	fruity

The key classifies 5 flowers: I, II, III, IV and V.



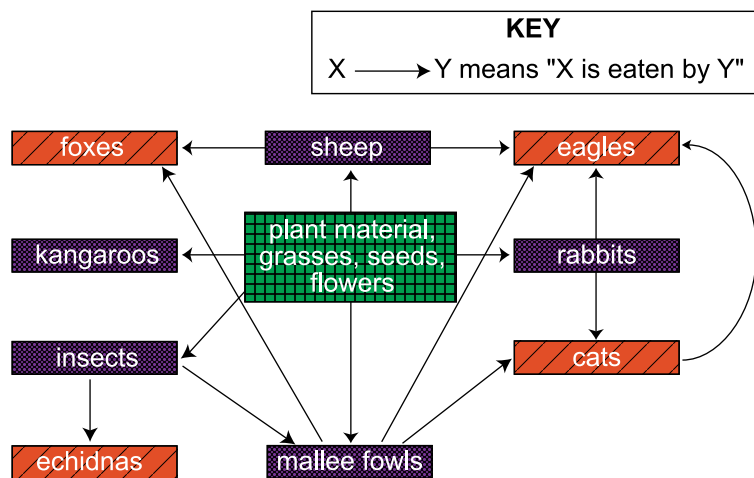
Which animal would be attracted to flower I and which would be attracted to flower IV?

	I	IV
(A)	bird	beetle
(B)	bee	bird
(C)	bird	bee
(D)	bee	bat

5. An animal that is threatened with extinction is endangered. The mallee fowl is a native species and is endangered.

Foxes, rabbits, cats and sheep are animal species introduced to Australia by humans. Introduced species can endanger native animals. The introduced species may be predators, or compete with native animals for food.

The diagram shows the main food web for a mallee fowl habitat.

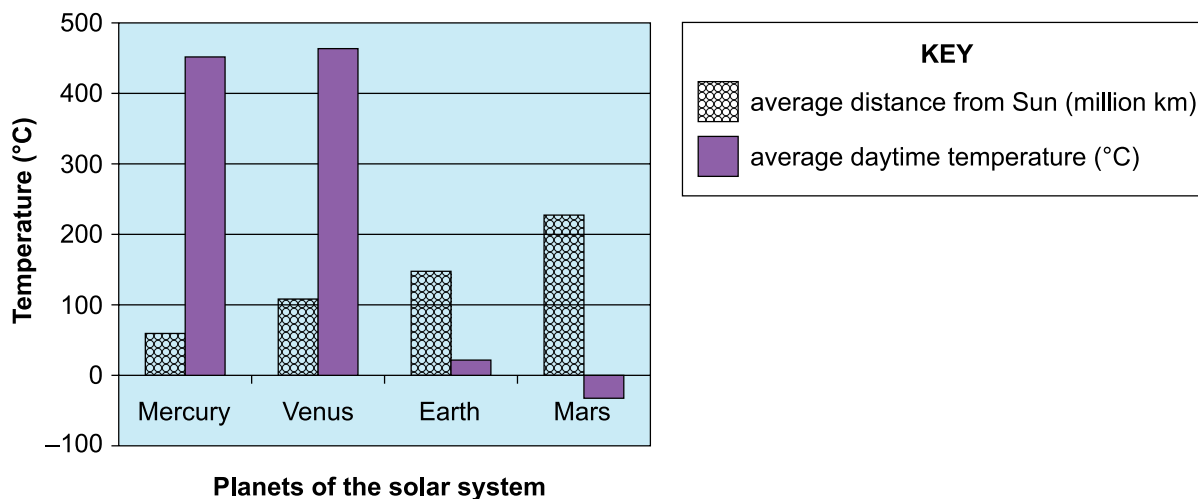


What is the purpose of the text box colour coding in the food web?

The colours distinguish between

- (A) endangered species and introduced species.
- (B) native species and introduced species.
- (C) plants, plant eaters and meat eaters.
- (D) plants, animals and insects.

6. The graph shows the average distance from the Sun and the average daytime temperature for some planets in the solar system.

