Sadiq Public School

Distance Learning for C2

August-September 2020

Sadiq Public School

Do the right, fear no man

Distance Learning

July, 2020

Dear students and parents,

Assalam o aleikum.

Inshallah all of our students and their families are staying home, staying safe, and protecting themselves and their communities in this most unusual situation. We understand as well as anyone how difficult it is to be living in such a situation. If we all follow the government's very simple guidance the situation will improve very soon, as it has in many countries around the world, and our lives can get back to normal.

The Government has announced that Schools will likely be allowed to re-open on September 15th, 2020. Let me be clear – Sadiq Public School is planning for a full school year from September 15th 2020, i.e. with the appropriate number of school days to ensure our students complete their normal syllabuses well in time for their annual examinations without compromising too much on the remainder of our unique, holistic curriculum that includes sports, clubs, and community service – and self-discipline (doing the right thing at the right time).

After a considerable amount of thought and planning, after considering the many factors associated with distance learning including health and safety risks to children of being online for too long and unsupervised, costs of technology/devices/software, and the expected/likely outcomes, we have decided to offer a package of distance learning activities for students to do some school work. These activities are NOT intended to replace in-school, teacher-student learning activities and they are NOT compulsory for students to complete. The team of education experts at Sadiq Public School very strongly believe that education, i.e. meaningful learning, happens best when teachers and students interact, face to face, spontaneously.

We also understand that the Sadiq Public School family is very diverse and what will work well for a K2 student living in Bahawalpur probably will not for a K2 student living in Quetta or a P6 student living in Karachi. This is a self-contained, age-specific package of learning material prepared by SPS teachers for SPS students. You will not need to use the internet and you will not need textbooks or any other material except a

normal, lined school notes book (a separate one for each subject) which you will bring back to school when lessons resume. We decided to create an e-booklet so it can be published and distributed to students and parents without needing to be printed and sent by post/courier out of concern for our environment. (There is an interesting hypothesis that the coronavirus outbreak is due to deforestation.)

Everyone's health is the top concern right now. Learning some mathematics right now is less important than protecting your health and your family's health. Not just your physical health, but also your mental health. We understand that these last few and next few months have been and will be difficult. It is very normal for everyone to be feeling worried and anxious. In such times, it is important to recognise your anxiety, understand what is causing it, and learn how to manage it by being kind to yourself, patient with others, eating well, sleeping well, doing some physical activity (there's a whole section about this later in the booklet), and trying to maintain a positive outlook. The virus outbreak will pass. We will all return to our normal lives. Inshallah!

Be happy. Not because everything is good, but because you can see some good in everything.

Yours Sincerely,

Mr Peter Giddens

Principal

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How to achieve academic success at Sadiq Public School

Our approach to teaching and learning is based on the knowledge that learning only occurs when cognitive effort is generated to the extent that information is made into a long-term memory that can be readily recalled. We use traditional teaching methods informed by current research in education and pedagogical practices.

The Sadiq Public School approach is based on:

1. Teachers impart knowledge and skills using a variety of media – talking/lecturing, written notes and diagrams on a whiteboard, demonstrations, initiating practical activities for students to experience what is being learnt.
2. All lessons are taught on the assumption that as the course unfolds, students are creating their own class notes.
3. Students use one standard textbook for each subject; the book recommended by the School. Students possess and use one lined or gridded copy book per subject, into which class notes are created. (Thinner books with less pages are preferable, to minimise the weight being carried from lesson to lesson. If students require, additional copy books should be used – but always a separate book for separate subjects.
4. A student's class notes are created from a combination of teacher-guided media and student-created media.
5. The class notes should replicate/mirror the course outline and the textbook chapter headings so that students can clearly see that their class notes match the course and the examination.
6. Teachers will show students how to use note-taking/making techniques such as underlining, using different colours, diagrams, lists, boxes, etc.
7. In general, the first half of the copy book is for class notes and the second half, indicated with some form of marker is for practice activities, e.g. homework tasks, the questions at the end of a textbook chapter, etc.
8. Students MUST keep a complete and neatly presented set of class notes. If a student misses a lesson, it is his/her responsibility to add in missed work. This may be done by copying another student's copy book.
9. Frequently, teachers will check students' copy books for completion, neatness, accuracy, etc., and to write personalised / individualised feedback to students.
10. Occasional paper handouts may be trimmed and pasted neatly into a copy book, but this should be kept to a minimum because the act of writing/drawing the class notes into the copy book is the student's first step in learning the material being taught by the teacher. Pasting handouts into copy books teaches students how to use a glue stick and scissors; it does not teach a student anything about the material on the handout.

Writing class notes is the basis of our teaching and learning – but of course this is supported by other experiences such as demonstrations, practical activities, etc.

Examination preparation

In the weeks before examinations, students would typically use the class notes and text book to create a set of study notes by re-writing, often in short-hand/note form, using diagrams and mnemonics etc. Doing this reinforces and consolidates the student's class notes. Students would also complete the questions at the end of each chapter on their own. They would attend lessons and, under the teacher's supervision, complete individual exam questions from past papers, in such a way that the teacher 'unpacks' a question, clarifies the demands of the question, and students and teacher collectively create 'perfect' exam answers – all of which models how a student would take an examination, i.e. read the question, unpack the requirements of the question, clarify key terms/vocabulary in the question, pause, think, plan an answer, and then write an answer.

If you can, now is a good time to buy and prepare your notes books for each subject, ready for when you return to school.

You can use these notes books to write your answers/essays/responses to the activities in this booklet.

1. English Language

1.   Reading

Activity: Newspaper Reading

Read 5 articles from one edition of DAWN (newspaper).

1. Summarise each article in one sentence.
2. Rewrite one of the articles from a different perspective.
3. What does the term 'bias' mean in regards to reporting news? How can we know that a newspaper articles is accurate and unbiased?

2.   Transformation of Sentence Structures

Activity: Related to Direct and Indirect Speech

Read this extract from Dickens' David Copperfield and rewrite the script after changing direct speech into indirect speech:

Peggotty and I were sitting one night by the parlour fire, alone. I had been reading to Peggotty about crocodiles. I must have read very perspicuously, or the poor soul must have been deeply interested, for I remember she had a cloudy impression, after I had done, that they were a sort of vegetable. I was tired of reading, and dead sleepy; but having leave, as a high treat, to sit up until my mother came home from spending the evening at a neighbour's, I would rather have died upon my post (of course) than have gone to bed. I had reached that stage of sleepiness when Peggotty seemed to swell and grow immensely large. I propped my eyelids open with my two forefingers, and looked perseveringly at her as she sat at work; at the little bit of wax-candle she kept for her thread—how old it looked, being so wrinkled in all directions!—at the little house with a thatched roof, where the yard-measure lived; at her work-box with a sliding lid, with a view of St. Paul's Cathedral (with a pink dome) painted on the top; at the brass thimble on her finger; at herself, whom I thought lovely. I felt so sleepy, that I knew if I lost sight of anything for a moment, I was gone.

'Peggotty,' says I, suddenly, 'were you ever married?'

'Lord, Master Davy,' replied Peggotty. 'What's put marriage in your head?'

She answered with such a start, that it quite awoke me. And then she stopped in her work, and looked at me, with her needle drawn out to its thread's length.

'But WERE you ever married, Peggotty?' says I. 'You are a very handsome woman, an't you?'

I thought her in a different style from my mother, certainly; but of another school of beauty, I considered her a perfect example. There was a red velvet footstool in the best parlour, on which my mother had painted a nosegay. The ground-work of that stool, and Peggotty's complexion appeared to me to be one and the same thing. The stool was smooth, and Peggotty was rough, but that made no difference.

3. Read a short story or a book (your choice) and then
   i.   Write a one-paragraph summary of each chapter.

    ii.   Write a one-page summary of the story/book/novel describing the book's plot, characters, theme and setting.

    iii.   Write two pages about your favourite character stating why you like the character the most and the characteristics which have influenced or inspired you.

4. Prepare notes for a debate about whether the government should make cigarette smoking illegal in Pakistan. So there should be arguments for and arguments against.

5. Observe something that occurs naturally – perhaps clouds moving across the sky, perhaps eagles, a cat, the sunrise, the moon and write about how this natural phenomenon affects you and your emotions.

6. Write a fictional story with a moral (message) and the characters will be a mongoose, an eagle, and a squirrel.

7. Some people have been complaining that school has been closed for so long – but one day you will be able to tell stories to people about the time you had the longest summer vacation EVER!! What have been the highlights – what will you remember about this time 20 years from now?

8. Write a travel article for a magazine or newspaper about somewhere you have visited in Pakistan. Travel articles are always informative and positive and enthusiastic, aiming to encourage others to visit the place being written about. They usually include information about how to get there, where to stay, what specials things can be done or seen there and usually something interesting about the people there. Here are some possible places: Taxila, Mangala Dam, Tharparkar Desert, Cholistan Desert, Lake Khanpur, Lahore's Shalimar Gardens, the Wagha Border Crossing, Bahawalpur, Karachi, Bumburet Valley, the top of Tirich Mir…

2. Urdu Language

1۔ "یونیفارم –ایک رحمت یا زحمت"۔ اس موضوع پر 150 الفاظ پر مشتمل مضمون تحریر کریں۔

2۔ آپ کے شہر میں پچھلے سال ایک ثقافتی شو منعقد ہوا تھا۔ اس کی رپورٹ تحریر کریں جو 200 الفاظ پر مشتمل ہو۔

3۔ "چاکلیٹ مضرِ صحت ہے"۔ اس موضوع پر دو دوستوں کے درمیان مکالمہ تحریر کریں۔

4۔ آپ نے کوئی دلچسپ کتاب پڑھی ہے۔ اس کتاب کے مصنف/مصنفہ کو خط لکھ کر کتاب کے بارے میں اپنی رائے کا اظہار کریں جو 200 الفاظ پر مشتمل ہو۔

5۔ مختلف قومی اخبارات میں شائع ہونے والے پسندیدہ اردو آرٹیکلز میں سے کوئی سے 3 آرٹیکلز کا خلاصہ تحریر کریں۔ (100 الفاظ)

6۔ موجودہ حالات میں ملک میں لاک ڈاؤن کے فوائد اور نقصانات کے حوالے سے باپ اور بیٹے کے درمیان 200 الفاظ پر مشتمل مکالمہ تحریر کریں۔

7۔ اپنی زندگی کے پہلے ریل کے سفر کے بارے میں رپورٹ تحریر کریں جو 200 الفاظ پر مشتمل ہو۔

8۔ کسی انگریزی اخبار، رسالے یا کتاب کے چار پیراگراف کا اردو میں ترجمہ کریں۔

9۔ "سچ کی اہمیت" پر ایک مضمون تحریر کریں جو 150 الفاظ پر مشتمل ہو۔

10۔ "ہمت کرے انساں تو کیا ہو نہیں سکتا"۔ اس موضوع پر 200 الفاظ پر مشتمل تقریر تحریر کریں۔
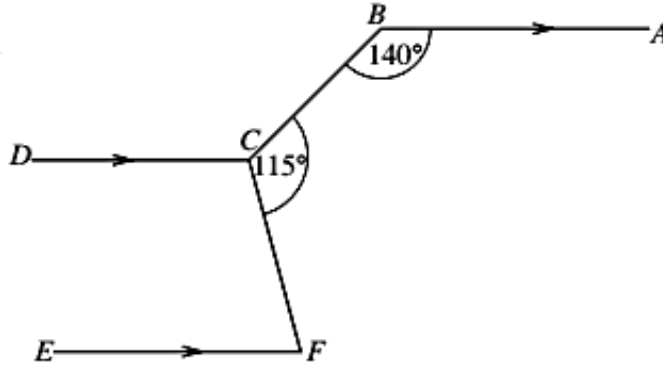
3. Mathematics

Q1. Evaluate

a) $\frac{1}{4} + \frac{1}{7}$

b) $1\frac{7}{8} \div \frac{3}{16}$

Q2. It is given that $\frac{2}{3}, \frac{8}{d}$ and $\frac{n}{39}$ are equivalent fractions. Find the value of d and the value of n.

Q3. In the given diagram, the lines BA, DC and EF are parallel. $A\hat{B}C = 140^0$, and $B\hat{C}F = 115^0$.
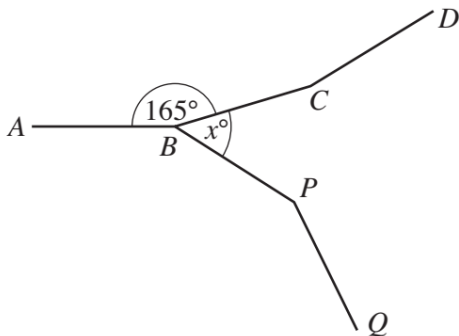

Find

a) $D\hat{C}B$

b) $D\hat{C}F$

c) $E\hat{F}C$

Q4. The numbers 225 and 540, written as the product of prime factors, are

$$225 = 3^2 \times 5^2, \quad 540 = 2^2 \times 3^3 \times 5$$

a) Write 2250 as the product of its prime factors.

b) Find the smallest positive integer value of n for which 225n is a multiple of 540.

Q5. In the diagram ABCD is a part of a regular polygon. Each interior angle is 165º.


a) How many sides does the polygon have?

b) ABPQ is part of another regular polygon. This polygon has 12 sides.

