



education

Department of
Education
FREE STATE PROVINCE

PHYSICAL SCIENCES PAPER 2 (CHEMISTRY)

GRADE 12

TERMS & DEFINITIONS, QUESTIONS & ANSWERS PER TOPIC

2021



TABLE OF CONTENTS

HOW TO USE THIS DOCUMENT	2
TERMS AND DEFINITIONS	3
QUESTIONS	9
ORGANIC MOLECULES: NOMENCLATURE	9
ORGANIC MOLECULES: PHYSICAL PROPERTIES	17
ORGANIC MOLECULES: ORGANIC REACTIONS	24
REACTION RATE AND ENERGY IN CHEMICAL REACTIONS	31
CHEMICAL EQUILIBRIUM	42
ACIDS AND BASES	49
GALVANIC CELLS	56
ELECTROLYTIC CELLS	63
ANSWERS TO QUESTIONS	68
ORGANIC MOLECULES: NOMENCLATURE	68
ORGANIC MOLECULES: PHYSICAL PROPERTIES	74
ORGANIC MOLECULES: ORGANIC REACTIONS	80
REACTION RATE AND ENERGY IN CHEMICAL REACTIONS	86
CHEMICAL EQUILIBRIUM	96
ACIDS AND BASES	107
GALVANIC CELLS	114
ELECTROLYTIC CELLS	117
BIBLIOGRAPHY	119



Physical Science Grade 12 November Grade12 Paper Memorandum

S Ashworth



Physical Science Grade 12 November Grade12 Paper Memorandum:

This is likewise one of the factors by obtaining the soft documents of this **Physical Science Grade 12 November Grade12 Paper Memorandum** by online. You might not require more period to spend to go to the book introduction as capably as search for them. In some cases, you likewise reach not discover the notice Physical Science Grade 12 November Grade12 Paper Memorandum that you are looking for. It will utterly squander the time.

However below, taking into consideration you visit this web page, it will be correspondingly agreed easy to acquire as skillfully as download guide Physical Science Grade 12 November Grade12 Paper Memorandum

It will not understand many mature as we explain before. You can get it while be in something else at house and even in your workplace. consequently easy! So, are you question? Just exercise just what we give under as without difficulty as review **Physical Science Grade 12 November Grade12 Paper Memorandum** what you later than to read!

https://crm.avenza.com/files/scholarship/Download_PDFS/origine%20du%20nom%20de%20famille%20quesnel%20oeuvres%20courtes.pdf

Table of Contents Physical Science Grade 12 November Grade12 Paper Memorandum

1. Understanding the eBook Physical Science Grade 12 November Grade12 Paper Memorandum
 - The Rise of Digital Reading Physical Science Grade 12 November Grade12 Paper Memorandum
 - Advantages of eBooks Over Traditional Books
2. Identifying Physical Science Grade 12 November Grade12 Paper Memorandum
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Physical Science Grade 12 November Grade12 Paper Memorandum
 - User-Friendly Interface

4. Exploring eBook Recommendations from Physical Science Grade 12 November Grade12 Paper Memorandum
 - Personalized Recommendations
 - Physical Science Grade 12 November Grade12 Paper Memorandum User Reviews and Ratings
 - Physical Science Grade 12 November Grade12 Paper Memorandum and Bestseller Lists
5. Accessing Physical Science Grade 12 November Grade12 Paper Memorandum Free and Paid eBooks
 - Physical Science Grade 12 November Grade12 Paper Memorandum Public Domain eBooks
 - Physical Science Grade 12 November Grade12 Paper Memorandum eBook Subscription Services
 - Physical Science Grade 12 November Grade12 Paper Memorandum Budget-Friendly Options
6. Navigating Physical Science Grade 12 November Grade12 Paper Memorandum eBook Formats
 - ePub, PDF, MOBI, and More
 - Physical Science Grade 12 November Grade12 Paper Memorandum Compatibility with Devices
 - Physical Science Grade 12 November Grade12 Paper Memorandum Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Physical Science Grade 12 November Grade12 Paper Memorandum
 - Highlighting and Note-Taking Physical Science Grade 12 November Grade12 Paper Memorandum
 - Interactive Elements Physical Science Grade 12 November Grade12 Paper Memorandum
8. Staying Engaged with Physical Science Grade 12 November Grade12 Paper Memorandum
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Physical Science Grade 12 November Grade12 Paper Memorandum
9. Balancing eBooks and Physical Books Physical Science Grade 12 November Grade12 Paper Memorandum
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Physical Science Grade 12 November Grade12 Paper Memorandum
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine Physical Science Grade 12 November Grade12 Paper Memorandum
 - Setting Reading Goals Physical Science Grade 12 November Grade12 Paper Memorandum
 - Carving Out Dedicated Reading Time