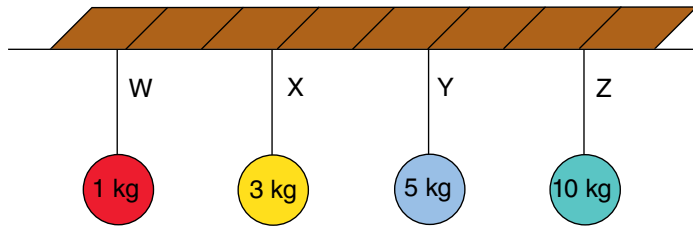


Generally, the further a planet is from the Sun, the colder will be its average daytime temperature.

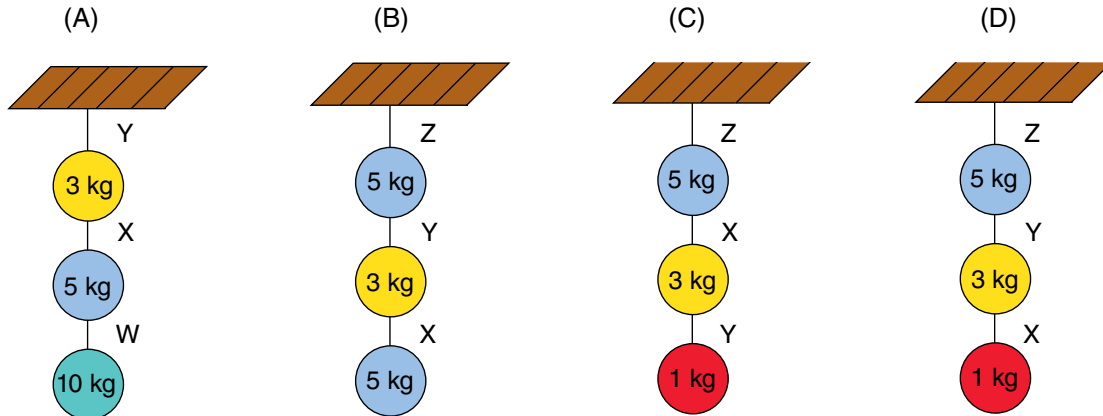
According to the graph, which planet does not follow this trend?

- (A) Mercury
- (B) Venus
- (C) Earth
- (D) Mars

7. Peter has four types of string that he labels W, X, Y and Z. The diagram shows the maximum weight that each can support without breaking.

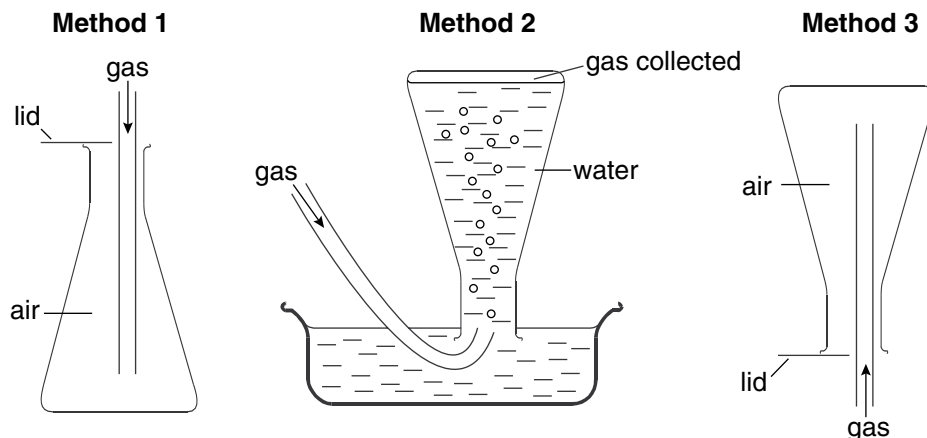


In which diagram will all the strings remain unbroken?



For questions 8 and 9 use the information below.

The diagrams show three methods that are commonly used to collect gases.



Some colourless gases and their properties are shown.

Gas	Soluble in water	Mass compared to equal volume of air	Smell
ammonia	yes	less	strong
oxygen	no	equal	none
hydrogen	no	less	none
methane	no	less	none
carbon dioxide	yes	more	none

8. What are the best methods for collecting some of these gases?

	Carbon dioxide	Hydrogen	Oxygen	Ammonia
(A)	method 1	method 2	method 2	method 3
(B)	method 3	method 2	method 2	method 1
(C)	method 2	method 3	method 1	method 3
(D)	method 1	method 2	method 2	method 1

9. A student wished to collect methane gas using method 3.

What would be her biggest problem?