Q6. a) Calculate x. Ali ran 100 meters in 12 seconds. Calculate his average speed in kilometers per hour.

b) A jar contained 370 g of jam. Usman ate 30% of the jam. What mass of jam remained in the jar?

c) In 2006 the population of a town was 30000. This was 5000 more than the population in 1999. Calculate the percentage increase in the population.
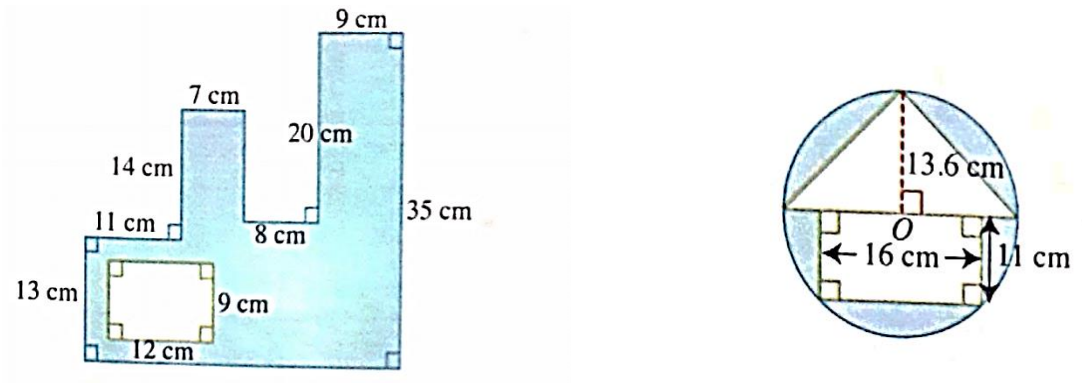
Q7. Find the area and perimeter of the following figures:
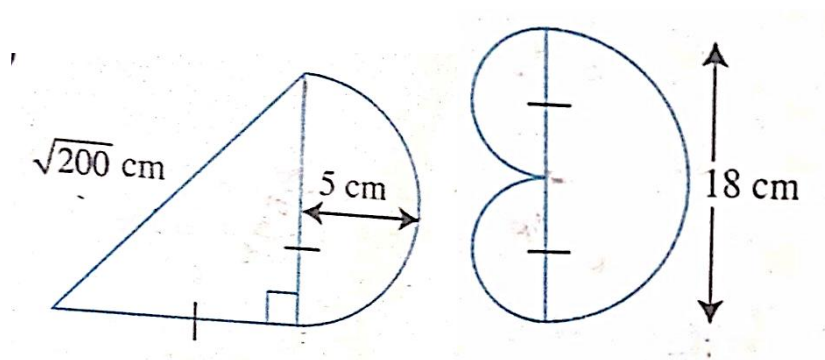
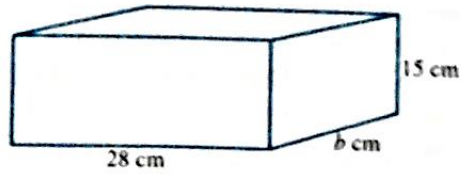**Q8.** The figure shows a parallelogram PQRS when QR = 10m. If ST = 8m and SU = 11.2m, find the length of PQ.
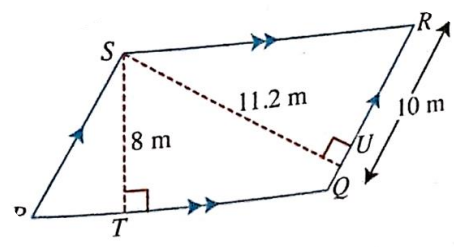
Q9. Find the area of the shaded regions:

Q10.   Simplify each of the following:

a) $\dfrac{2a+b}{4a^2-b^2}$

b) $\dfrac{c^2+2cd-15d^2}{4c^2+20cd}$

c) $\dfrac{8ab^3(2a+3b)}{32a^2b(3b+2a)}$

d) $\dfrac{8an^3(b+c)}{96a^2n(c+b)^2}$

e) $\dfrac{y^2-2y-15}{y^2-3y-10}$

f) $\dfrac{8-2m-m^2}{2m^2\ -3m-2}$

Q11.   A cuboid with dimensions 28 cm by b cm by 15 cm has a volume of 6720 cm³.

i)   Find the breadth of the cuboid.

ii)   The cuboid is melted to form small cubes of length 4cm. How many cubes can be obtained?

Q12.   The internal dimensions of an open, wooden rectangular box are 3.2 m by 2.2 m by 1.5 m. If the wood has a thickness of 0.2 m, find the volume of the wood used.
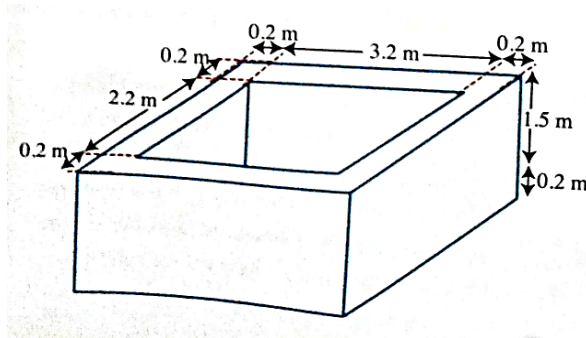
Q13.   Find the volume of the hollow glass cylinder.
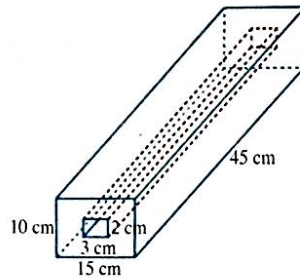
Q14.   Find the volume and the surface area of:

Q15.   By identifying the base first, find the volume of the given prism:

(a)

75 cm
46 cm
120 cm
59 cm

(b)

7 cm
28 cm
16 cm
38 cm
18 cm
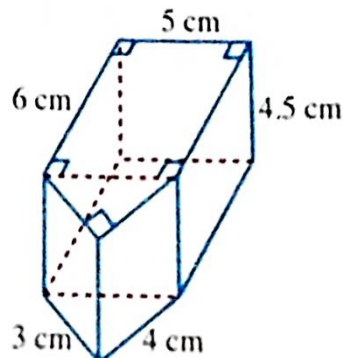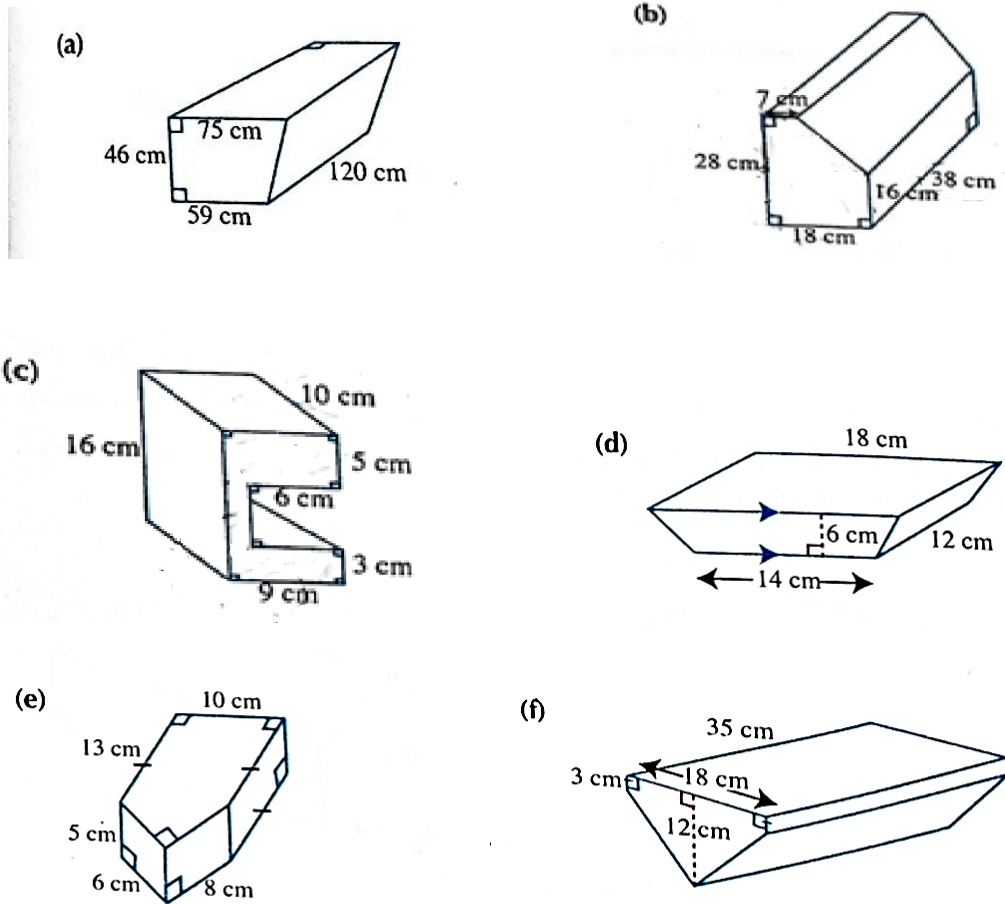
(c)

10 cm
16 cm
5 cm
6 cm
3 cm
9 cm

(d)

18 cm
6 cm
12 cm
14 cm

(e)

10 cm
13 cm
5 cm
6 cm
8 cm

(f)

35 cm
3 cm
18 cm
12 cm

Q16. The table shows the recorded minimum monthly temperatures recorded in °C in Hunza Valley and Murree.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Hunza Valley	−36	−47	−64	−70	−71	−71	−74	−75	−72	−61	−45	−35
Murree	−10	−9	−8	−2	−1	5	7	6	3	−4	−5	−7

Find

a) The difference in temperatures in Hunza Valley and Murree in July.

b) The difference between the temperatures in Hunza Valley in February and June.

Q17. Jamila and Kiran share some money in the ratio 5:3. Kiran's share is Rs.16 less than Jane's share. Find each person's share.

Q18. A box has volume 2.5m^3. Express this volume in cm^3.

Q19. A circle of diameter 6 cm is cut from a square of side 8 cm.
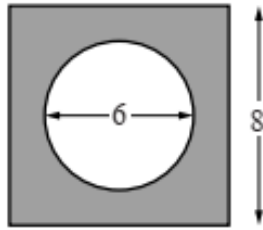
Find an expression in the form $a - b\pi$, for the shaded area.

Q20.   Aisha buys a new car.

Cash price

Rs. 4500

Credit Items

Deposit: 25% of cash price
+
12 monthly payments of Rs 320

She buys the car using the credit terms. How much more than the cash price will she pay overall for the car?

4. Islamiat

1	Write and memorize last 4 Surahs of the Holy Qur'an.
2	How can we save ourselves and our community in this pandemic?
3	Share your experiences of spending money amongst the poor in this crucial situation.
4	Write the main theme of the Quranic passages from 1 to 5.
5	Write the main teachings of the first 6 Hadith.
6	Outline the main events of Hazrat Adam's (AS) life.
7	Write the main services of the first 4 caliphs.
8	Services of Hazrat Khadija and Hazrat Ayesha during and after the death of the Holy Prophet Muhammad (SAW).
9	Among whom can we distribute the amount of zakat?
10	Identify and list 20 aspects of your life for which you are grateful.

5. Pakistan Studies - I

Assignment 1   Khilafat Movement

   i.   Who were Ali brothers? Describe their role regarding Khilafat movement.

  ii.   What do you know about Afghan Hijrat during Khilafat movement?

 iii.   'Withdrawal of Ghandi was the major reason for the failure of Khilafat movement'.

 iv.   Do you agree or not? Explain your answer.

Assignment 2   Simon Commission-1927

What does the above picture tell you about the Simon Commission?

Why was the Simon Commission rejected by the Indians

Assignment 3   Nehru Report, Fourteen Points

What do you know about the Nehru Report 1928?

What do you know about the Fourteen Points of Jinnah?

Why did Jinnah present the Fourteen Points in 1929?

Assignment 4   Allahabad Address

Why did Allama Muhammad Iqbal give the idea of an independent Muslim state in 1930?

Find out a picture of Allama Muhammad Iqbal from any source, paste it on a page, and write a brief introduction of his life.

Assignment 5   Round Table Conferences (1930-1932)

What does the above picture tell you about the Salt-March?

Why were the three Round Table Conferences held from 1930-1932?

Why did the first Round Table Conference fail?

'Second Round Table Conference achieved more than any other conference during 1930-1932'. Do you agree or not? Explain your answer.

What do you know about Communal Award 1932?

Pakistan Studies II

Assignment 1:   **Fishing Industry**

1. Name the two fishing ports of Pakistan.

2. State two uses of fish.

3. Describe three fishing methods used in the marine waters.

4. What is a fish farm?

5. Describe the characteristics of a fish farm.

6. Explain any two problems inflicted on the natural environment by the fishing industry.

Assignment 2:   **Mineral Resources**

1. Identify the main locations of limestone, gypsum and rock salt extraction from a map, and write their uses.

2. Name the main metallic and non-metallic mineral resources of Pakistan.

3. Describe the environmental problems caused by mineral extraction.

4. Explain the main causes of variations in mineral extraction.

5. Explain the problems faced by the mining industry in Pakistan.

6. Describe the methods of mining in Pakistan.

Assignment 3:   **Agriculture**

1. Find out the difference between the following.

   • Small Scale Subsistence farming and Cash Crop Farming

   • Livestock Farming and Fruit Farming

   • Nomadic Farming and Transhumance

   • Arable Farming and Pastoral Farming

   • Food Crop and Cash Crop

   • Rabi Crops and Kharif Crops

2. Name the main crops of Pakistan.

3. State the uses of main crops and write two main areas of their production.

4. Name the oil seeds grown in Pakistan.

5. Explain the Barani method of farming.

Assignment 4:   **Agriculture**

1.   Name the main livestock resources of Pakistan.

2.   Explain the importance of livestock resources.

3.   Identify the main problems faced by livestock resources.

4.   What measures are taken by the Government to develop livestock resources in Pakistan?

5.   Name any three steps carried out in the process of keeping goats.

Assignment 5:   **Agriculture**

1.   Name the factors affecting agriculture production in Pakistan.

2.   Explain how topography and drainage caused problems for agriculture in Balochistan.

3.   Explain the causes of water logging and salinity.

4.   Explain any two effects of water logging and salinity.

5.   Explain how land damaged by waterlogging and salinity can be restored.

Assignment 6:   **Agriculture**

1.   Define the term sustainable agriculture.

2.   What can be done to develop agriculture on sustainable basis?

3.   Describe the environmental effects of farming.

4.   Suggest some ways to minimize the harmful effects of farming on our environment.

5.   What do the land reform laws aim to do? What are the advantages of land consolidation?

6.   Physics

Heat (Transfer of Heat, specific Heat, Latent Heat)

1. Define heat, and write in your notebook the different modes of transfer of heat (conduction, convection, and radiation) with examples from daily life.

