# STAAR CHEMISTRY REFERENCE MATERIALS



#### ATOMIC STRUCTURE

$$c = f\lambda$$

$$E_{photon} = hf$$

$$E_{proton} = \frac{hc}{\lambda}$$

#### BEHAVIOR OF GASES

$$P_{\rm T} = P_1 + P_2 + P_3 + \dots$$

$$PV = nRT$$

$$\frac{P_1V_1}{n_1T_1} = \frac{P_2V_2}{n_2T_2}$$

$$P_1V_1 = P_2V_2$$

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$\frac{V_1}{n_1} = \frac{V_2}{n_2}$$

#### SOLUTIONS

$$M = \frac{\text{mol}}{1}$$

$$K_{w} = [H^{*}][OH^{-}]$$

$$Volume of (molarity of solution 1) (molarity of solution 2) (molarity of solution 2)$$

$$V_1 M_1 = V_2 M_2$$

$$pH = -log[H^*]$$

#### THERMOCHEMISTRY

$$Q = mc_p \Delta T$$

Enthalpy of 
$$=$$
  $\begin{pmatrix} enthalpy \\ of products \end{pmatrix} - \begin{pmatrix} enthalpy \\ of reactants \end{pmatrix}$ 

$$\Delta H = \Delta H_f^0(\text{products}) - \Delta H_f^0(\text{reactants})$$

# **Staar Chemistry Assessment Activities Answers**

**Jessica J Manson** 

#### **Staar Chemistry Assessment Activities Answers:**

Paperbound Books in Print ,1984Activities & Assessment Pack George Burton,1994Activities & AssessmentPack George Burton, John Holman, Gwen Pilling, University of York. Science Education Group,1994ACS Small-scaleLaboratory Assessment Activities Lucy T. Eubanks, I. Dwaine Eubanks, Robert G. Silberman, 1996Assessment ofChemistry Association for Institutional Research, Alexis Collier, 2010-11Assessment of

Immerse yourself in heartwarming tales of love and emotion with is touching creation, **Staar Chemistry Assessment Activities Answers**. This emotionally charged ebook, available for download in a PDF format (\*), is a celebration of love in all its forms. Download now and let the warmth of these stories envelop your heart.

http://www.frostbox.com/data/Resources/fetch.php/wbchse hs suggestion english b 2015.pdf

## **Table of Contents Staar Chemistry Assessment Activities Answers**

- 1. Understanding the eBook Staar Chemistry Assessment Activities Answers
  - The Rise of Digital Reading Staar Chemistry Assessment Activities Answers
  - Advantages of eBooks Over Traditional Books
- 2. Identifying Staar Chemistry Assessment Activities Answers
  - 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 Staar Chemistry Assessment Activities Answers
  - User-Friendly Interface
- 4. Exploring eBook Recommendations from Staar Chemistry Assessment Activities Answers
  - Personalized Recommendations
  - Staar Chemistry Assessment Activities Answers User Reviews and Ratings
  - Staar Chemistry Assessment Activities Answers and Bestseller Lists
- 5. Accessing Staar Chemistry Assessment Activities Answers Free and Paid eBooks
  - Staar Chemistry Assessment Activities Answers Public Domain eBooks
  - Staar Chemistry Assessment Activities Answers eBook Subscription Services
  - Staar Chemistry Assessment Activities Answers Budget-Friendly Options
- 6. Navigating Staar Chemistry Assessment Activities Answers eBook Formats

- o ePub, PDF, MOBI, and More
- Staar Chemistry Assessment Activities Answers Compatibility with Devices
- Staar Chemistry Assessment Activities Answers Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Staar Chemistry Assessment Activities Answers
  - Highlighting and Note-Taking Staar Chemistry Assessment Activities Answers
  - Interactive Elements Staar Chemistry Assessment Activities Answers
- 8. Staying Engaged with Staar Chemistry Assessment Activities Answers
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Staar Chemistry Assessment Activities Answers
- 9. Balancing eBooks and Physical Books Staar Chemistry Assessment Activities Answers
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Staar Chemistry Assessment Activities Answers
- 10. Overcoming Reading Challenges
  - $\circ\,$  Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Staar Chemistry Assessment Activities Answers
  - Setting Reading Goals Staar Chemistry Assessment Activities Answers
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Staar Chemistry Assessment Activities Answers
  - Fact-Checking eBook Content of Staar Chemistry Assessment Activities Answers
  - 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