- (A) getting the methane to stay in the flask
- (B) knowing when the flask is full
- (C) preventing the methane from igniting
- (D) avoiding the strong smell of methane

10. Aquatic environments have a number of sources of pollutants. Pollutants from point sources come from specific places that can be easily identified and controlled. Non-point sources of pollutants are more widespread, usually covering a large area and cannot be easily measured or identified.

The following table identifies some types of pollutants and their sources.

	Point sources		Non-point sources	
Pollutant	Mines	Wastewater treatment plants	Stormwater	Agriculture
pathogens (bacteria and viruses)	✓	✓	✓	✓
toxicants (heavy metals and pesticides)	✓	✓	✓	✓
sediments	✓		✓	✓
nutrients (nitrates and phosphates)		✓	✓	✓
salinity				✓
heat	✓			

Which statement is correct according to the information in the table?

- (A) Wastewater treatment plants are non-point sources of toxicant and nutrient pollution.
(B) All listed sources of pollutants release sediment and pathogens into aquatic environments.
(C) Mines and agriculture release the largest volume of pollutants into aquatic environments.
(D) While the table shows different pollution sources, the volume of each pollutant is not shown.

Acknowledgment

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The following year levels should sit THIS Paper:

Australia	Year 7
Brunei	Form 1
Hong Kong	Form 1
Indonesia	Year 8
Malaysia	Form 1
New Zealand	Year 8
Pacific	Year 7
Singapore	Primary 6
South Africa	Grade 7



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HOW TO FILL OUT THIS SHEET:



- Rub out all mistakes completely.
- Print your details clearly in the boxes provided.
- Make sure you fill in only one oval in each column.

EXAMPLE 1: Debbie Bach

FIRST NAME						LAST NAME					
D	E	B	B	I	E	B	A	C	H		
(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)		
(B)	(B)	(B)	(B)	(B)	(B)	(B)	(B)	(B)	(B)		
(C)	(C)	(C)	(C)	(C)	(C)	(C)	(C)	(C)	(C)		
(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)		

EXAMPLE 2: Chan Ai Beng

FIRST NAME **LAST NAME**

C	H	A	N
○	○	○	○
(A)	(A)	●	(A)
(B)	(B)	(B)	(C)
●	(C)	(C)	
(D)			

A	I	B	E	N	G
○	○	○	○	○	○
●	(A)	(A)	(A)	(A)	(A)
(B)	(B)	(B)	●	(B)	(B)
(C)	(C)	(C)	(C)	(C)	
(D)	(D)	(D)	(D)	(D)	

EXAMPLE 3: Jamal bin Abas

FIRST NAME										LAST NAME			
J	A	M	A	L		B	I	N		A	B	A	S
☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐
(A)	☒	(A)	☒	(A)	(A)	(A)	(A)	(A)	☒	(A)	☒	(A)	
(B)	B	(B)	B	(B)	B	B	☒	(B)	(B)	☒	(B)	(B)	
(C)	C	(C)	C	(C)	C	C	(C)	(C)	(C)	C	(C)	(C)	
(D)	D	(D)	D	(D)	D	D	(D)	(D)	(D)	D	(D)	(D)	

FIRST NAME to appear on certificate

[illegible]

LAST NAME to appear on certificate

[illegible]

Are you male or female?

☐ Male ☐ Female



Does anyone in your home usually speak a language other than English?

☐ Yes ☐ No

School name: _____

DATE OF BIRTH

Day		Month		Year	
0	0	0	0	0	0
1	1	1	1	1	1
2	2		2	2	2
3	3		3	3	3
	4		4	4	4
	5		5	5	5
	6		6	6	6

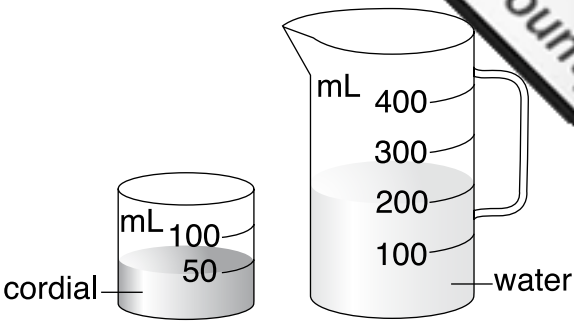
CLASS
(optional)

(A)	(K)
(B)	(L)
(C)	(M)
(D)	(N)
(E)	(O)
(F)	(P)
(G)	(Q)

TO ANSWER THE QUESTIONS

Example: Ari added cordial to water to make a jug of drink.
What will be the volume of the drink in the jug?