2. Do an activity to investigate whether water and glass are poor conductors of heat or not.

3. Do an activity to investigate if black surface is a better absorber of heat radiations than shiny surface.

4. Write some common applications of thermal energy transfer by conduction, convection and radiations.

5. Design a vacuum flask and write its different parts and find out how it stops transfer of heat.

6. Define sea breeze and land breeze.

Specific Heat Capacity and Latent Heat

1. Define heat capacity and specific heat capacity.

2. 12600 J of thermal energy was required to raise the temperature of 100g of water from 30^0C to 60^0C. Find
    a) Heat capacity of 100g of water
    b) Heat capacity of 1000g of water
    c) Heat energy required to raise the temperature of 1000g of water from 30^0 to 40^0

3. A piece of copper of mass 2kg is cooled from 150 C to 50 C. The specific heat capacity of copper is 400 Jkg^{-1} C^{-1}. What is the amount of the heat loss?

4. An immersion heater rated at 150 W is fitted into a large block of ice at 0 C. The specific latent heat of fusion of ice is 300J/g. How long does it take to melt 10g of ice?

5. Lemonade can be cooled by adding lumps of ice to it. A student discovers that 70g of ice at a temperature of 0 ºC cools 0.30kg of lemonade from 28^0C to 7ºC.
    The latent heat of fusion of ice is 0.33MJ/kg.
    The specific heat capacity of water is 4.2 KJ/kg.
    Determine
    a. The energy gained by the ice in melting
    b. The energy gained by the melted ice
    c. The energy lost by the lemonade
    d. A value for the specific heat capacity of the lemonade

6. Define latent heat and specific latent heat.

7. Define melting and solidification?

8. Write the differences between boiling and evaporation.

9. What is condensation?

10. A gas burner is used to heat 0.50kg of water in a beaker. The temperature of the water rises from 15ºC to 60ºC in 60s. Assuming that the specific heat capacity of water is 4200J/kg, calculate the average rate at which heat is transferred to the water.

11. A mass of 0.20kg of water at 0 C is placed in a vessel of negligible heat capacity. An electric heater with an output of 24 W is placed in the water and switched on. When the temperature of the water reaches 12 C, the heater is switched off.

a) Calculate the time for which the heater is switched on. Assume that the heat capacity of water is 4200J/kg.

b) An ice cube of mass 0.020kg is added to the 0.20kg of water at 0 C in the same vessel, and the heater is switched on. Assuming that all the ice is at 0 C, calculate how long it will take for the water to reach 12 C. Assume that the specific latent heat of fusion on ice is 0.34 MJ/kg.

12. 2.0 kg of ice is placed in a vacuum flask, both ice and flask being at 0 C. It is found that exactly 14 hours elapse before the contents of the flask are entirely water at C. Given that the specific latent heat of fusion of ice is 3.4 x 105 J/kg, calculate the average rate at which the contents gain heat from the surroundings. Suggest a reason why the rate of gain of heat gradually decreases after all the ice has melted.

13. 1 (a). Name the following processes

i. a solid changes into liquid

ii. liquid changes into a solid

iii. liquid changes into a gas at a particular temperature

iv. Liquid changes into a gas at ordinary room temperature

v. a gas changes into liquid

b. What would you expect the boiling point of water to be if its freezing point is less than 0^oC?

c. Describe how is the melting point of ice affected by

i. presence of sugar

ii. altitude

14. A 200W heater is used to melt ice at 0^oC in a filter funnel. After 300s, the mass of water collected is 0.188kg. If 0.088kg of the ice is melted purely due to heat taken in from the surroundings (and not from the heater), calculate the specific latent heat of fusion of ice.

15. A 100g packet of frozen peas at 0^oC is taken from the cold compartment of a fridge. After 20min, the ice has completely melted and produced 5g of water:

a. assuming that the peas and the water are still at 0^oC, calculate the rate at which the heat has been gained from the surroundings to melt the ice. Assume that the specific latent heat of melting ice is 340 J/G. bi. Suggest why the rate of gain of heat might have been larger than the value you have calculated. bii. If the peas and water are left for several more minutes, the rate of gain of heat decreases. Suggest why this is so.

16. Define reflection of light and laws of reflection.

17. Investigate the laws of reflection by using optical pins and plane mirror strip.

18. Investigate the image in a plane mirror by making yourself stand in front of a plane mirror and write the characteristics of that image (the image formed in a plane mirror).

19. What is periscope? Draw its diagram and write its uses.

20. Define refraction of light and the laws of refraction.

21. Investigate the laws of refraction by using optical pins and glass slab.

22. Estimate the refractive index and speed of light in different materials.

23. The refractive index of glass is 1.52. Calculate the speed of light in glass.

24. What is total internal reflection? Write the conditions for total internal reflection.

25. What is optical fibre? Write its uses.

26. Define convex and concave lenses.

Converging lens
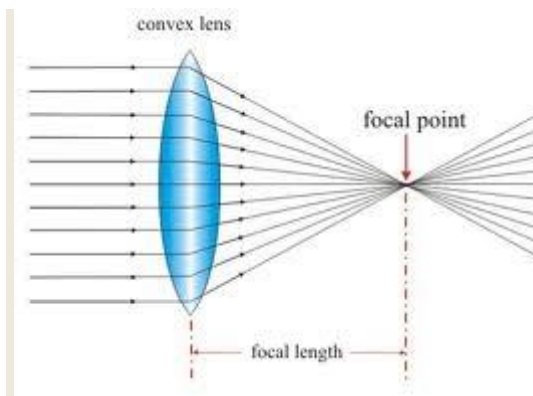
Object distance	Properties of image	Image distance	Uses
Object distance is at infinity (parallel rays)	- inverted - real - diminished	- Focal length - opposite of lens	Object lens of a telescope
Object distance is more than 2 focal lengths	- inverted - real - diminished	- Between 1 and 2 focal length - opposite lens	- camera - eyes
Object distance is 2 focal lengths	- inverted - real - same size	- 2 focal lengths - opposite lens	photocopier (equal size copy)
Object distance between 1 and 2 focal length	- inverted - real - magnified	- More than 2 focal length - opposite lens	- projector - photograph enlarger
Object distance is 1 focal length	- upright - magnified - virtual	- infinity - same side of lens	spotlight
Object distance is less than 1 focal length	- upright - magnified - virtual	- image behind object - same side of lens	magnifying glass

27. Define focal length, focus point, optical centre for a convex lens.

28. Write the differences between real and virtual image.

29. Draw a diagram of film camera and write its different parts and their uses.

30. What do you know about short sightedness and long sightedness?

31. How can the defects of human eye be corrected?

7.   Chemistry

Assignment 1

Consider the following compounds:

  i)   sodium chloride,

  ii)   water

  iii)   silicon dioxide

  a.   Find out the differences in the structure of sodium chloride, water and silicon dioxide (any five)

  b.   Predict the properties of sodium chloride, water and silicon dioxide from their structures.

  c.   Find out the examples of ionic, simple and macromolecules from daily life.
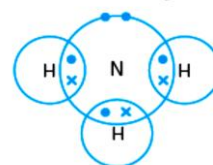
Assignment 2

One structure of covalent compound is given below along with its description.
The atoms share electrons, to gain stable outer shells.

ammonia, NH₃

a molecule of ammonia

Description

Each nitrogen atom shares electrons with three hydrogen atoms. So all three   atoms
now have a stable arrangement of electrons in their outer Shells; 2 for   hydrogen
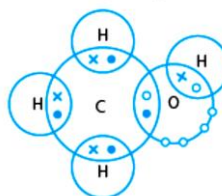and 8 for nitrogen.

Look at the given diagrams and describe them as mentioned above:

Example 1

methanol, CH₃OH

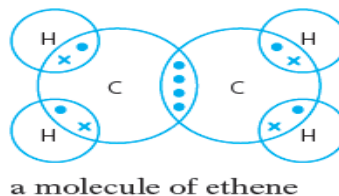a molecule of methanol

Description

Example 2

carbon dioxide, CO₂
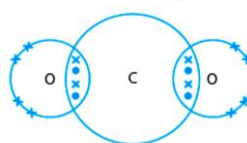
a molecule of carbon dioxide

Description

Example 3

ethene, C_2H_4

a molecule of ethene

Description

Assignment 2

Activity 1

Balancing of equation is very important in chemistry. All stoichiometric calculations are related with it.

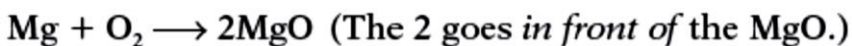A balanced equation with products is given to you.

Magnesium burns in oxygen to form magnesium oxide, a white solid. Write an equation for the reaction.

1 magnesium + oxygen ⟶ magnesium oxide

2   Mg   + O_2 ⟶   MgO

3 Mg 1 atom on the left and 1 atom on the right.

O: 2 atoms on the left and 1 atom on the right.

The equation is *not* balanced. Try this:

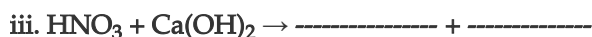$Mg + O_2 \longrightarrow 2MgO$ (The 2 goes *in front of* the MgO.)

Another magnesium atom is now needed on the left:

The equation is balanced.

4 $2Mg\ (s) + O_2\ (g) \longrightarrow 2MgO\ (s)$
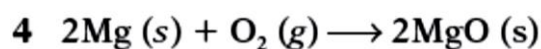
Note: Follow the rules and balance the equations, also complete them:

i) $Mg + H_2SO_4 \rightarrow$ -------------- + ----------------

ii. $HCl + CuO \rightarrow$ -------------- + --------------

iii. $HNO_3 + Ca(OH)_2 \rightarrow$ -------------- + --------------

iv. $Na_2CO_3 + HCl \rightarrow$ -------------- + ------------- + -------------

Activity 2

You know about the empirical formula which shows the *simplest ratio* in which atoms combine and the molecular formula which shows the *actual* numbers of atoms that combine to form a molecule. Let us find out the molecular formula of octane.

Octane is a hydrocarbon – it contains only carbon and hydrogen. It is 84.2% carbon and 15.8% hydrogen by mass. Its Mr is 114. Its empirical and molecular formula is calculated as follows

First the empirical formula for the compound.

From the %, we can say that in 100 g of octane, 84.2 g is carbon and 15.8 g is hydrogen. So 84.2 g of carbon combines with 15.8 g of hydrogen.

Changing masses to moles:

$\frac{84.2}{12}$ moles of carbon atoms combine with $\frac{15.8}{1}$ moles of hydrogen atoms, or

7.02 moles of carbon atoms combine with 15.8 moles of hydrogen atoms, so

1 mole of carbon atoms combines with $\frac{15.8}{7.02}$ or **2.25 moles** of hydrogen atoms.

So the atoms combine in the ratio of 1: 2.25 or 4:9.

(Give the ratio as *whole* numbers, since only whole atoms combine.)

The empirical formula of octane is therefore C4H9.

    d.   Then use Mr to find the molecular formula.

For the empirical formula (C_4H_9), the empirical mass = 57.
But M_r = 114.

$$So \quad \frac{M_r}{empirical\ mass} = \frac{114}{57} = 2$$

So the molecular formula of octane is $C_8H_{18.}$

Determine the formulae of the following compounds by taking help from the above example:

    i)   An organic compound contains 12.8% carbon, 2.1% hydrogen and 85.1% bromine, by mass. Its relative molecular mass is188.Calculate its empirical and molecular formula.

    ii)   A substance which, on analysis is found to contain 50% water of crystallization, 19.1%oxygen, 18.2% sodium, and 12.7% sulphur. Find out only empirical formula.

    iii)   Calculate empirical formula of a substance which, on analysis is found to contain 12.8% carbon, 2.1% hydrogen, 85.1% bromine.

Assignment 3

You can work out the formula of a compound from the ratio of the different atoms in it. Sodium carbonate has the formula Na_2CO_3 because it contains 2 atoms of sodium for every 1 atom of carbon and 3 atoms of oxygen.

Deduce the formula for each compound a to h.

	Compound	Ratio in which the atoms are combined in it
a	lead oxide	1 of lead, 2 of oxygen
b	lead oxide	3 of lead, 4 of oxygen
c	potassium nitrate	1 of potassium, 1 of nitrogen, 3 of oxygen
d	nitrogen oxide	2 of nitrogen, 1 of oxygen
e	nitrogen oxide	2 of nitrogen, 4 of oxygen
f	sodium hydrogen carbonate	1 of sodium, 1 of hydrogen, 1 of carbon, 3 of oxygen
g	sodium sulfate	2 of sodium, 1 of sulfur, 4 of oxygen
h	sodium thiosulfate	2 of sodium, 2 of sulfur, 3 of oxygen

Assignment 4

Activity 1

Electrolytes are decomposed by the passage of electricity and the half reaction take place at the electrode. It is very easy to write half-equations for the reactions at each electrode.

This table shows the steps.