#### **Staar Chemistry Assessment Activities Answers Introduction**

Free PDF Books and Manuals for Download: Unlocking Knowledge at Your Fingertips In todays 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 Staar Chemistry Assessment Activities Answers PDF books and manuals is the internets 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 Staar Chemistry Assessment Activities Answers 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 Staar Chemistry Assessment Activities Answers 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 Staar Chemistry Assessment Activities Answers Books**

- 1. Where can I buy Staar Chemistry Assessment Activities Answers books? Bookstores: Physical bookstores like Barnes & Noble, Waterstones, and independent local stores. Online Retailers: Amazon, Book Depository, and various online bookstores offer a wide range of books in physical and digital formats.
- 2. What are the different book formats available? Hardcover: Sturdy and durable, usually more expensive. Paperback: Cheaper, lighter, and more portable than hardcovers. E-books: Digital books available for e-readers like Kindle or software like Apple Books, Kindle, and Google Play Books.
- 3. How do I choose a Staar Chemistry Assessment Activities Answers book to read? Genres: Consider the genre you enjoy (fiction, non-fiction, mystery, sci-fi, etc.). Recommendations: Ask friends, join book clubs, or explore online reviews and recommendations. Author: If you like a particular author, you might enjoy more of their work.
- 4. How do I take care of Staar Chemistry Assessment Activities Answers books? Storage: Keep them away from direct sunlight and in a dry environment. Handling: Avoid folding pages, use bookmarks, and handle them with clean hands. Cleaning: Gently dust the covers and pages occasionally.
- 5. Can I borrow books without buying them? Public Libraries: Local libraries offer a wide range of books for borrowing. Book Swaps: Community book exchanges or online platforms where people exchange books.
- 6. How can I track my reading progress or manage my book collection? Book Tracking Apps: Goodreads, LibraryThing, and Book Catalogue are popular apps for tracking your reading progress and managing book collections. Spreadsheets: You can create your own spreadsheet to track books read, ratings, and other details.
- 7. What are Staar Chemistry Assessment Activities Answers audiobooks, and where can I find them? Audiobooks: Audio recordings of books, perfect for listening while commuting or multitasking. Platforms: Audible, LibriVox, and Google Play Books offer a wide selection of audiobooks.

- 8. How do I support authors or the book industry? Buy Books: Purchase books from authors or independent bookstores. Reviews: Leave reviews on platforms like Goodreads or Amazon. Promotion: Share your favorite books on social media or recommend them to friends.
- 9. Are there book clubs or reading communities I can join? Local Clubs: Check for local book clubs in libraries or community centers. Online Communities: Platforms like Goodreads have virtual book clubs and discussion groups.
- 10. Can I read Staar Chemistry Assessment Activities Answers books for free? Public Domain Books: Many classic books are available for free as theyre in the public domain. Free E-books: Some websites offer free e-books legally, like Project Gutenberg or Open Library.

## **Find Staar Chemistry Assessment Activities Answers:**

warn winch the basic guide to winching techniques
warren buffett s investment survival guide
way to go indigo lab pre lab answers
watermelon lime bars recipe
warfield intermediate accounting solutions 10th edition
wards squire gilson tractor owners parts manual
washington manual surgery 6th
wartsila 38 manual
wced exam papers 2012
waterfall teardrop 2 lauren kate
warcraft and enchanting guide
war trash ha jin
watercolors dreaming in color
warlords battlecry 3 guide

## **Staar Chemistry Assessment Activities Answers:**

peaks of the balkans trail self guided bookatrekking com - Dec 12 2021

#### peaks of the balkans trail a beginners guide - May 17 2022

guide to peaks of the balkans trail chasing the - Apr 27 2023

web what is the peaks of the balkans trail the peaks of the balkans trail short pob is a circular trek that leads you through the bordering region of albania montenegro and

