

State of Georgia Industrial Radiography Certifying Exam Study Guide

The questions that follow are typical calculations that are performed in the field as part of radiographic operations. They include using the inverse square law to determine shielding thicknesses, dose rates, and restricted/unrestricted area boundaries. While these are similar in nature, **these questions are NOT taken from previous Industrial Radiography Certifying Exams**. Please concentrate on HOW to solve the problem, not just the final answer.

Additionally, a knowledge of the Radioactive Materials Rules and Regulations, Chapter 391-3-17-.04, and an understanding of safe practices in the use of radiographic equipment, is required in order to perform well on the Certifying Exam. Please prepare accordingly.

Inverse Square Law

The inverse square law can be represented as follows:

$$I_1 \cdot D_1^2 = I_2 \cdot D_2^2$$

where I_1 = the initial dose rate (in R/hr or mR/hr),
 D_1 = the distance from the source where I_1 is measured
 I_2 = the second dose rate; units must be the same as I_1
 D_2 = the distance from the source where I_2 is measured; units must be the same as D_1

This equation can be rearranged to isolate the desired variable.

Half Value Layer (HVL)

The half value layer (HVL) is the thickness of a given shielding material that will reduce to dose rate by half. For example, if there is a source emitting a dose rate of 50 mR/hr, and you put a HVL of a material between yourself and the source, the dose rate on the far side of the shielding material will be reduced to 25 mR/hr.

A material will have different HVLs for different isotopes; i.e., concrete will have one HVL for Ir-192, and a different one for Co-60.

In most problems, you will need to determine the number of HVLs of shielding material that are needed. The number of HVLs can be determined using the following equation:

$$N = \frac{\log \left[\frac{I_0}{I_d} \right]}{\log 2}$$

where I_0 = initial radiation intensity (R/hr or mR/hr)
 I_d = radiation intensity at a desired distance (R/hr or mR/hr)
 N = number of HVLs

Half-Life and Standard Dose Rate

The half-life ($T_{1/2}$) is the amount of time required for an isotope to reduce its activity by a half. Each radioactive isotope has a set, constant half life, no matter how much (or little) of the isotope is there. For instance, if you have 1 Curie of activity today, after one half life has passed, the activity will be 0.5 Curie. The half life and standard dose rate for common radiography isotopes is as follows:

Isotope	Half-Life	Standard Dose Rate
Ir-192	75 days	5.9 R/hr/Ci at 1 foot
Co-60	5 years	14.0 R/hr/Ci at 1 foot

Intensity (in R/hr) can be determined by multiplying the **Standard Dose Rate** (above) by the **Isotope Activity** (in

Irrsp Study Guide

Michael Hoelscher



Irrsp Study Guide:

Reviewing **Irrsp Study Guide**: Unlocking the Spellbinding Force of Linguistics

In a fast-paced world fueled by information and interconnectivity, the spellbinding force of linguistics has acquired newfound prominence. Its capacity to evoke emotions, stimulate contemplation, and stimulate metamorphosis is actually astonishing. Within the pages of "**Irrsp Study Guide**," an enthralling opus penned by a very acclaimed wordsmith, readers attempt an immersive expedition to unravel the intricate significance of language and its indelible imprint on our lives. Throughout this assessment, we shall delve into the book's central motifs, appraise its distinctive narrative style, and gauge its overarching influence on the minds of its readers.

https://staging.conocer.cide.edu/data/Resources/fetch.php/Mtx_Tna251_Amp_Manual.pdf

Table of Contents Irrsp Study Guide

1. Understanding the eBook Irrsp Study Guide
 - The Rise of Digital Reading Irrsp Study Guide
 - Advantages of eBooks Over Traditional Books
2. Identifying Irrsp Study Guide
 - 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 Irrsp Study Guide
 - User-Friendly Interface
4. Exploring eBook Recommendations from Irrsp Study Guide
 - Personalized Recommendations
 - Irrsp Study Guide User Reviews and Ratings
 - Irrsp Study Guide and Bestseller Lists

5. Accessing Irrsp Study Guide Free and Paid eBooks
 - Irrsp Study Guide Public Domain eBooks
 - Irrsp Study Guide eBook Subscription Services
 - Irrsp Study Guide Budget-Friendly Options
6. Navigating Irrsp Study Guide eBook Formats
 - ePub, PDF, MOBI, and More
 - Irrsp Study Guide Compatibility with Devices
 - Irrsp Study Guide Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Irrsp Study Guide
 - Highlighting and Note-Taking Irrsp Study Guide
 - Interactive Elements Irrsp Study Guide
8. Staying Engaged with Irrsp Study Guide
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Irrsp Study Guide
9. Balancing eBooks and Physical Books Irrsp Study Guide
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Irrsp Study Guide
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine Irrsp Study Guide
 - Setting Reading Goals Irrsp Study Guide
 - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Irrsp Study Guide
 - Fact-Checking eBook Content of Irrsp Study Guide
 - 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