The steps	Example: the electrolysis of molten magnesium chloride
1 First, name the ions present, and the products.	Magnesium ions and chloride ions are present. Magnesium and chlorine form.
2 Write each half-equation correctly. • Give the ion its correct charge. • Remember, positive ions go to the cathode, and negative ions to the anode. • Write the correct symbol for the element that forms. For example, Cl_2 for chlorine (not Cl). • The number of electrons in the equation should be the same as the total charge on the ion(s) in it.	Ions: Mg^{2+} and Cl^- At the cathode: $Mg^{2+} + 2e^- \longrightarrow Mg$ At the anode: $2Cl^- \longrightarrow Cl_2 + 2e^-$ (two Cl^- ions, so a total charge of 2 $-$) Note that it is also correct to write the anode reaction as: $2Cl^- - 2e^- \longrightarrow Cl_2$
3 You could then add the state symbols.	$Mg^{2+}(l) + 2e^- \longrightarrow Mg(l)$ $2Cl^-(l) \longrightarrow Cl_2(g) + 2e^-$

Try to write your observations and reactions for the given compound. Molten lithium chloride contains lithium ions and chloride ions.

a) Copy the following diagram and use arrows to show which way:

i. the ions move when the switch is closed

ii. the electrons flow in the wires
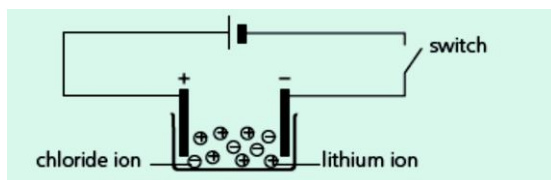
b) i. Write equations for the reaction at each electrode, and the overall reaction.

ii. Describe each of the reactions using the terms *reduction, oxidation* and *redox*.

8.   Biology

Transport in humans

1 Fig. 1.1 shows different types of blood cells

Fig. 1.1

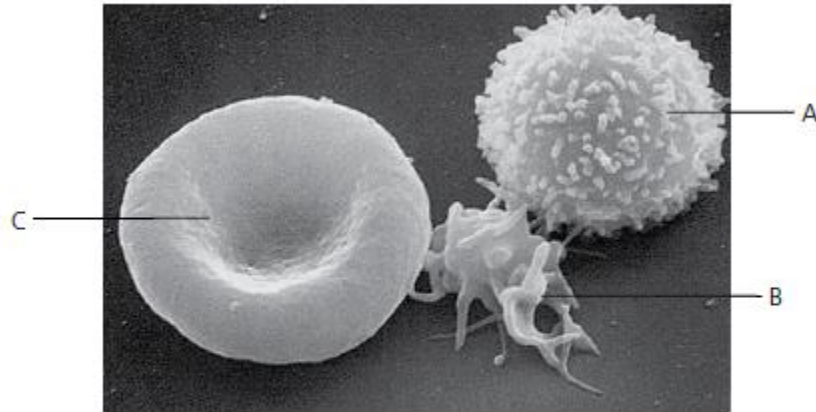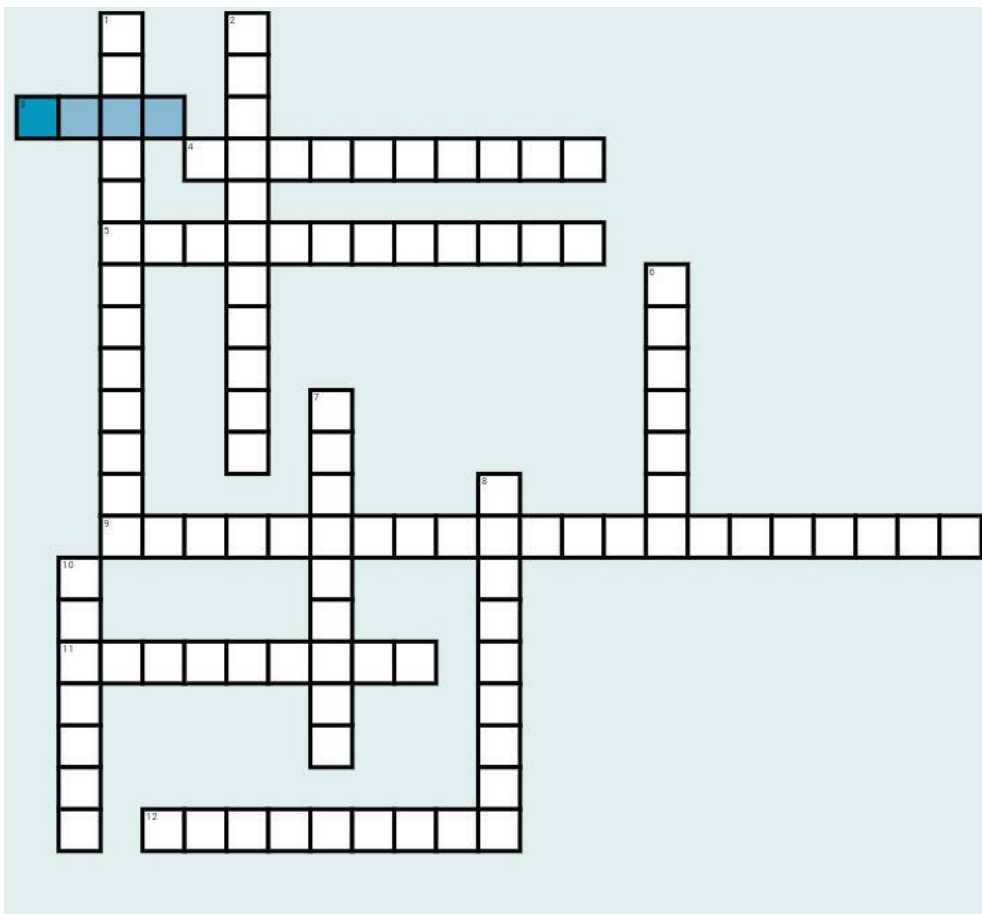Calculate the magnification of your drawing from the photograph of cell A given in Fig. 1.1.

(a) An athlete training for a race went to a hill station to carry out his training.

(i) State two advantages to the athlete of training at a high altitude.

(ii) How long would it take before the athlete's stamina returns to its original level?

Activity 1   Cell Organelles

Down:

1. It controls what goes in and out of the cell and has semi-permeable barrier

2. It goes through photosynthesis and is only found in plant cell

6. It stores things inside of the cell

7. Its a tough outside barrier that protects the structure of plant cell

8. It makes proteins for the cell

9. It controls the cell and has DNA in it

Across:

3. The most simplest level of organization of multicellular organisms

4. It packs and ships things out of the cell

5. It provides energy for the cell by doing cellular respiration

9. It transport materials inside the cell from one place to another

11. It's a gel like substance that holds the organelles in place

12. It breaks down waste and old cell

Activity 2: The Digestive System

1.) Label the diagram of the digestive system with the structures given in the table to the right.

2.) In the table, give the function of each of the structures you have labelled on the diagram of the digestive system.

Structure	Function in Digestion
mouth	
epiglottis	
oesophagus	
stomach	
small intestine	
large intestine	
appendix	
rectum	
anus	
liver	
gall bladder	
pancreas	

12.

11.

10.

9.

8.

7.

6.

5.

1.

2.

3.

4.

Activity 3: The Heart

Label the identified part of the heart. Color the parts with oxygenated blood in red and deoxygenated blood in purple or deep red. When done complete the chart below with the function and oxygen level of each heart part.
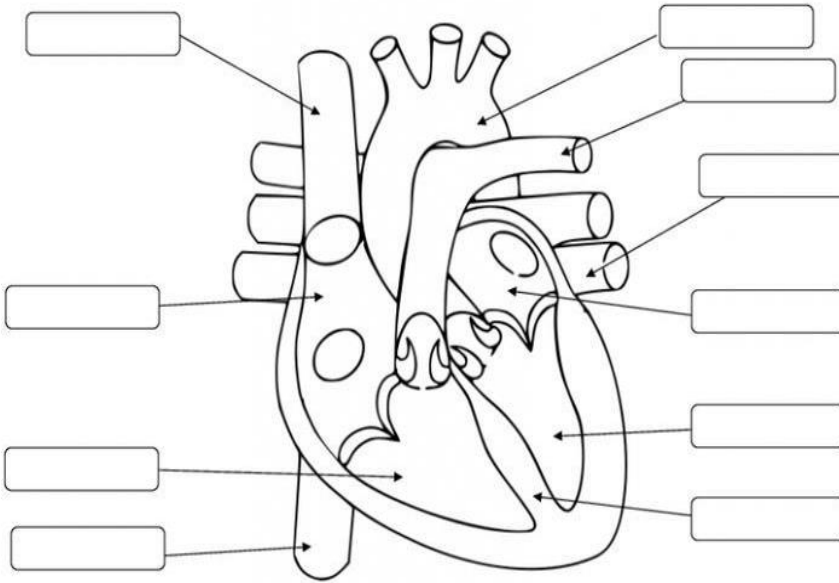
	Oxygenated/ Deoxygenated Blood	Function
Vena cava		
Aorta		
Pulmonary Artery		
Pulmonary Vein		
Right Atrium		
Right Ventricle		
Left Atrium		

Activity 4: Structure of Leaf

FEATURES OF A LEAF

Label the parts of the leaf in the diagram below
Use the table on the right to help you if needed

1.
2.
3.
10.
9.
8.
7.
6.
5.
4.
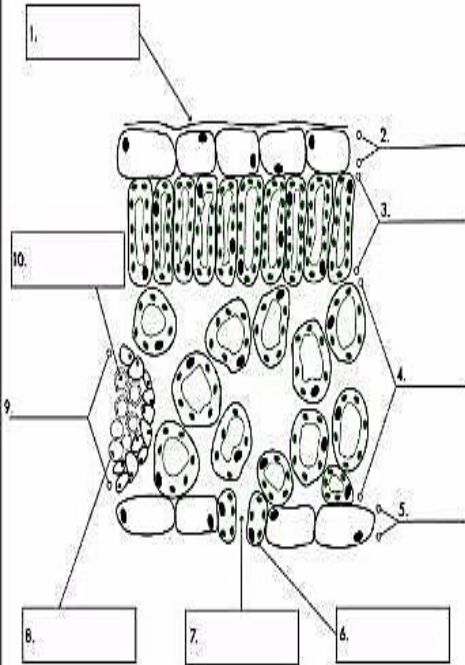
FUNCTIONS OF THE LEAF PARTS

Complete the table below with how each feature of the leaf helps the plant photosynthesise efficiently

Leaf Part	How is it involved in Photosynthesis?
Waxy Cuticle	
Upper Epidermis	
Palisade Mesophyll	
Spongy Mesophyll	
Lower Epidermis	
Xylem	
Phloem	

9. Business Studies

Task 1: Read the case below and answer the given questions.

Tibalt's Wood Products (TWP)

TWP is based in country X. It makes wood products, such as windows and doors. These are sold to building firms which repair or build houses and offices.

TWP buys imported wood. TWP could buy materials from local forests that produce sustainable wood. This means the cut trees are replaced by newly planted ones. TWP uses imported wood because it is cheaper (at current exchange rates) and there is a wide range of different woods available. TWP uses both job production and batch production when producing wood products for its customers.

Tibalt owns TWP and he is a sole trader. Tibalt wants the business to continue to grow and become more profitable. He is thinking of expanding by taking over another wood product manufacturer.

He only sells his products to small businesses that build or repair houses and offices. A lot of people are now starting to build or repair their own houses. Tibalt is also considering targeting these customers. These customers are concerned about the environment. They only want to buy wood products made with materials from sustainable forests.

Appendix 1

To: Tibalt@TWP.com

From: Fred

Date: 3 May 2013

Re: Customer enquiry

I am building my own house. I want to know if your wood products are produced with wood from sustainable forests as I am worried about the environment. I do not mind if the products are a bit more expensive. How can I find out more about your products? I have not seen any promotions for your business.

Appendix 2

- Wood products are made to customer's own design.
- Any quantity supplied.
- All types of wood products available at low prices.
- All materials from local forests.
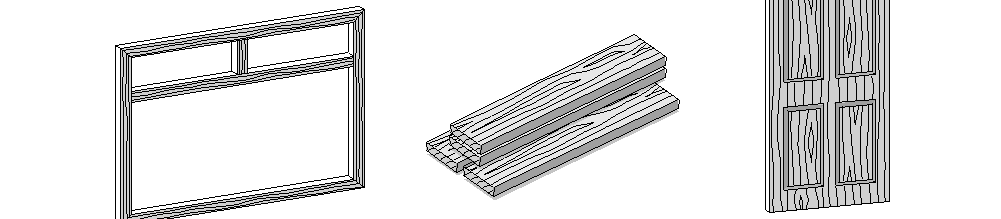
1. Identify two stakeholders of TWP and explain why each stakeholder is interested in the business.

2. Identify and explain two reasons why the business objectives of growth and increased profits are important to TWP.

3. TWP wants to start selling directly to customers who build or repair their own houses. Consider the advantages and disadvantages of three methods of promotion it could use. Recommend the best method to use. Justify your answer.

4. TWP has taken out a bank loan and arranged an overdraft. Identify and explain two differences between a bank loan and an overdraft.

5. Tibalt wants to motivate his employees. Identify and explain four ways he could use to motivate his employees.

Task 2

Deco is an electronics company manufacturing a wide range of products. The company operates in a highly competitive and fast changing market. The management of Deco believes that the company is 'market orientated'.

(a) What is meant by a 'market orientated' company?

(b) Identify two possible disadvantages to Deco of having a wide range of products.

(c) Deco is about to carry out some market research. It intends to use sampling to research the market. Identify and explain two methods of sampling that Deco could use.

(d) Deco also uses secondary market research. Identify and explain three reasons why the results of secondary market research might not always be useful to a business.