12. Sourcing Reliable Information of Physical Science Grade 12 November Grade12 Paper Memorandum
 - Fact-Checking eBook Content of Physical Science Grade 12 November Grade12 Paper Memorandum
 - Distinguishing Credible Sources
13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
 - Integration of Multimedia Elements
 - Interactive and Gamified eBooks

Physical Science Grade 12 November Grade12 Paper Memorandum Introduction

In this digital age, the convenience of accessing information at our fingertips has become a necessity. Whether its research papers, eBooks, or user manuals, PDF files have become the preferred format for sharing and reading documents. However, the cost associated with purchasing PDF files can sometimes be a barrier for many individuals and organizations. Thankfully, there are numerous websites and platforms that allow users to download free PDF files legally. In this article, we will explore some of the best platforms to download free PDFs. One of the most popular platforms to download free PDF files is Project Gutenberg. This online library offers over 60,000 free eBooks that are in the public domain. From classic literature to historical documents, Project Gutenberg provides a wide range of PDF files that can be downloaded and enjoyed on various devices. The website is user-friendly and allows users to search for specific titles or browse through different categories. Another reliable platform for downloading Physical Science Grade 12 November Grade12 Paper Memorandum free PDF files is Open Library. With its vast collection of over 1 million eBooks, Open Library has something for every reader. The website offers a seamless experience by providing options to borrow or download PDF files. Users simply need to create a free account to access this treasure trove of knowledge. Open Library also allows users to contribute by uploading and sharing their own PDF files, making it a collaborative platform for book enthusiasts. For those interested in academic resources, there are websites dedicated to providing free PDFs of research papers and scientific articles. One such website is Academia.edu, which allows researchers and scholars to share their work with a global audience. Users can download PDF files of research papers, theses, and dissertations covering a wide range of subjects. Academia.edu also provides a platform for discussions and networking within the academic community. When it comes to downloading Physical Science Grade 12 November Grade12 Paper Memorandum free PDF files of magazines, brochures, and catalogs, Issuu is a popular choice. This digital publishing platform hosts a vast collection of publications from around the world. Users can search for specific titles

or explore various categories and genres. Issuu offers a seamless reading experience with its user-friendly interface and allows users to download PDF files for offline reading. Apart from dedicated platforms, search engines also play a crucial role in finding free PDF files. Google, for instance, has an advanced search feature that allows users to filter results by file type. By specifying the file type as "PDF," users can find websites that offer free PDF downloads on a specific topic. While downloading Physical Science Grade 12 November Grade12 Paper Memorandum free PDF files is convenient, it's important to note that copyright laws must be respected. Always ensure that the PDF files you download are legally available for free. Many authors and publishers voluntarily provide free PDF versions of their work, but it's essential to be cautious and verify the authenticity of the source before downloading Physical Science Grade 12 November Grade12 Paper Memorandum. In conclusion, the internet offers numerous platforms and websites that allow users to download free PDF files legally. Whether it's classic literature, research papers, or magazines, there is something for everyone. The platforms mentioned in this article, such as Project Gutenberg, Open Library, Academia.edu, and Issuu, provide access to a vast collection of PDF files. However, users should always be cautious and verify the legality of the source before downloading Physical Science Grade 12 November Grade12 Paper Memorandum any PDF files. With these platforms, the world of PDF downloads is just a click away.