Irrsp Study Guide Introduction

Free PDF Books and Manuals for Download: Unlocking Knowledge at Your Fingertips In today's fast-paced digital age, obtaining valuable knowledge has become easier than ever. Thanks to the internet, a vast array of books and manuals are now available for free download in PDF format. Whether you are a student, professional, or simply an avid reader, this treasure trove of downloadable resources offers a wealth of information, conveniently accessible anytime, anywhere. The advent of online libraries and platforms dedicated to sharing knowledge has revolutionized the way we consume information. No longer confined to physical libraries or bookstores, readers can now access an extensive collection of digital books and manuals with just a few clicks. These resources, available in PDF, Microsoft Word, and PowerPoint formats, cater to a wide range of interests, including literature, technology, science, history, and much more. One notable platform where you can explore and download free Irrsp Study Guide PDF books and manuals is the internet's largest free library. Hosted online, this catalog compiles a vast assortment of documents, making it a veritable goldmine of knowledge. With its easy-to-use website interface and customizable PDF generator, this platform offers a user-friendly experience, allowing individuals to effortlessly navigate and access the information they seek. The availability of free PDF books and manuals on this platform demonstrates its commitment to democratizing education and empowering individuals with the tools needed to succeed in their chosen fields. It allows anyone, regardless of their background or financial limitations, to expand their horizons and gain insights from experts in various disciplines. One of the most significant advantages of downloading PDF books and manuals lies in their portability. Unlike physical copies, digital books can be stored and carried on a single device, such as a tablet or smartphone, saving valuable space and weight. This convenience makes it possible for readers to have their entire library at their fingertips, whether they are commuting, traveling, or simply enjoying a lazy afternoon at home. Additionally, digital files are easily searchable, enabling readers to locate specific information within seconds. With a few keystrokes, users can search for keywords, topics, or phrases, making research and finding relevant information a breeze. This efficiency saves time and effort, streamlining the learning process and allowing individuals to focus on extracting the information they need. Furthermore, the availability of free PDF books and manuals fosters a culture of continuous learning. By removing financial barriers, more people can access educational resources and pursue lifelong learning, contributing to personal growth and

professional development. This democratization of knowledge promotes intellectual curiosity and empowers individuals to become lifelong learners, promoting progress and innovation in various fields. It is worth noting that while accessing free Irrsp Study Guide PDF books and manuals is convenient and cost-effective, it is vital to respect copyright laws and intellectual property rights. Platforms offering free downloads often operate within legal boundaries, ensuring that the materials they provide are either in the public domain or authorized for distribution. By adhering to copyright laws, users can enjoy the benefits of free access to knowledge while supporting the authors and publishers who make these resources available. In conclusion, the availability of Irrsp Study Guide free PDF books and manuals for download has revolutionized the way we access and consume knowledge. With just a few clicks, individuals can explore a vast collection of resources across different disciplines, all free of charge. This accessibility empowers individuals to become lifelong learners, contributing to personal growth, professional development, and the advancement of society as a whole. So why not unlock a world of knowledge today? Start exploring the vast sea of free PDF books and manuals waiting to be discovered right at your fingertips.

FAQs About Irrsp Study Guide Books

What is a Irrsp Study Guide 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 Irrsp Study Guide 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 Irrsp Study Guide 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 Irrsp Study Guide PDF to another file format? There are multiple ways to convert a PDF to another format: Use online converters like Smallpdf, Zamzar, or Adobe Acrobats 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 Irrsp Study Guide 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 Irrsp Study Guide :

[mtx tna251 amp manual](#)

mtu detroit diesel 2000 series manual

msi laptop owners manual

msce biology paper 1 theory exams 2015

[msbte sample paper of 17215](#)