(e) Deco wants to spend more on developing new products. In order to do this, it will have to spend less on market research. Do you think Deco should do this? Justify your answer.

Task 3

Play Well is a company that produces a range of games. The company's best-selling products are computer games. For many years Play Well only sold games to the domestic market but they are now trying to export to other countries as well. However, export sales have been disappointing. Figs. 1 and 2 show data about the company's sales in 2005 which were Rs.240 m.
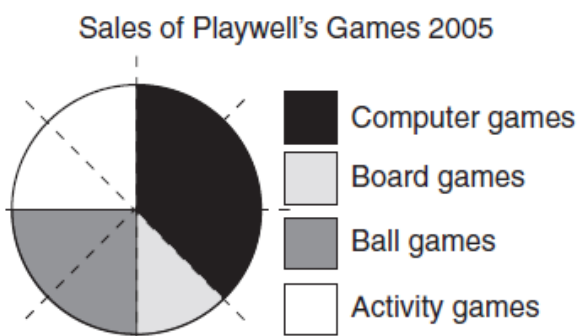
Fig. 1   Fig. 2

1. Play Well's Marketing Director believes that the market demand for the board games is price inelastic. Explain what is meant by 'price inelastic demand'.

2. Explain how Play Well's pricing policy for board games might be influenced by the demand being price inelastic.

3. Play Well's Board of Directors feel that good distribution channels are very important for increasing company sales. How important do you think channels of distribution are for increasing sales of Play well's products?

4. Why might Play well find it difficult to sell their games in other countries?

Task 4

Research Task

Choose one of the following products

- Cola drinks
- Sports shoes
- Tablet computers
- Perfume

1. Find out (approximately) how many brands are being sold in your area/country.

2. Make a note of the difference of prices charged for different brands (try to select packets/containers of the same size).

3. Investigate one of the brands you have identified in more detail. What was the last product introduced?

4. Recommend what the brand can do further to promote their product.

10. Accounting

Activity 1

Mustafa McDonald's trial balance at 31 December 2015 was as follows:

	Rs.	Rs.
Sales		120000
Purchases	62400	
Sales returns	7300	
Purchase returns		4190
Wages	17310	
Rent	3200	
Heating and lighting	2772	
Motor expenses	1284	
Interest on loan	500	
Inventory	5660	
Trade receivables	12440	
Trade payables		6167
Bank	5055	
Bank loan (long term)		10000
Premises	24000	
Motor vehicles	7400	
Drawings	7036	
Capital		16000
	156357	156357

Additional information:

1. Inventory on 31 December 2015 was valued Rs.8000

Required:

a. State two accounting concepts a business applies when preparing an income statement and statement of financial position.

b. Prepare the income statement for the year ended on 31 December 2015

c. Prepare the statement of financial position on 31 December 2015.

Activity 2

Zainab Tractors' trial balance at 31 March 2016 was as follows

	Rs.	Rs.
Plant and machinery	36000	
Motor vehicles	17000	
Inventory	9000	
Trade receivables	7060	
Bank	5400	
Trade payables		3950
Capital		70000
Drawings	22088	
Sales		219740
Purchases	100100	
Sales returns	17420	
Purchase returns		8777
Wages	67000	
Rent payable	8000	
Rent receivable		2600
Interest receivables		840
Discount allowed	2826	
Discount received		1040
Carriage inward	5170	
Carriage outwards	7920	
Stationary and other expenses	1963	
	306947	306947

Additional information

1. Inventory on 31 March 2016 was valued at Rs.11000

Required:

a. Prepare the income statement for the year ended on 31 March 2016
b. Prepare the statement of financial position on 31 March 2016.

Activity 3

Riaz is in business as a sole trader. The following balances were extracted from his books on 31 March 2019.

	Rs.
Capital	80 000
Drawings	25 000
Non-current assets (at cost)	
Land and buildings	150 000
Computer equipment	46 000
Fixtures and fittings	12 000
Wages and salaries	87 000
Computer repairs	21 600
Commission receivable	12 300
Trade payables	31 850
Trade receivables	42 000
Revenue	475 000
Purchases	255 000
Returns outwards	7 900
Inventory on 1 April 2018	31 000
Rent and rates	22 750
Discount Received	3 700
Marketing expenses	12 600
bank loan (repayable by May 2023)	113 600
Bank loan interest paid	2 100
Heat and light	9 750
General expenses	14 300
Bank overdraft	6 750

Additional information on 31 March 2019

1   Inventory was valued at Rs.26 400.

Activity 4

Zainab Tractors also incurred the following expenditure. State whether each of the items above is capital expenditure or revenue expenditure

    i.   Delivery of motor van from manufacturer (Capital)

    ii.   Fuel for motor van (Revenue)

    iii.   Signwriting his business name on the motor van (Capital)

    iv.   Motor van insurance (Revenue)

b.

Valda prepares a monthly control account for her sales ledger.

The following information relates to the month of August 2016.

	Debit $	Credit $
Sales ledger control account balances 1 August 2016	18410	720
Sales ledger control account balances 1 September 2016	?	580

	$
Cheques received	40500
Dishonoured cheque (included in cheques received)	800
Cash sales	8950
Discount allowed	970
Bad debt written off	2750
Credit sales	39600
Returns inwards	3900

REQUIRED

(a) Prepare the sales ledger control account for the month of August 2016. Balance the account and bring down the balances on 1 September.

Activity 5

1 On 1 September 2017 the balance of the bank column in Keung's cash book was $1900 debit.

The transactions for the month of September 2017 were:

September 5 Received and banked a cheque, $830, from Cello, a credit customer. He had deducted $20 cash discount.

8 Paid general expenses by cheque, $725.

14 Francis, a credit customer, paid his debt of $2000 by cheque after deducting a cash discount of 3%.

23 Received and banked a cheque from Alice, a credit customer, $300.

26 Paid a cheque to Tansley, a supplier, in full settlement of his account of $3500 less 2% cash discount.

29 The bank returned the cheque received from Alice on 23 September as dishonoured.

REQUIRED

(a) Prepare the bank and discount columns of the cash book for September 2017. Balance the bank column and bring down the balance on 1 October 2017.

11. Economics

Q1 A firm is currently using 12 machines. Each machine is capable of producing 100 units of output. It anticipates that by the end of the year, 3 of its machines will wear out.

a)   If it expects to sell 1600 units next year, how many machines will it buy?

b)   Why in the future may fewer machines be needed to produce the same output?

c)   Discuss how advances in technology have changed:

    i)   The cost of producing housing

    ii)   People's medical care

    iii)   Food production

    iv)   Privacy of individuals' personal information

    v)   The standard of living / quality of life for poor people

d)   Identify two non-human factors of production.

e)   Explain two causes of an increase in the quantity of labour.

f)   Analyze why the mobility of labour may increase over time.

g)   Exolain the concept of oportnity cost:

    a.   Using lunch at a school cafeteria as an example.

    b.   Using the government budget as an example.

    c.   Using the time between the end of school lessons and the sleep time for a normal high school student.

h)   Explain why a car is an economic good?

i)   Is water a free good? Explain your answer.

Q2   A Production Possibility Curve (PPC) shows the maximum output of two types of products and combination of those products that can be produced with existing resources and technology.

a)   Decide whether the following will cause a shift of a country's PPC inwards or outwards:

    i.   Advances in technology

    ii. A rise in the retirement age

    iii. Improved education

    iv. Widespread floods

    v.   Worn out capital goods not being replaced

b)   What is the difference between a point inside and a point on a PPC?

c)   Write an essay that explains how a PPC illustrates scarcity, opportunity cost, and efficiency?

Q3   India has a long tradition of government planning, but the degree of government intervention in the economy has been reduced in the last two decades. Privatization started in 1991, with the creation and sale of a small number of shares in some State-owned Enterprises (SOEs). This process accelerated in between 2000 and 2020 but slowed in the second decade. There was still some debate about whether a number of state-owned enterprises, including the Air India, should be transferred from the private to the public sector.

a)   Explain one reason for better performance of a firm when:

    i.   It is in the private sector

    ii.   It is in the public sector.

b) In the USA there is a considerable gap between the rich and the poor. Explain, how in a market economy, some people can be rich and some poor.

c) Which of the following may be found in a market economy:

    i.   Most people working for SOEs

    ii.   Controls on the prices of most products

    iii.   Entrepreneurs earning high profits.

    iv.   Most land being privately owned.

d) Identify two differences between the private sector and the public sector.

e) Explain why consumers are said to be sovereign in a market economic system.

f) Analyze the role of profit in a market economic system.

g) Discuss whether or not prices will be low in a market economic system.

Q4   Agricultural output in Africa

The output of more fertilizers and better irrigation has contributed to higher agricultural output for each unit of land in Africa in recent years. More significant, however, has been the increase in the quantity of land used to grow crops. For example, in 1975 12% of land was used for agriculture. By 2015 this has increased to 25%. Moreover, agricultural expansion is particularly high at 7% per year.

Despite the rise in agricultural output, the quantity of high quality food that people would like to consume is not keeping pace with the rise in population in all African countries. Africa's population is set to double by 2050, which will increase even further the demand for food. As incomes increase in Africa, the desire for a range of products is increasing. People in Africa, for example, want more and better housing. Indeed, the desire for housing usually outstrips the growth in resources devoted to housing. People constantly strive for better living standards. The expansion of the house building industry is encouraging some farm workers switch to working in the building industry. Changes in the pattern of the demand are causing not only making agricultural workers, but also other workers to change their occupation and where they work.

Agricultural output can fluctuate significantly as it can be influenced by, for example, floods, draughts and heat waves. The contribution of agricultural output varies between countries. For example, in 2015 agriculture accounted for only 2% of South Africa's output, but 21% of Nigeria's output.

The total output that a country produces is influenced by the size of the labour force. The table shows the size of the labour force and total output for a group of selected African countries.

Country	Labour force (millions)	Total output (US Rs. billions)
Ethiopia	49	62
Ghana	12	38
Mali	6	13
Nigeria	58	481
South Africa	21	315

The labour force and total output of 5 African countries

1. Calculate the value of agricultural output in South Africa in 2015.
2. Identify two reasons why the productivity of land has increased in Africa.
3. Explain the opportunity cost of working on a farm.
4. Analyze, using a PPC, the effect on an economy of a flood.
5. Explain two examples of the economic problem.
6. Analyze the relationship between the size of a country's labour force and its output shown in the table.
7. Discuss whether or not skilled workers are likely to be more occupationally and geographically mobile than unskilled workers.
8. Discuss whether or not an increase in the output of food will reduce the output of other products.

Q5   India has one of the fastest growing air travel markets in the world. It started to expand in the mid-1990's when the monopoly of state-run Air India ended, and Jet Airways and Air Sahara where launched. Its rate of expansion accelerated in 2003 with the founding of Air Deccan, a 'no-frills' carrier. In 2005 Spice Jet, Go Air and Kingfisher Airlines were launched. More air lines have been established since then, for example, Pinnacle Air (2013), TruJet (2015), and Air Carnival (2016). This expansion has resulted as an increase in the number of pilots and air cabin crew employed in India.

a) Explain what has likely to have happened to the wages of air cabin crew in India in the recent years.
b) Explain two reasons for the pilots receiving a higher remuneration than the air cabin crew.
c) How are the wages determined in a free market?
d) Explain two benefits a chef may gain from specializing in cooking one type of food such as Thai food.
e) Analyze, using a demand and supply diagram, how an increase in demand for the restaurant meals may affect the wage rate that chefs are paid.
f) Identify three reasons why a person may want to be a pilot.
g) Explain three reasons why a person, despite wanting to be a pilot, may not succeed in becoming a pilot.

12. Computer

Assignment 1

The following 2 pictures are images of the letter 'R' stored as bitmap files:

a) Why is picture X fuzzy?

b) Even the sharp image in picture Y would become fuzzy if enlarged. Why would this happen?

c) Name an output device that makes use of this imaging method.

d) State a drawback of storing sharp quality bitmap image files.

Assignment 2

A remote-controlled model car contains RAM, ROM and a solid state drive. The car receives radio signals from its remote control. It can only receive radio signals of a certain frequency. The manufacturer sets this frequency and the owner cannot change it. The owner of the model car can input their own sequence of movements from an interface underneath the car.

(a) Describe the purpose of each of the three types of memory supplied with the car.

(b) The owner needs to be able to enter their own sequence of movements for the model car. Name a suitable input device.

(c) Explain why the model car uses a solid state drive rather than another type of secondary storage.

Assignment 3

(a) Four examples of the optical storage media are:

• DVD-RW

• DVD-RAM

• CD-ROM

• Blu-ray disc

(ii) Explain why many web servers still use hard disc drive (HDD) technology.

Assignment 4

Complete the paragraph by choosing six correct terms from the list.

• Optical

• On-line

• RAM

• HDD

• Primary

• SSD

• Secondary

• ROM

• Off-line

A computer has two different types of memory. _____ memory is not directly accessed by the CPU, but it allows a user to store data that can easily be accessed by applications. Two examples of this type of memory are _____and _____. The second type of memory is _____memory. This memory is directly accessed by the CPU. It allows the processor to access data and instructions that are stored in this memory. Two examples of this memory are _____and _____.

Assignment 5

A computer system is to have access to the internet. Name and describe six potential security issues.

Assignment 6

A customer logs on to a bank website so that she can access her account.

(a) The first thing she was asked to do was to give the 3rd, 4th and 7th character of her password. This was done using drop-down boxes:

Give two reasons why the customer was asked to supply only 3 characters from her password.

b)   Authentication is a technique used in bank security to check if the customers are who they say they are. This involves three pieces of information, other than the password, all related to the customer. Give three examples of the suitable information:

Assignment 7

A company has a number of offices around the world.