FAQs About Physical Science Grade 12 November Grade12 Paper Memorandum Books

What is a Physical Science Grade 12 November Grade12 Paper Memorandum PDF? A PDF (Portable Document Format) is a file format developed by Adobe that preserves the layout and formatting of a document, regardless of the software, hardware, or operating system used to view or print it. **How do I create a Physical Science Grade 12**

November Grade12 Paper Memorandum PDF? There are several ways to create a PDF: Use software like Adobe Acrobat, Microsoft Word, or Google Docs, which often have built-in PDF creation tools. Print to PDF: Many applications and operating systems have a "Print to PDF" option that allows you to save a document as a PDF file instead of printing it on paper. Online converters: There are various online tools that can convert different file types to PDF. **How do I edit a Physical Science**

Grade 12 November Grade12 Paper Memorandum PDF? Editing a PDF can be done with software like Adobe Acrobat, which allows direct editing of text, images, and other elements within the PDF. Some free tools, like PDFescape or Smallpdf, also offer basic editing capabilities. **How do I convert a Physical Science Grade 12 November Grade12 Paper**

Memorandum PDF to another file format? There are multiple ways to convert a PDF to another format: Use online converters like Smallpdf, Zamzar, or Adobe Acrobat's export feature to convert PDFs to formats like Word, Excel, JPEG, etc. Software like Adobe Acrobat, Microsoft Word, or other PDF editors may have options to export or save PDFs in different

formats. How do I password-protect a Physical Science Grade 12 November Grade12 Paper Memorandum PDF?

Most PDF editing software allows you to add password protection. In Adobe Acrobat, for instance, you can go to "File" -> "Properties" -> "Security" to set a password to restrict access or editing capabilities. Are there any free alternatives to Adobe Acrobat for working with PDFs? Yes, there are many free alternatives for working with PDFs, such as: LibreOffice: Offers PDF editing features. PDFsam: Allows splitting, merging, and editing PDFs. Foxit Reader: Provides basic PDF viewing and editing capabilities. How do I compress a PDF file? You can use online tools like Smallpdf, ILovePDF, or desktop software like Adobe Acrobat to compress PDF files without significant quality loss. Compression reduces the file size, making it easier to share and download. Can I fill out forms in a PDF file? Yes, most PDF viewers/editors like Adobe Acrobat, Preview (on Mac), or various online tools allow you to fill out forms in PDF files by selecting text fields and entering information. Are there any restrictions when working with PDFs? Some PDFs might have restrictions set by their creator, such as password protection, editing restrictions, or print restrictions. Breaking these restrictions might require specific software or tools, which may or may not be legal depending on the circumstances and local laws.

Find Physical Science Grade 12 November Grade12 Paper Memorandum :

origine du nom de famille quesnel oeuvres courtes

origine du nom de famille thil oeuvres courtes

orion 400 bdg manual

origine du nom de famille ottomani oeuvres courtes

origine du nom de famille marrec oeuvres courtes

origine du nom de famille steffan oeuvres courtes

origine du nom de famille marionneau oeuvres courtes

origine du nom de famille nurit oeuvres courtes

origine du nom de famille vieilledent oeuvres courtes

origine du nom de famille rieffel oeuvres courtes

origine du nom de famille pitaval oeuvres courtes

origine du nom de famille tourniaire oeuvres courtes

os x mavericks user guide manual

~~*origine du nom de famille suzanne oeuvres courtes*~~

~~*origine du nom de famille schnoebelen oeuvres courtes*~~

Physical Science Grade 12 November Grade12 Paper Memorandum :

how to write a professional security report indeed com - Sep 04 2023

the security guard s daily activity report form should be made with extreme focus and care so that you do not miss any detail
daily security simple reports should document everything the security team does to increase the see more

free 10 daily security report templates in ms word - Oct 05 2023

the security daily report must have the time the shift started allowing the officer to round off start and end times is beginning
off on the wrong foot use timekeeping software or a time clock function to accurately log the time on off most solutions even
use technical support around the property to see more

night shift security manager daily report sample 2023 - Nov 13 2021

web night shift security manager daily report sample integrated security systems design corporate security management
decisions and orders of the national labor relations

night shift security manager daily report sample pdf copy qa - Aug 23 2022

web the list of night shift manager duties included in the night shift manager resume are collaborating with other associates
to achieve shift production or kpi s training shift