~~mulled psalms moving from i to we~~

msi u135 keyboard america

mtd fast attach manual sleeve hitch

~~mule 3010 service manual~~

~~mtd bolens manual~~

mta operating system fundamentals questions

mtd sprinto user manual

~~mtd manual thorx 35~~

~~msi u1user guide~~

~~msbte syllabus electrical engineering~~

Irrsp Study Guide :

the smiths album wikipedia - Aug 04 2023

web the smiths is the debut studio album by english rock band the smiths released on 20 february 1984 by rough trade

records after the original production by troy tate was felt to be inadequate john porter re recorded the album in london manchester and stockport during breaks in the band s uk tour during september 1983

the smiths greatest hits full album best songs of the youtube - Dec 28 2022

web sep 23 2021 the smiths greatest hits full album best songs of the smiths playlist 2021 youtube 0 00 1 44 01 the smiths greatest hits full album best songs of the smiths playlist 2021 music

the smiths how soon is now official music video youtube - Jun 02 2023

web feb 6 2014 the smiths 864k subscribers subscribe subscribed 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 1 2

the smiths this charming man official music video - Jul 03 2023

web the smiths this charming man official music video the smiths 864k subscribers subscribe subscribed 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 1 2 3 4

the smiths youtube - Mar 31 2023

web about 0 00 0 00 the queen is dead by the smiths in 60 seconds 242 802 views 3 years ago the monolithic era defining third album the queen is dead by the smiths

the smiths discography wikipedia - Sep 05 2023

web the smiths discography the english alternative rock band the smiths released four studio albums one live album 10 compilation albums three extended plays eps 24 singles one video album and 13 music videos on the

the smiths members albums songs facts britannica - May 01 2023

web sep 15 2023 the smiths are one of the most popular and critically acclaimed english bands of the 1980s prime exponents of british alternative rock the band burst onto the manchester scene and quickly won a cult following learn more about the smiths and the later careers of singer morrissey and guitarist johnny marr

the smiths wikipedia - Oct 06 2023

web were an english rock band formed in in 1982 and composed of singer johnny marr and drummer mike joyce morrissey and marr formed the band s songwriting partnership the smiths are regarded as one of the most important acts to emerge from 1980s british

the 20 best the smiths songs updated 2017 billboard - Jan 29 2023

web sep 13 2017 the smiths see latest videos charts and news all that aside the smiths created one of the greatest bodies of work in rock history below are our picks for the 20 best smiths songs of all

a light that never goes out why the smiths are eternally influential - Feb 27 2023

web jun 1 2023 a light that never goes out why the smiths are eternally influential the smiths the guardian charming then the smiths in 1987 photograph andre csillag shutterstock the smiths a

sacrés animaux nos amis de la biodiversite by marie heitmann - Feb 16 2022

web sacra di san michele avis de voyageurs sur sacra di san les amis d holstenius perse vinnyca guides amp ides de voyage griffonia basilic sacr 60 sacrés animaux nos

syrie les animaux en voie de disparition et les espèces - Jul 24 2022

web la liste des animaux en voie de disparition que nous avons traités en syrie ainsi que toutes les actualités sur la biodiversité et l environnement

sacrés animaux nos amis de la biodiversite by marie heitmann - Apr 20 2022

web aug 15 2023 annoncezvous annuaire gt animaux baleines et dauphins les gardiens de la terre et de la catherine baveye facebook via sacra rome 2020 ce qu il faut savoir

sacrés animaux nos amis de la biodiversite by marie heitmann - Dec 17 2021

web sacrés animaux nos amis de la biodiversite by marie heitmann cristiana palestini cn o radio la nouvelle radio du hainaut cambrsis virus rvlateur lpoque o motions

sacra c s animaux nos amis de la biodiversite download - Sep 25 2022

web sacra c s animaux nos amis de la biodiversite annual report of the bureau of animal industry the publishers weekly bair island ecological refuge don edwards san

top 10 des animaux sacrés topito - May 22 2022

web jul 11 2016 animaux top 10 des animaux sacrés dans le monde ne mangez pas n importe quoi quand on pense animal sacré on aurait tendance à imaginer du

sacra c s animaux nos amis de la biodiversite pdf - Jan 30 2023

web may 28 2023 sacra c s animaux nos amis de la biodiversite 2 9 downloaded from uniport edu ng on may 28 2023 by guest the free market and the strong state has an

sacra c s animaux nos amis de la biodiversite download - Jun 03 2023

web sacra c s animaux nos amis de la biodiversite 3 3 consumer concern for the environmental impact of animal production gains in animal efficiency will have to be part

sacra c s animaux nos amis de la biodiversite 2023 - Jul 04 2023

web sacra c s animaux nos amis de la biodiversite downloaded from data northitalia com by guest maurice destiney solar energy update national academies press as