(a) Data is transmitted between the offices over the Internet. In order to keep the data safe the company is using Secure Socket Layer (SSL) protocol and a firewall at each office. Explain how SSL protocol and a firewall will keep the company's data safe.

(b) A company stores personal details of its customers on a computer system behind a firewall. Explain, with reasons, what else the company should do to keep this data safe.

Assignment 8

Data sent across the Internet are frequently encrypted. The following flowchart shows a basic encryption method (Note: the → symbol in the flowchart means "is replaced by").

START

INPUT
character

is character =
"." ?   Yes → STOP

No

is character a
vowel ?   Yes →

a → o
e → u
i → a
o → e
u → i

No

is character =
b,c,d,f,g,h or j ?   Yes →

b → s
c → t
d → v
f → w
g → x
h → y
j → z

No

is character =
k,l,m,n,p,q or r ?   Yes →

k → b
l → c
m → d
n → f
p → g
q → h
r → j

No

is character =
s,t,v,w,x,y or z ?   Yes →

s → k
t → l
v → m
w → n
x → p
y → q
z → r

No →
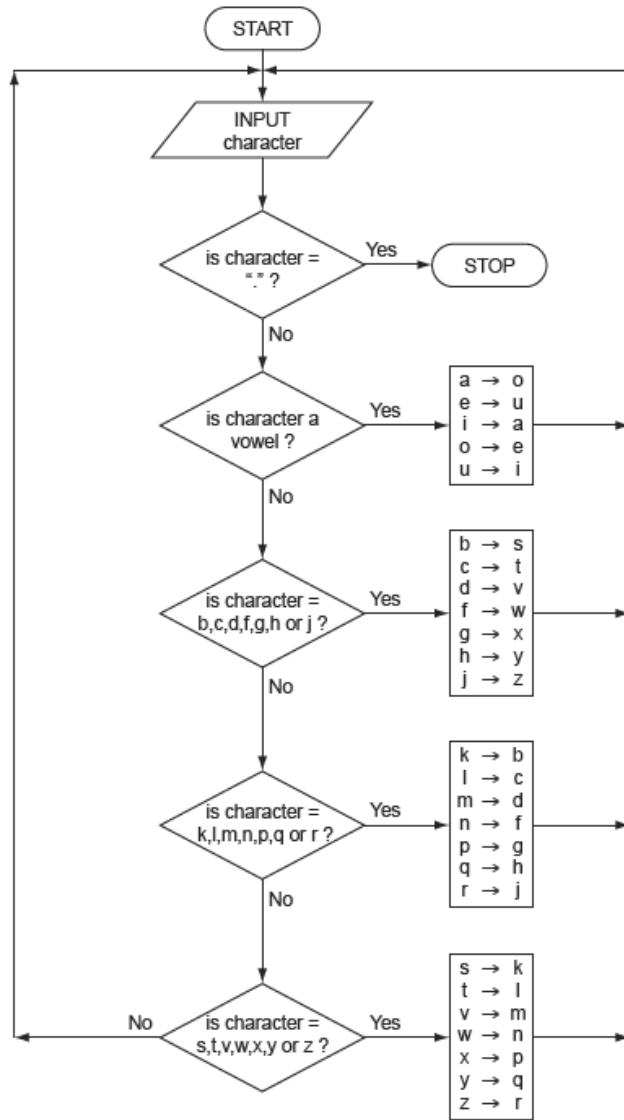
For example,

| h | e | l | l | o | | i | | a | m | | a | | r | o | b | o | t | . |

becomes:

| y | u | c | c | e | | a | | o | d | | o | | j | e | s | e | l | . |

(a) Use the flowchart to encrypt the following message:

| m | e | e | t | i | n | g | | w | i | l | l | | g | o | | a | h | e | a | d | . |

| | | | | | | | | | | | | | | | | | | | | |

(b) Use the information in the flowchart to show which input message produced the following encrypted message:

(c)   Many customers shop online. Apart from encryption, describe three other security features built into many online shopping websites.
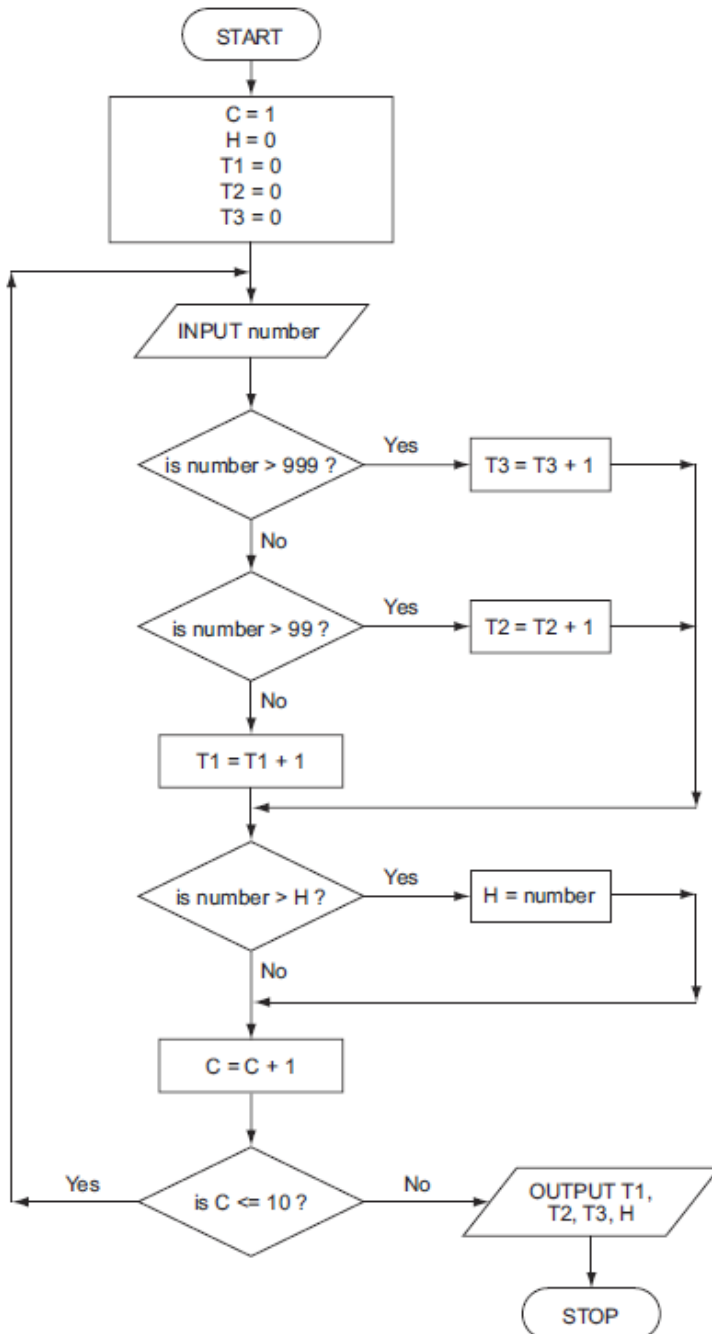
Assignment 9

(a)   New software is often developed using top-down (modular) design. Give three benefits of using this method of development.

(b)   A program requires the user to type in a user ID which must be in the form:

<div align="center">

XX999999

</div>

where X stands for any letter, and 9 stands for any digit.

(c)   Name two possible validation checks that could be applied to this user ID.

(d)   Name a validation check that could not be used on this occasion. Give a reason for your choice.

Assignment 10

Study this flowchart very carefully. Complete the trace table for the following data:

1500, 1000, 100, 10, 999, 99, 2000, 5, -3, 0

C	H	T1	T2	T3	number	OUTPUT

13.   Critical Thinking

Thinking critically means to question new information before accepting it as true. If you are told something new or read something new, here are some questions that you can ask before accepting the new information as true…

What: -is the source of the information and is it a reputable and reliable source?

- are some alternative explanations/perspectives?

Who: -benefits (or could benefit) from this information?

-else have you heard discuss this?

-is this harmful to?

-would be best to ask for more information about this topic?

-is the person generating this information and what is their expertise in the matter?

Where: -could we search for supporting information or information to refute the information?

-are similar concepts/information available?

-has this information come from to you?

When: -was this information created?

-was the information received (compared to when it was created)?

Why: -is the information relevant to you/others?

-has the information been created and communicated?

-are people influenced by this information?

-is this information needed now?

How: -is this information similar to other information?

-can this information be used?

Read the following 3 news article and apply some critical thinking questions to answer the basic question: should I believe this new information? Which articles do you think are true, not true, not sure and would want more information before deciding? Does the source (where you receive information from) matter in your critical thinking?

Article 1:

The first Arab space mission to Mars has blasted off aboard a rocket from Japan, with its unmanned probe – called Al-Amal, or Hope – successfully separating about an hour after liftoff.

A live feed of the launch showed the rocket carrying the probe lifting off from the Tanegashima Space Centre in southern Japan at 6.58am (9.58pm GMT).

Almost exactly one hour later, the feed showed people applauding in the Japanese control room as the probe successfully detached.

In Dubai, the launch was met with rapturous excitement, with the UAE Mars mission's deputy project manager Sarah al-Amiri declaring it "an indescribable feeling" to see the probe blasting off.

"This is the future of the UAE," Amiri, who is also minister of state for advanced sciences, told Dubai TV from the launch site.

The Emirati project is one of three racing to Mars, including Tianwen-1 from China and Mars 2020 from the United States, taking advantage of a period when the Earth and Mars are nearest.

In October, Mars will be a comparatively short 38.6m miles (62m km) from Earth, according to Nasa.

Hope is expected to reach Mars's orbit by February 2021, marking the 50th anniversary of the unification of the UAE, an alliance of seven emirates.

Unlike the two other Mars ventures scheduled for this year, it will not land on the planet, but instead orbit it for a whole Martian year, or 687 days.

While the objective of the Mars mission is to provide a comprehensive image of the weather dynamics in the red planet's atmosphere, the probe is a foundation for a much bigger goal – building a human settlement on Mars within the next 100 years.

The UAE also wants the project to serve as a source of inspiration for Arab youth, in a region too often wracked by sectarian conflicts and economic crises.

On Twitter, the UAE's government declared the probe launch a "message of pride, hope and peace to the Arab region, in which we renew the golden age of Arab and Islamic discoveries."

Source: The Guardian (July 20, 2020),

https://www.theguardian.com/science/2020/jul/20/uae-mission-mars-al-amal-hope-space

Article 2:

A couple living on the South Island's Otago Peninsula in New Zealand are not giving up hope of finding their beloved dogs – despite having spent $20,000 (£10,400) and nine months scouring the country for them, to no avail.

Nine-year-old black poodle Dice and three-year-old fox terrier Weed went missing from Alan Funnell and Louisa Andrew's home in October last year.

Since then, Funnell has spent one weekend a month traversing the South Island searching for them.

He and Andrew say they have put up about 400 signs and spent at least NZ$20,000 in their mission.

"Our dogs to us are like our family, we just know they are out there somewhere," Funnell said. "New Zealand is really not that big a place."

The saga started when Andrew went to feed the couple's chickens and let the dogs out of the car. They ran off, perhaps chasing a rabbit, and did not return.

"We called and called, and they didn't come," said Funnell. "We love our animals. They are great wee dogs. We are not going to give up until we find them."

Members of the public have helped with putting up signs which are now spread throughout country – from the tip of the North Island to the bottom of the South Island.

The couple have raised more than $10,000 to help with the search from almost 300 donors. "We got a huge amount of support throughout New Zealand and we are lucky to have that," Funnell said.

Funnell thinks the dogs were picked up by tourists after a sighting came through of two dogs being tied to a campervan in the area.

"We have been through a rollercoaster of emotions in the process of it all. We are sure they are alive. We have come to being positive about things," said Funnell.

"We can feel them out there."

Source: The Guardian (July 20, 2020),

https://www.theguardian.com/world/2020/jul/20/new-zealand-is-not-that-big-a-place-the-nine-month-20000-search-for-two-lost-dogs

Article 3:

American Airlines To Phase Out Complimentary Cabin Pressurization

FT. WORTH, TX—Explaining that the costs of the service have grown too high in recent years, American Airlines announced Tuesday that it will no longer offer free cabin pressurization to passengers starting March

15. "Unfortunately, to stay competitive as a legacy carrier in today's air travel market, it no longer makes economic sense for us to provide breathable air at altitude," said American Airlines CEO Doug Parker, noting that despite the cutbacks, air pressurization would still be available to first- and business-class travelers as well as those willing to pay an additional fee. "While we regret any altitude sickness, blood problems, dimmed vision, or hyperventilation that may result from air pressure less than a third normal levels, we remind our customers that such effects will diminish as soon as the aircraft descends below 10,000 feet." Parker added that the company is also planning to discontinue complimentary landing gear on flights under four hours.

The Onion (25 February, 2014)

https://www.theonion.com/american-airlines-to-phase-out-complimentary-cabin-pres-1819576190

Article 4:

Nutritionists Admit You Can Just Eat Hotdogs And Live Like That For Basically Decades

DENVER—Conceding that people can, in fact, survive indefinitely on a daily diet consisting solely of hotdogs, top nutritionists admitted Wednesday that you could just eat hotdogs and live for basically decades. "We put a lot of work into formulating dietary guidelines based on discoveries and advancements in the field of food science, but honestly, if you just ate hotdogs three times a day every day, you'd be okay," said nutritionist Alison Lawler, noting begrudgingly that a supermarket hotdog contains sufficient proteins, carbohydrates, and minerals to sustain an average human well into their 80s. "You won't be healthy per se, but you'd last on hot dogs for years and years. You wouldn't feel great, you'd be a bit weak and tired, but that's about it. And you'd most likely be reasonably happy, because hot dogs are tasty and satisfying. Now, by no means are we recommending that you stock your pantry full of hot dogs, but we have to admit, that wouldn't be the end of the world." At press time, the nutritionists were not available for further comment as they had all gone out for hotdogs.