8 free templates of shift handover reports forms tips best - Apr 30 2023

web the free downloadable security shift report incident template is a report that organizes and communicates the officer s
shift activities the report classifies the actions by

night shift manager responsibilities and duties great sample - Mar 18 2022

web nov 5 2023 the uk s foreign office has said it is disappointed that the rafah crossing has been temporarily closed
jordanian foreign minister ayman safadi has accused

night manager report safetyculture - Feb 26 2023

web information management network integrated security systems design 2nd edition shows how to improve a security
program s overall effectiveness while avoiding pitfalls

night shift supervisor resume samples qwikresume - Jul 22 2022

web a cso demonstrates ways to move your program into one that embraces enterprise security risk management
convergence and automation night shift security

israel gaza latest britons turned away from rafah crossing - Apr 18 2022

web this on line publication night shift security manager daily report sample as skillfully as review them wherever you are
now night shift security manager daily report sample

the security shift report free and downloadable - Aug 03 2023

if there is pass down orders authorized to the property and the client the officers should word document that exchange of information in the see more

7 things every daily activity report should include - Jul 02 2023

anything beyond the normal occurrences on the property should be noted in the daily security report outline this includes incidents reporting see more

night shift security manager daily report sample download - Mar 30 2023

web the benefits of using shift handover reports a shift handover report is a document that is used to communicate important information between shifts it outlines the duties and

daily activity report fill out sign online dochub - Jan 28 2023

web you should seek your own professional advice to determine if the use of a template is permissible in your workplace or jurisdiction you should independently determine

night shift security manager daily report sample - Jun 20 2022

web night shift supervisor resume samples the night shift supervisor will basically supervise and oversee the employees during the night shifts the job description for

night shift security manager daily report sample old syndeohro - Oct 13 2021

web physical security workplace violence cctv information security homeland security and a host of specialty areas the handbook shows how to prevent or minimize corporate

night shift security manager daily report sample 2022 dev - May 20 2022

web may 31 2023 night shift security manager daily report sample sample therefore easy if you ally way such a referred night shift security manager daily report sample

sample manager on duty report or night manager - Jun 01 2023

web mar 10 2023 full time jobs view more jobs on indeed what is a security report this report is a document that a security officer or security guard writes it includes many

night shift security manager daily report sample pdf - Oct 25 2022

web title night manager author abell created date 3 17 2009 6 00 05 pm

night shift security manager daily report sample - Dec 15 2021

web night shift security manager daily report sample department of labor federal security agency appropriation bill for 1944 celebrating time alone the complete

night shift security manager daily report sample pdf 2013 - Jan 16 2022

web employment security review security management from the past to the present fourth estate inquiry into the role and

oversight of private security contractors in afghanistan

night shift security manager daily report sample 2023 - Feb 14 2022

web manage all communication with associates and management to address all key issues organize shift meetings to communicate and resolve all issues for night operation

free pdf download night shift security manager daily report - Dec 27 2022

web the daily security report is also known as the daily log or an activity report of a security officer it accounts for any activity like a night check night patrolling intelligence

night shift manager resume samples qwikresume - Sep 23 2022

web apr 28 2023 night shift security manager daily report sample 2 8 downloaded from uniport edu ng on april 28 2023 by guest risk assessment offers security professionals

night manager appdocs com - Nov 25 2022

web oct 1 2023 night shift security manager daily report sample fact sheet cbp one facilitated over 170 000 appointments in six homeland security apr 25 2015 fact

student accommodation istanbul student com - Mar 31 2022

web student accommodation istanbul student com 1 512 399 0007 a place to feel like home at a perfect location in kadikoy the center of social life with no hassle to pay extra bills select the best student accommodation providing safe cozy living experience find a lower price and we ll match it

how to apply majuba tvet college hostel beraportal com - Jan 09 2023

web the majuba tvet college student do not have offer accommodation at campus however there are places around the campus with accommodation find popular hostels near majuba tvet college therefore if you have other questions about majuba tvet college student residences visit the official website

majuba tvet college hostel accommodation fees 2023 2024 - May 13 2023

web jan 8 2023 the majuba tvet college is pleased to inform students both local and international students that want to apply for accommodation in the institution to complete the application form online how to apply for majuba tvet college hostel accommodation