sacra c s animaux nos amis de la biodiversite catherine b - May 02 2023

web could enjoy now is sacra c s animaux nos amis de la biodiversite below wastewater irrigation and health pay drechsel 2010 first published in 2009 routledge is an

sacra c s animaux nos amis de la biodiversite copy uniport edu - Nov 27 2022

web jul 22 2023 *sacra c s animaux nos amis de la biodiversite* 1 8 downloaded from uniport edu ng on july 22 2023 by guest
sacra c s animaux nos amis de la

sacra c s animaux nos amis de la biodiversite pdf - Dec 29 2022

web jul 13 2023 *sacra c s animaux nos amis de la biodiversite* 2 6 downloaded from uniport edu ng on july 13 2023 by guest
 the j paul getty museum journal the j paul

sacra c s animaux nos amis de la biodiversite pdf - Mar 20 2022

web apr 2 2023 *sacra c s animaux nos amis de la biodiversite* 2 7 downloaded from uniport edu ng on april 2 2023 by guest
 with it the colored woodcuts of hokusai

les animaux sacrés nefernathy e monsite com - Jun 22 2022

web *les animaux sont des images des dieux depuis les temps préhistoriques les égyptiens voient dans toutes les formes de la nature une expression du divin vache*

sacrés animaux nos amis de la biodiversite by marie heitmann - Nov 15 2021

web sep 8 2023 *sacrés animaux nos amis de la biodiversite by marie heitmann cristiana palestini le sanctuaire des chats de torre argentina rome pour virus rvlateur lpoque o*

sacrés animaux nos amis de la biodiversite by marie heitmann - Apr 01 2023

web *les 262 meilleures images de animaux en 2020 animaux hotel isola sacra rome airport fiumicino italie la sainte bible mente tome 5 le livre de l les amis d holstenius*

sacra c s animaux nos amis de la biodiversite pdf - Oct 07 2023

web apr 8 2023 *sacra c s animaux nos amis de la biodiversite* 3 10 downloaded from uniport edu ng on april 8 2023 by guest
commentariorum in euangelicam harmoniam

sacrés animaux nos amis de la biodiversite by marie heitmann - Sep 06 2023

web *sacrés animaux nos amis de la biodiversite by marie heitmann cristiana palestini via sacra ne s arrête pas et vient à vous d une façon différente absolument faire un*

sacra c s animaux nos amis de la biodiversite pdf - Jan 18 2022

web 4 *sacra c s animaux nos amis de la biodiversite* 2022 05 24 estimate emissions from animal feeding operations accurately and to develop mitigation strategies their

sacrés animaux nos amis de la biodiversite by marie heitmann - Aug 25 2022

web *animaux nos amis de la biodiversite by marie heitmann cristiana palestini after securing special hotel ribeira sacra monforte de lemos tarifs 2020*

[sacrã â s animaux nos amis de la biodiversite by marie](#) - Feb 28 2023

web sacrã â s animaux nos amis de la biodiversite by marie heitmann cristiana palestini via sacra rome 2020 ce qu il faut savoir pour votre la sainte bible mente tome 5 le

[sacra c s animaux nos amis de la biodiversite isabella](#) - Aug 05 2023

web it is your no question own get older to show reviewing habit along with guides you could enjoy now is sacra c s animaux nos amis de la biodiversite below the barnacle

les animaux sacrés qui sont ils et dans quels pays - Oct 27 2022

web dec 6 2021 la vache en inde le mammifère qui peuple nos campagnes est certainement l animal sacré le plus connu au monde considérée comme la mère des humains la

[igcse physics alternative to practical revision guide youtube](#) - May 13 2023

web may 11 2022 you can access the file for free justlike the video and subscribe to the channel youtube com channel uc9bvcha2noxqjzztrpz4 0aphysics resourcestop

physics alternative to practical past papers semantic scholar - Dec 28 2021

web published 2019 physics education physics alternative to practical past papers addtax de igcsephysics this wordpress site is for revising physics alternative to practical past papers buysms de cambridge igcse physics 0625 igcse biology 0610 past papers jun amp nov 2017 updated tips alternative to practical paper 6 by vavski teaching cie

electrical quantities cie igcse physics alternative to practical - Oct 06 2022

web free physics revision notes on measurement designed by the teachers at save my exams for the cie igcse physics 0625 0972 syllabus

igcse physics 0625 alternative to smart notes online facebook - Jan 29 2022

web november 6 2016 igcse physics 0625 alternative to practical paper 6 is approaching follow the revision guide below made specifically for paper 6 make sure you completely understand the experiments given in the guide low quality pictures of some pages are attached below as preview

cambridge o level physics cie notes - Sep 05 2022

web aug 3 2016 the guide describes what you need to know about your cambridge o level physics examination it will help you to plan your revision programme for the written examinations and will explain what we are looking for in the answers you write

igcse physics alternative to practical revision guide youtube - Feb 27 2022

web you can access the file for free justlike and comment on three videos and subscribe to the channel follow on instagram instagram com arfeenul zai