The Onion (20 July, 2020).

https://www.theonion.com/nutritionists-admit-you-can-just-eat-hot-dogs-and-live-1844383727

14. Sports

Sadiq Public School's curriculum is more than just academic subjects. This is one of the main ways that Sadiq Public School is so unique. We aim for all students to learn the value of team sports sportsmanship and good health through regular physical activity. You can learn some of these even while at home.

1. Choose 2-3 physical exercises and practice doing these every day. It may be press ups, step ups (walking up and down 3-4 stairs repeatedly), star-jumps, squats… You should do 2-3 of these every day for about 30 minutes every day. Early in the morning is probably better. You are aiming to make it a daily habit that you will still be doing when you're 50 years old. You can challenge yourself to do more each day or more in the 30 minute session. You can challenge your parents (but remember that they're very old and so be gentle with them).

2. Think of a skill-based physical activity that involves some coordination, such as jugging three balls or skipping rope. Now teach yourself how to do this. And when you're proficient, teach someone else. Why? Doing these things occupies your brain and that means you're not thinking about other things – so these activities become a good way to relax, distract your brain from things that are causing you stress (like exams!)

3. Ball games are good for reducing stress, and sneakily using up energy and so keeping you for and healthy and helping you to sleep properly. If you have brothers and sisters at home you can ball games like mini-cricket, catching & throwing, bouncing a ball against a wall and catching it (who knows you may be selected as wicket-keeper for the 1st XI).

4. Hop-scotch. You might have to ask your parents how to play this. With chalk, draw a grid of 9 squares on a paved area…
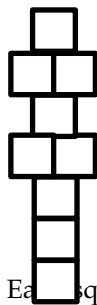
Stand at the bottom of the grid. Each square has a number 1-9 in it (I can't draw the number with my computer, but you can with chalk.) Use a small stone and slide it first to the 1st square. Hopping, jump over the square with the stone in it, continue hopping up the grid in the correct order, torn around, hop back to the 2 square, bend down and pick up the stone (you're not to put your other foot on the ground otherwise it's too easy), and then back to the start. If you succeed, now slide the stone to the 2 square and hop away, and back, bend down pick up the stone, hop to the start… etc. If you miss the square with you stone, or you put your non-hopping foot down your turn has ended and the next player starts. Yes, parents can play too, but not your neighbours or your cousins who live in Lahore because they're staying home and staying safe. If you don't like my rules, make your own. But once you make the rules, no cheating.

15 Community service

Community service simply means serving our community – doing something to help the community. In the current situation we can all serve our community by staying at home / staying away from other people and washing our hands frequently with soap because when we do this we stop the virus being passed from one person to another. If we all do this, our whole community will be helped.

You can help the whole world's community by doing what you can to reduce plastic waste. You can do this by refusing plastic bags at shops. Make your own paper bags at home and take these to the shops and so not use plastic bags. Buy less (or even none) products that have plastic packaging. Glass can be recycled and so that's fine.

Bury biodegradable waste in your garden rather than send it by rubbish truck to a dump somewhere. Fruit, vegetable scraps, leftover food etc. will rot in your garden and so quickly convert back into soil and return nutrients to plants. Paper waste will do the same.

Turn off lights and other electricity-users when not needed and do not let water taps run needlessly.

Look for ways to help others. Practise saying, 'can I help you?' with family members and then helping will become part of who you are.

There is an interesting theory that the virus that has caused this current situation was passed to humans because animal habitats, especially forests, are being destroyed. Destroying forests, whether for the timber, for clearing land to use for agriculture, or simply to burn the wood as fuel, is called deforestation and it is the main cause of climate change. The next few pages will help you learn more about deforestation and its very bad effects on the planet and human life.

Lesson 2. Deforestation

Deforestation is the removal of forest from land which is then converted to agricultural or urban use. Most deforestation occurs in tropical rainforests such as the Amazon Rainforest.

Between 2000 and 2012, about 890,000 square miles of forests around the world were cut down. Only about 2.4 million square miles of the Earth's original 6 million square miles of forest remains. An area about size of a football field is cleared from the Amazon rainforest every minute for agriculture.

Deforestation is a significant contributor to global warming because it is responsible for about 20% of all greenhouse gas emissions.

According to the UN's Food and Agriculture Organization, almost 80% of all deforestation is driven by agriculture. The UN Framework Convention on Climate Change says the primary cause of deforestation is agriculture.

Subsistence farming is responsible for almost half of all deforestation (48%), with commercial agriculture (32%; logging (14%), and fuel wood (5%) the other causes.

The EU is a major importer of agricultural products, such as palm oil, soy, and cocoa, products commonly associated with agricultural land that was recently forested land. EU countries are keen to reduce the impact of their commercial activities on forests and deforestation. France's government, for example, announced it will 'encourage every actor (producers, businesses, investors, and consumers), to change their practices in order to reduce deforestation.' The French government passed a law stating that palm oil is not considered a biofuel.

In 2008, the EU agreed to stop global forest cover loss by 2030. The UN declared a Sustainable Development Goal of ending deforestation by 2030.

Which countries are worst affected by deforestation?

South & Central America
Large areas of Brazil's share of the Amazon rainforest is being destroyed by illegal logging, exacerbated by government corruption. Deforestation in Peru's share of the Amazon rainforest is due to illegal logging and clearing forests for use as agricultural land. Bolivia's large soya industry and cattle-ranching are the country's main causes of deforestation and the Bolivian government is unlikely to risk the country's food security. Mexico's avocado industry is responsible for the loss of tropical and pine forests.

Asia Pacific
Indonesia's palm oil industry has driven destruction of its rainforest and also its wetlands, with more than 5000 square miles cut down annually to supply palm oil. More than 2000 square miles of Russia's vast forests are lost to wildfires annually. Logging and the palm oil industry account for about 1000 square miles of trees lost in Papua New Guinea annually.

Africa
In Sudan, about 500 square miles of trees are cut down every year to be used as household cooking fuel and heating, and for commercial production of steam-generated electricity. Just 6% of Nigeria's original forests remain because of trees being cut for household cooking fuel and heating.

While these countries are where deforestation is occurring the most, all countries are affected by deforestation because it is a significant factor in global warming and therefore climate change.

K
C

Activities

1. Write the following words into your book and then write an explanation of the word.

deforestation
agricultural
rainforest
greenhouse gas
primary cause
subsistence farming
logging
fuel wood
palm oil
sustainable
corruption
food security

2. Explain why deforestation is a problem for our environment.

3. Explain which countries/regions are most affected by deforestation.

4. Describe the main causes of deforestation.

5. Research: Explain how cutting a tree down contributes to green house gas emissions and therefore global warming.

6. Create: Write a letter to Bolivia's President asking for Bolivia's government to please stop deforestation.

7. Critical thinking: Describe how might you check this article to be sure it is accurate.

8. Reflect: List at least three things you learnt about deforestation from this material.

9. List 3 questions related to information in this article to which you would like answers. Describe how could you find the answers to your questions and how you can be sure they are accurate.

What can I do?

1. Learn more about the forests near where you live. Learn what plants and animals live in the forest. When you know about a forest, you will be more inclined to take care of it.

2. Ask your friends to visit a forest so they can learn about it. Is there anything you and your friends can do? Gathering plastic trash from the forest, for example.

3. Palm oil, soy, beef, and cocoa are the main agricultural products that are responsible for global deforestation. Use the internet to find out what products these ingredients are used to make, for example palm oil is used in the production of some low-quality chocolate and soap. Find out which companies use it and stop buying their products.

4. Write to the companies that use these products and tell them you have stopped buying their products because they are major causes of deforestation.

5. Use your social media accounts to tell your friends about deforestation, what its effects are, what causes it, and what they can do to help.

6. Send emails to government officials and tell them you do not want your country contributing to deforestation by buying these products.

7. Find a local organization that plants trees and help.

8. Grow seedlings and when they are big enough, plant them around your neighborhood. Encourage your teachers to start a program in your school in which students grow seedlings and plant them in an area that needs trees.
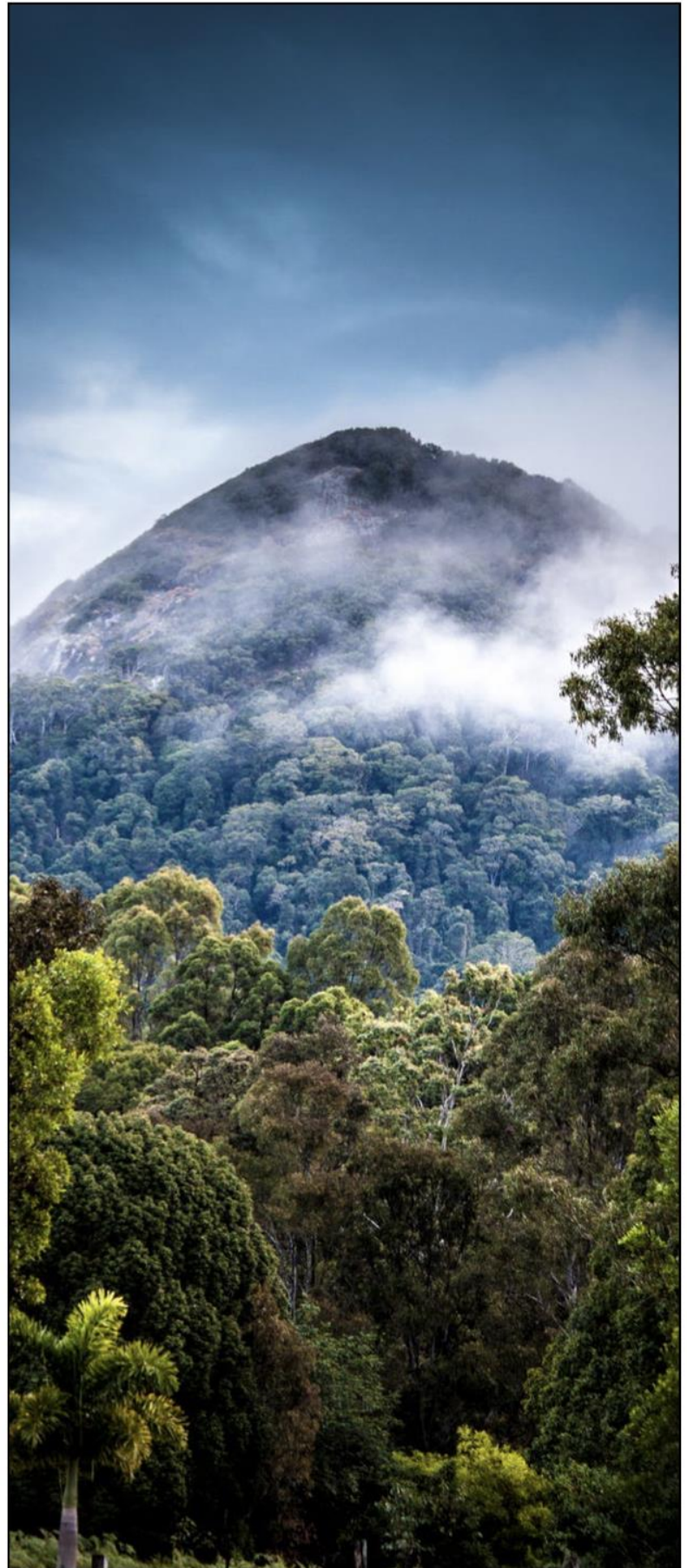
Deforestation 1

Answer the crossword using information from the article.
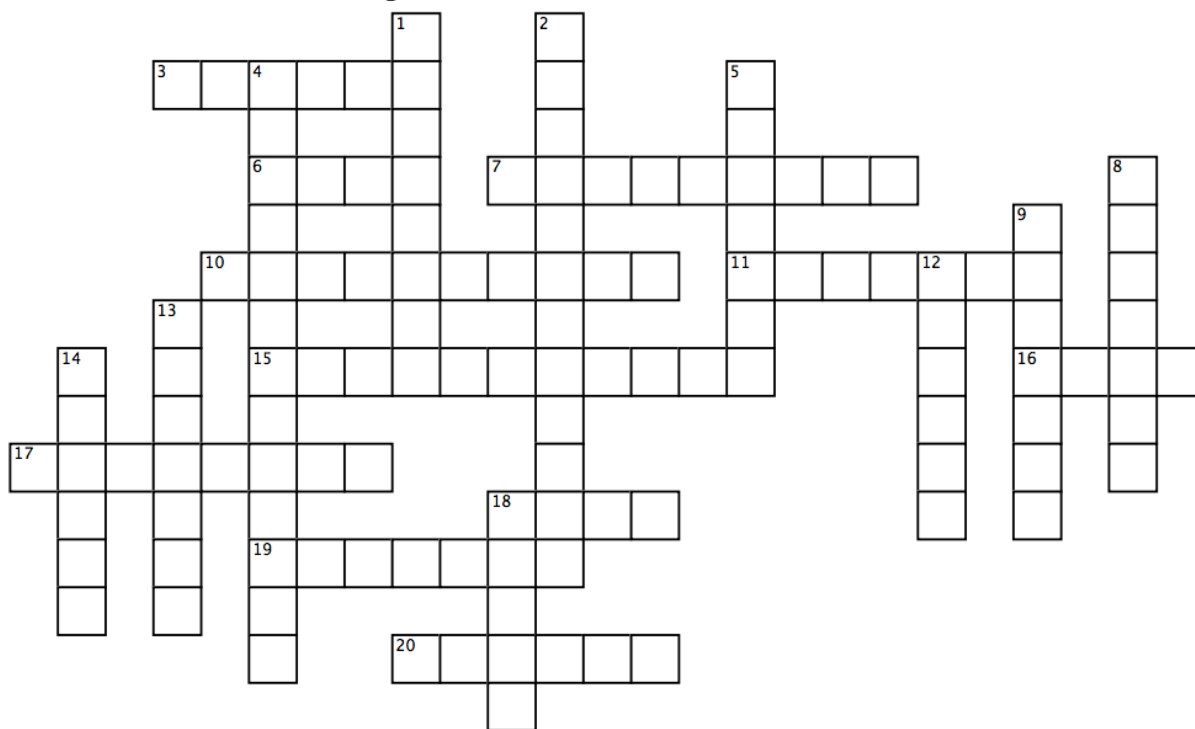
Across

3. France's government announced it will 'encourage every actor (producers, businesses, investors, and consumers), to change their practices in order to _____ deforestation.'
6. In Sudan, trees are cut down to be used as household cooking _____ and heating, and for commercial production of steam-generated electricity.
7. More than 2000 square miles of Russia's vast forests are lost to _____ annually.
10. Deforestation is responsible for about 20% of all _____ gas emissions.
11. Mexico's _____ industry is responsible for the loss of tropical and pine forests.
15. _____ farming is responsible for almost half of all deforestation.
16. The UN declared a Sustainable Development _____ of ending deforestation by 2030.
17. An area about size of a _____ field is cleared from the Amazon rainforest every minute for agriculture.
18. The French government passed a law stating that _____ oil is not considered a biofuel.
19. Deforestation in Peru's share of the Amazon rainforest is due to _____ logging and clearing forests for use as agricultural land.
20. Only about 2.4 million _____ miles of the Earth's original 6 million _____ miles of forest remains.