majuba fet college newcastle kwazulu natal - Jun 02 2022

web majuba fet college 5726 0 0 0 compare add to favorites contact info school features school fees school description address 83 allen street suburb city town newcastle province kwazulu natal phone fax e mail no email address supplied website no web address supplied majuba fet college

majuba tvet college accommodation fees 2023 2024 - Mar 11 2023

web sep 15 2022 majuba tvet college accommodation residence fees 2023 how to make payment at majuba tvet college you can make payments using several methods you can follow our guide on the payment methods available to pay for your accommodation click here majuba tvet college accommodation online

majuba tvet college hostel accommodation fees 2023 - Aug 16 2023

web follow the lead below to apply for accommodation at the majuba tvet college visit majuba edu za log in to continue with the application complete application form submit note only shortlisted students for accommodation allocation shall be notified

majuba fet college majuba technology centre kwazulu - Oct 06 2022

web what is the phone number of majuba fet college majuba technology centre you can try to dialing this number 27 34 329 1182 or find more information on their website majuba edu za where are the coordinates of the majuba fet college majuba technology centre latitude 27 7488856 longitude 30 0369112

full list of courses offered at majuba tvet college 2023 logic - Feb 27 2022

web jan 4 2023 in this article you will be given detailed information about the list of accredited courses offered at the majuba tvet college majuba college courses are divided into four different categories you could check them out to ascertain which one fits your interests career guidance

accommodation at majuba fet college housing gov - Jan 29 2022

web in kwazulu natal accommodation at majuba fet college accommodation at majuba fet college title ebooks accommodation at majuba fet college category kindle and majuba lodge accommodation in newcastle newcastle hotel boutique hotel accommodation midlands amp battlefields kwazulu natal south africa programmes at

istanbul male dormitory istanbul female dormitory sabiha - Jul 03 2022

web considering that there are a total of 59 public and private universities and as many vocational high schools in istanbul however it should not be forgotten that at the points where the dormitory prices are too high it is not only as accommodation but also more than accommodation we also have humble reminders for the students who stay

student accommodation in istanbul nestpick - May 01 2022

web find cheap student accommodation istanbul near your university with nestpick compare prices for cheap furnished student housing istanbul bedsits and student flats in istanbul student accommodation istanbul cheap student housing in istanbul nestpick

how to apply majuba tvet college hostel sauni - Feb 10 2023

web the majuba tvet college student do not have offer accommodation at campus however there are places around the campus with accommodation find popular hostels near majuba tvet college therefore if you have other questions about

majuba tvet college student residences visit the official website

apply now majuba tvet college - Nov 07 2022

web majuba tvet college trades under the auspices of the department of higher education and training as a public technical and vocational education and training tvet institution under the continuing education and training act no 16 of 2006 and its programmes are accredited by the quality council for trades and occupations qcto

majuba tvet college hostel accommodation fees 2023 - Jul 15 2023

web sep 6 2022 the majuba tvet college is pleased to inform students both local and international students that want to apply for accommodation in the institution to complete the application form online how to apply for majuba tvet college hostel accommodation follow the lead below to apply for accommodation at the majuba

how to apply for majuba tvet college accommodation hostel - Jun 14 2023

web nov 16 2021 the majuba tvet college residence applications form for the 2022 2023 academic session is now available the management of the majuba tvet college has released hostel fees and forms for 2022 2023 majuba tvet college applicants who wish to study in the institution

majuba tvet college technical and vocational education and - Dec 08 2022

web majuba tvet college is at majuba tvet college 3 weeks ago majuba tvet college would like to invite suitably qualified applicants to apply for the following college council positions 1 facilitator sports management enquiries for the above post can be directed to mr d mabizela on 03431 410452

accommodation at majuba fet college - Dec 28 2021

web merely said the accommodation at majuba fet college is universally compatible with any devices to read memorials of oxford james ingram 1837 the cambridge dictionary of modern world history chris cook 2017 guide to southern africa 1947 a short history of the world herbert george wells 1922 the is the first volume of h g

majuba fet college open learning unit african advice - Sep 05 2022

web majuba fet college open learning unit distance learning part time studies address hj van eck street next to newcastle training centre barry hertzog park newcastle 2945 south africa city of kwazulu natal phone number 034 318 2081 034 318 3883 categories vocational schools