- (A) 50 mL
- (B) 150 mL
- (C) 200 mL
- (D) 250 mL



The answer is 250 mL, so you would fill in the oval (D), as shown.

(A) (B) (C) (D)



START

- 1 (A) (B) (C) (D)
- 2 (A) (B) (C) (D)
- 3 (A) (B) (C) (D)
- 4 (A) (B) (C) (D)
- 5 (A) (B) (C) (D)
- 6 (A) (B) (C) (D)
- 7 (A) (B) (C) (D)
- 8 (A) (B) (C) (D)
- 9 (A) (B) (C) (D)
- 10 (A) (B) (C) (D)

QUESTION	KEY	KEY REASONING	LEVEL OF DIFFICULTY
1	D	The image of the boat is 20 mm and the image of the wingspan of the manta ray is 43 mm. If the boat is actually 2.0 m long then the wingspan is 4.3 m. The best answer is D. (Note that some printers may distort the images.)	Easy
2	D	Start at the top of the diagram. The satellite's diameter of 4 800 km is greater than the diameter of the Earth's moon (3 500 km), but less than Mercury's diameter of 4 900 km.	Easy
3	B	As carbon dioxide changes directly from solid to gas, bypassing the liquid state, sublimation is the correct answer.	Medium
4	D	The table identifies the characteristics of flowers that attract particular animals. The key classifies some flowers according to their characteristics. To arrive at the correct answer you must match the characteristics from the key to those given in the table.	Easy
5	C	Plant material is coded green. Things that eat plants are coded purple while things that eat animals only are coded orange. Rabbits (introduced) and mallee fowls (native) are both coded purple, so A and B are wrong. Cats and rabbits are animals but are coded with different colours, so D is wrong. Producers are coded green, herbivores or omnivores are coded purple and carnivores are coded orange.	Medium
6	B	To answer the question, we have to ask the following: as the spotted graph goes up (increasing distance away from the Sun), does the purple graph (average daytime temperature) always go down? The average daytime temperature of Venus is higher (not lower) than Mercury's average daytime temperature even though it is further from the Sun. It should be noted that the daytime temperature of Mars is below Earth's daytime temperature.	Medium/Hard
7	D	For the strings to remain unbroken, the strength of each string must exceed the mass it is required to support. That is, the top string must be capable of supporting the total mass of the three weights, the middle string must be capable of supporting the mass of the two weights beneath it, and the bottom string must be capable of supporting the mass of the bottom weight. This occurs only in option (D), where string Z (capable of supporting 10 kg) is supporting three weights with a total mass of 9 kg, string Y (capable of supporting 5 kg) is supporting two weights with a total mass of 4 kg, and string X (capable of supporting 3 kg) is supporting a mass of 1 kg.	Medium/Hard
8	A	As carbon dioxide is soluble in water, method 2 will not work; and as it is also denser than air method 3 will not work – leaving method 1, for collecting carbon dioxide, options A or D. As ammonia is less dense than air, method 3 is the best method to collect it, therefore A is the answer.	Hard
9	B	As methane has no smell, D is wrong. Because methane is less dense than air it will float upwards, so A is wrong. While methane is flammable this will not hinder getting methane into the flask, so C is wrong.	Medium/Hard
10	D	While the table shows different pollution sources, the volume of each pollutant is not shown. Wastewater treatment plants are point sources of pollution, so A is wrong. According to the table, wastewater treatment plants do not release sediments, so B is wrong. The table only shows the type of pollution and its source; there is no information in the table that shows the correct volume of pollution produced, so C is wrong and D is correct.	Medium/Hard

LEGEND

Level of difficulty refers to the expected level of difficulty for the question.

Easy more than 70% of candidates will choose the correct option.

Medium about 50–70% of candidates will choose the correct option.

Medium/Hard about 30–50% of candidates will choose the correct option.

Hard less than 30% of candidates will choose the correct option.