Down

1. Indonesia's palm oil industry has driven destruction of its rainforest and also its _____.
2. The EU is a major importer of _____ products, such as palm oil, soy, and cocoa.
4. _____ is the removal of forest from land which is then converted to agricultural or urban use.
5. All countries are affected by deforestation because it is a significant factor in global warming and therefore _____ change.
8. The _____ cause of deforestation is agriculture.
9. Large areas of Brazil's share of the Amazon rainforest is being destroyed by illegal _____, exacerbated by government corruption.
12. Most deforestation occurs in tropical rainforests such as the _____ Rainforest.
13. Just 6% of Nigeria's original forests remain because of trees being cut for household cooking fuel and _____.
14. Deforestation is a significant contributor to _____ warming.
18. Logging and the palm oil industry account for about 1000 square miles of trees lost in _____ New Guinea annually.

K
C
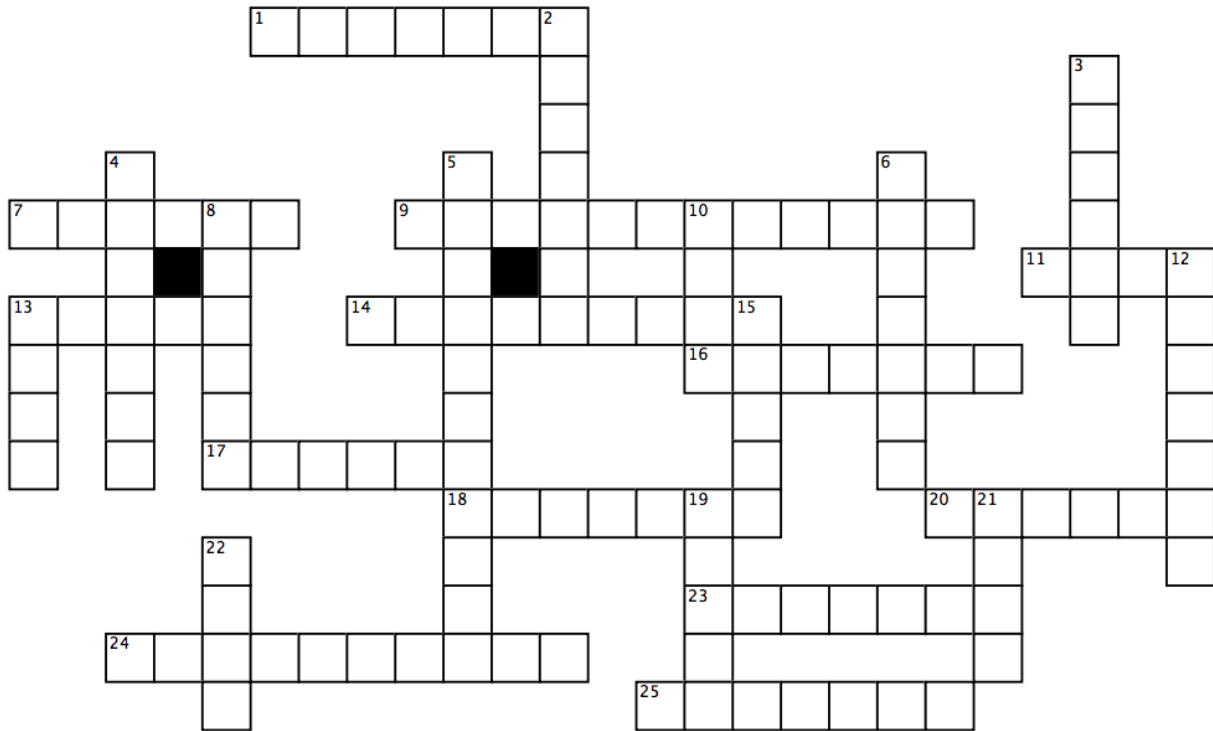
Deforestation 2

Across

1. 80% of all land _____ and plants live in forests.
7. Forests absorb greenhouse gases that would otherwise fuel _____ warming.
9. Deforestation occurs because people clear forested land to make space for _____ activities such as cattle ranching.
11. Forests keep the _____ moist by blocking the sun and inhibiting evaporation.
13. Cutting down _____ releases carbon dioxide into the atmosphere.
14. Deforestation of tropical rainforests adds more carbon dioxide to the atmosphere than all cars' and trucks' _____.
16. Forests absorb carbon _____ and release oxygen.
17. _____ has the largest area of land deforested.
18. Most deforestation occurs in rainforests which are concentrated in the _____.
20. Deforestation results in more than 1.5 billion tons of _____ dioxide being released into the atmosphere every year.
23. Forests absorb and store carbon, so that when trees are cut down, the carbon is released into the atmosphere contributing to the greenhouse effect whihc causes global warming which causes _____ change.
24. If the current rate of deforestation continues, 100 years from now there will be no more _____.
25. Deforestation occurs because people take wood for household fuel and _____.

Down

2. Forests are home to millions of plant and animal _____.
3. The _____ rainforest is one of the Earth's most threatened forests.
4. _____ are one the main natural factors that regulate and determine the Earth's climate.
5. _____ is one of the most significant causes of deforestation.
6. Deforestation is the main cause of global _____ and therefore climate change.
8. Deforestation has a double effect: it releases carbon dioxide and there are less trees to _____ carbon dioxide.
10. Forests cover a large proportion of the world's _____ area, but large areas of forest are being lost each year.
12. Deforestation is caused by household fuel burning, agriculture, and unsustainable _____.
13. Deforestation is the loss of _____ cover, due to forests being cleared.
15. Forests are called 'carbon _____' because they trap or hold carbon.
19. Forests play a significant role in the water _____ by releasing water vapor into the atmosphere.
21. Although Brazil has lost the largest _____ of forest, Comoros has lost 50% of its forests.
22. Forests prevent _____ erosion.
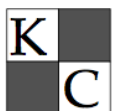
Brazil
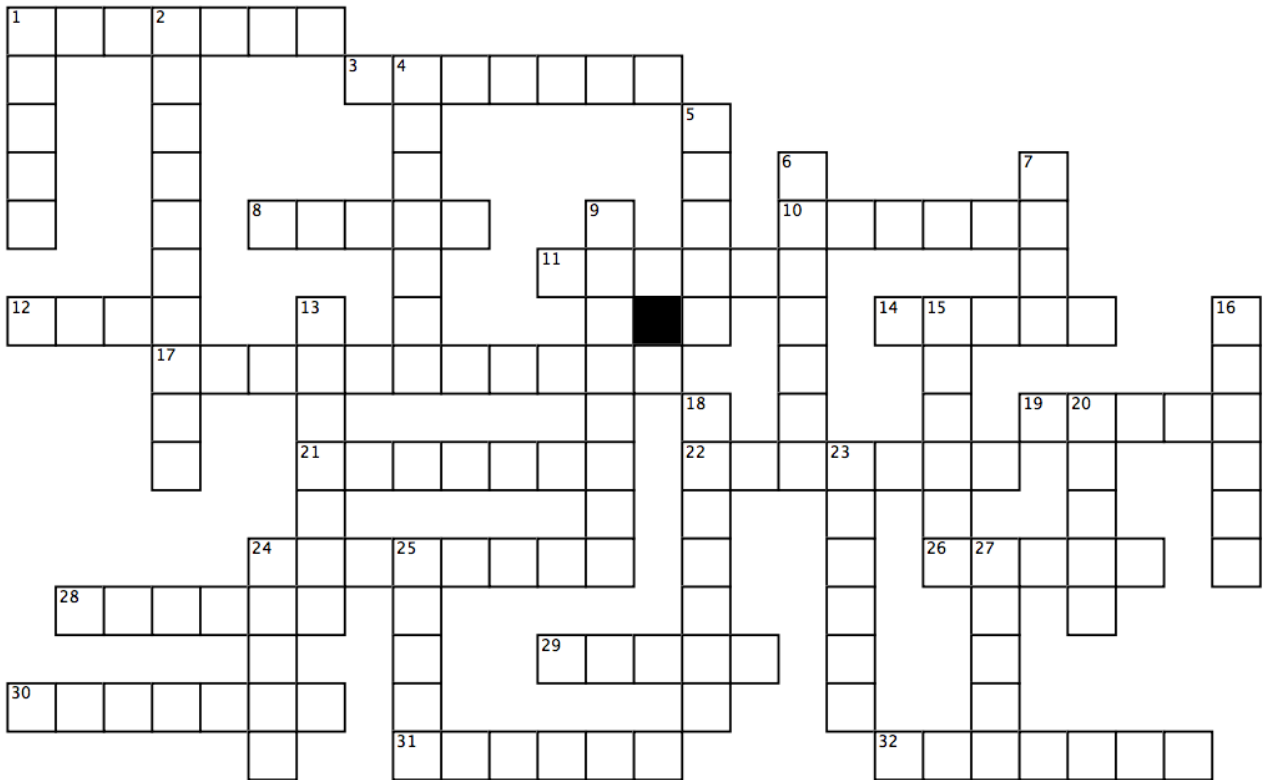
Across

1. Early sailors often called Brazil Terra di Papaga (Land of _____).
3. Rio de Janeiro is home to two well known _____, the Ipanema and the Copacabana.
8. The predominant religion throughout Brazil is _____ Catholic.
10. Brazil has been the world's largest producer of _____ for more than 150 years.
11. The Alchemist, by the Brazilian author Paulo _____ de Souza, has sold over 83 million copies, and so is one of the most sold books ever.
12. Brazil spans _____ time zones.
14. Sao _____ is the most populous city in the southern hemisphere.
17. Brazil's Itaipu Dam generates the most _____- of all the world's hydroelectric plants.
19. In the 16th century Brazil's major export was _____, but in the 17th century it was gold.
21. Brazil is the largest country in South _____.
22. Rio de Janeiro hosted the 2016 _____ Games and 2016 Paralympic Games.
24. In September 1822 Brazil declared independence from _____ and declared Prince Pedro de Alcântara the first Emperor of the Brazilian Empire.
26. Most Brazilians _____ Portuguese.
28. The Iguazu Falls are on the Brazil-Argentina _____.
29. The Amazon River _____ includes the vast Amazon rainforest.
30. Brasilia was planned and developed in 1956 to move the capital from Rio de _____ to a more central location.
31. Deforestation of the _____ rainforest has a double-effect on the greenhouse effect and therefore climate change: living trees store CO2 and dead trees release CO2 into the atmosphere.
32. In 2014-2016 a severe _____, caused by El Nino, had a significant impact on Sao Paulo and Rio de Janeiro.

Down

1. In 1831, Brazil's Emperor, Pedro I abdicated, returned to Portugal, and passed the monarchy to his five year old son, _____ II who was eventually crowned in 1841.
2. The Amazon _____ has the greatest biological diversity in the world.
4. Brazil is the only country with the _____ and the Tropic of Capricorn running through it.
5. The final of the 2014 football _____ Cup was played at the Maracana Stadium in Rio de Janeiro
6. Brazil's _____ is eighth-largest by GDP.
7. Brazil's currency, the _____, is pegged to the US dollar.
9. Brazil's national sport is _____ and the men's national team has won the World Cup 5 times.
13. Brazil borders all South American countries except _____ and Chile.
15. Brazil remained neutral in World War 2 until 1942, at which time it joined the _____.
16. The _____ the Redeemer statue overlooking Rio de Janeiro is 30 metres tall and was built in 1931.
18. The Amazon basin includes land in Brazil as well as _____, Colombia, Ecuador, Guyana, Peru, Suriname, and Venezuela.
20. 85% of Brazil's population live in _____ areas.
23. The Christ the Redeemer statue overlooking Rio de Janeiro is 30 _____ tall and was built in 1931.
24. In 1500 _____ Alvares Cabral claimed the area of Brazil for the Portuguese Empire and it remained a Portuguese colony until 1808.
25. Brazil's original official name was _____ da Santa Cruz (Land of the Holy Cross).
27. Brazil's capital city is Brasilia, but the largest city is Sao _____.