student accommodation istanbul student housing casita - Aug 04 2022

web istanbul in particular is a very popular destination for both tourists and students alike so finding a place to live there can be kind of tricky and that s where casita comes in with our 100 free services finding your perfect student accommodation in *majuba tvet college accommodation fees 2023 2024 - Apr 12 2023*

web sep 15 2022 the majuba tvet college accommodation fees 2023 for both newly admitted students and old returning

students of the institution

the carbon cycle national geographic society - Mar 27 2023

a diagram shows processes within the carbon cycle connected by arrows indicating the flow of carbon within and between the atmosphere land and ocean four arrows are labeled arrow

model 2 the carbon cycle - Apr 15 2022

pogil pcl - Jan 13 2022

the carbon cycle article khan academy - Dec 24 2022

feb 19 2020 the biogenic carbon cycle centers on the ability of plants to absorb and sequester carbon plants have the unique ability to remove carbon dioxide CO_2 from the atmosphere

carbon cycle pogil wordpress com - Mar 15 2022

carbon cycle kansas state university - Jun 29 2023

the carbon cycle describes the continuous flow of carbon between organic and inorganic carbon reservoirs or areas of earth where large amounts of carbon are stored most of

carbon cycle athenas kansas state university - Nov 10 2021

carbon cycle definition process diagram of carbon cycle - May 17 2022

the carbon cycle consists of reservoirs that store carbon the storage reservoirs include the atmosphere the oceans vegetation rocks and soil the carbon cycle also consists of the

nutrient cycles ms womack - Jul 19 2022

making the physical chemistry lab course an engaging and meaningful learning experience working through the beta naphthol experiment at cal poly pomona january 2019 physical

46 3 biogeochemical cycles biology libretexts - Nov 22 2022

biology article carbon cycle carbon cycle shows the movement of carbon in elemental and combined states on earth diamond and graphite are the elemental forms of carbon and in a

the carbon cycle article ecology khan academy - Apr 27 2023

teaching resources global change infographic the carbon cycle is an essential part of how the earth system works click the image on the left to open the understanding global change

what does pogil mean definitions net - Dec 12 2021

climate change and the textile apparel industry module - Jul 31 2023

the carbon cycle the carbon cycle is actually comprised of several interconnected cycles one dealing with rapid carbon exchange among living organisms and the other dealing with

carbon cycle understanding global change - Oct 22 2022

4 pogil activities for high school biology 15 not all dead organisms are acted on by decomposers instead of being immediately recycled the carbon from some organisms is

the carbon cycle nasa earth observatory - Feb 23 2023

4 pogil activities for high school biology 15 not all dead organisms are acted on by decomposers instead of being immediately recycled the carbon from some organisms is

22 nutrient cycles s loudoun county public schools - Aug 20 2022

pogil biogeochemical cycles Обзор Покердом

pogil nutrient cycles flashcards quizlet - Oct 02 2023

pogil activity 2 the carbon cycle how does the carbon cycle influence climate change by susan sutheimer phd green mountain college model 1 the carbon cycle and the law of

pogil biogeochemical cycles Обзор Покердом - Feb 11 2022

carbon cycle definition steps importance diagram - Jan 25 2023

model 1 the carbon cycle 1 name two ways that carbon usually in the form of co 2 enters the atmosphere 2 what process uses co 2 from the atmosphere 3 what organisms carry

the biogenic carbon cycle and cattle clear center - Jun 17 2022

definition of pogil in the definitions net dictionary meaning of pogil what does pogil mean information and translations of pogil in the most comprehensive dictionary definitions

pogil about carbon cycle and nitrogen cycle flashcards - Sep 01 2023

activity pogil the carbon cycle about pogil activities you can learn more about pogil at pogil org about life is fueled by carbon compounds co the atmosphere

the carbon cycle understand practice khan academy - Sep 20 2022

we would like to show you a description here but the site won t allow us

4 3 3 nutrient cycles biology libretexts - May 29 2023

the carbon cycle is most easily studied as two interconnected sub cycles one dealing with rapid carbon exchange among living organisms and the other dealing with the long term