[igcse physics atp notes teaching resources](#) - Aug 04 2022

web feb 9 2021 igcse physics alternative to practical notes included the following experiments cooling water experiment pendulum bob experiment hooke s law experiment focal length experiment pin experiment resistance wire experiment not available outside tes students having difficulties in answering igcse physics paper 6

[light cie igcse physics alternative to practical questions 2023](#) - May 01 2022

web free physics revision notes on measurement designed by the teachers at save my exams for the cie igcse physics 0625 0972 syllabus

alternative to practical questions mark schemes ig exams - Jul 15 2023

web revision notes experiment videos igcse chemistry edexcel igcse chemistry topic questions revision notes cie igcse chemistry topic questions revision notes physics edexcel igcse physics topic questions revision notes cie igcse physics topic questions revision notes maths edexcel igcse maths topic questions

caie igcse physics 0625 alternative to practical revision - Aug 16 2023

web best free resources for caie igcse physics 0625 alternative to practical including summarized notes topical and past paper walk through videos by top students

cie igcse physics past papers revision science - Nov 07 2022

web physics paper 2 core 0625 22 download paper download marking scheme physics paper 5 practical test 0625 51 download paper download marking scheme physics paper 6 alternative to practical test 0625 61 download paper download marking scheme november 2012

[moments cie igcse physics alternative to practical questions](#) - Jan 09 2023

web moments cie igcse physics alternative to practical questions 2023 medium save my exams cie igcse physics topic questions igcse physics cie topic questions 1 motion forces energy 1 5 moments 1 5 moments download download questions model answers 1a 2 marks a student investigates the balancing of a metre rule fig 1 1 shows

notes on the alternative to practical paper physics resources - Mar 11 2023

web this paper is an alternative to a practical exam not an alternative to a practical course the preparation for students is a well designed practical course the course should teach candidates how to make measurements using many different types of instruments

[csaaie igcse physics 0625 alternative to practical v1](#) - Jun 02 2022

web znotes org caie igcse physics 0625 observer a fires the gun observer b starts the record max temperature stopwatch when he sees the puff of smoke heat loss could be reduced by observer b stops the stopwatch when he hears the insulation of beaker sound and the time is noted

[motion cie igcse physics alternative to practical questions](#) - Feb 10 2023

web 1 2 motion download questions model answers 1 1a 2 marks an igcse student is investigating the average speed of a toy car travelling down a slope she releases the toy car on the slope she uses a stopwatch to measure the time taken for the car to travel down part of the slope fig 5 1 shows the slope i

[caie igcse physics 0625 alternative to practical v1 znotes](#) - Apr 12 2023

web caie igcse physics 0625 alternative to practical v1 znotes org updated to 2019 syllabus caie igcse physics 0625 summarized notes on the alternative to skip to document ask ai sign in terry l cook cambridge international as a level economics revision guide 2015 hodder education libgen cambridge o level 100 6 91

igcse physics 0625 62 paper 6 alternative to practical feb mar - Dec 08 2022

web 6 ucles 2020 0625 62 f m 20 e fig 1 8 on fig 1 8 draw an arrow showing the correct line of sight for reading the volume of water in the measuring cylinder 1 f suggest a possible source of inaccuracy in method 2 even if it was carried out carefully 1 total 11 buy o a level igcse original books solved past papers notes online at

igcse physics alternative to practical solved past exam papers - Jun 14 2023

web igcse physics alternative to practical solved past exam papers solved past papers following are sample solved past papers for igcse physics 0625 for the cambridge board membership area provides not only solved past papers but also revision notes topic questions video lectures and a lot more

[top tips for cie igcse physics alternative to practical paper 6](#) - Jul 03 2022

web may 13 2023 hazel shares her top tips for getting a grade 9 in your cie igcse physics alternative to practical paper 6 for private tuition and perfect answer revision gu

[alternative to practical questions mark schemes ig exams](#) - Mar 31 2022

web section 1 general physics length time 1 theory her length time 2 theorizing here length time 3 theory here duration start 4 theory here