#### walking the peaks of the balkans trail cicerone press - Nov 22 2022

web feb 28 2020 descending on the albanian side of the crossing from montenegro part of the peaks of the balkans trail make your way to the remote borders of montenegro

## the balkan trail a 5 day hiking adventure through the peaks - Aug 20 2022

web peaksofthebalkans com this is a waymarked circular trail of 190km through the mountains of the three countries albania kosovo and montenegro it was established in

guide the peaks of the balkans prishtina insight - Jan 25 2023

web mar 20 2022 the peaks of the balkan trail is a relatively new transitional trekking trail passing through albania kosovo and montenegro it s 190km of trail passes through the

## peaks of the balkans trail pob balkans peace park project - Jan 13 2022

peaks of the balkans how to plan a cross border trek - Mar 27 2023

web nov 6 2017 guidebook to the peaks of the balkans trail a 192km circular trek through the borderlands of montenegro albania and kosovo takes two weeks and crosses

how to hike the peaks of the balkans self guided tmbtent - Feb 11 2022

the peaks of the balkans hiking trail the backpacking - May 29 2023

web guidebook to the peaks of the balkans trail a 192km trek through montenegro albania and kosovo the route which can comfortably be completed in less than a fortnight is

#### the peak of the balkans trail europe s last true - Jun 29 2023

web the peaks of the balkans are a collection of beautiful and spectacular mountains shared by albania kosovo and montenegro the peaks of the balkans trail connects the three

#### guidebook to walking the peaks of the balkans trail - Sep 20 2022

web the peaks of the balkans takes hikers through the spectacular accursed mountains and crosses through albania kosovo and montenegro along the way hikers are treated to

#### peaks of the balkans - Oct 02 2023

web the world's newest transnational hiking experience the peaks of the balkans trail is a winner in the prestigious global awards the 192 kilometre signposted trail winds through the remote and unspoilt mountainous regions of albania kosovo and montenegro in the

the complete guide to the peaks of the balkans trail tmbtent - Sep 01 2023

web our guide to trekking the peaks of the balkans trail is the ultimate tool to help you plan your perfect trip when you purchase a guide you ll get instant access to all the

intensive peaks of the balkans trail guided bookatrekking com - Jun 17 2022

#### peaks of the balkans trail guided bookatrekking com - Feb 23 2023

web aug 1 2021 the transnational peaks of the balkan trail is a 192km circular route that will lead you through the remote and wild mountainous region of the western balkans and

solo hiking the peaks of the balkans where wonder waits - Oct 22 2022

web the transnational peaks of the balkans trail leads through one of the most remote and wild mountainous regions of western balkans on this 192 km trail you will use

peaks of the balkans ultimate guide diary of a - Jul 19 2022

web overview itinerary what s included faq visit the famous bazaar in gjakova conquer the most famous peaks of the balkans discover the blue eye of theth visit albania

#### peaks of the balkans trail 10 day guided hiking tour - Jul 31 2023

web in this adventure you explore some of the most beautiful mountain peaks in the world during this trek you ll pass albania kosovo and montenegro as you trek for 125km in

mountain paths across balkan borders lonely planet - Apr 15 2022

## peaks of the balkans hiking trail 10 days outdoor kosovo - Mar 15 2022

peaks of the balkans trail all you need to know - Dec 24 2022

web not afraid to challenge yourself but prefer the convenience of a guided trek then this 7 day trek is your match as you will explore this amazing region under guidance enjoy

optics lenses shmoop - May 01 2022

web learn about the topic lenses in this free and fun physics study guide we answer the basic questions and break it down in

an easy to understand format

#### ap physics 2 6 5 images from lenses and mirrors fiveable - Jan 09 2023

web jan 9 2023 1 where s the image and how does the height of it compare with the object s 2 is the image real or virtual 3 is the image upright or inverted 1 think back to when you look at yourself in a flat mirror it seems as if the image of yourself is behind the mirror when you take a step sideways the image of you also steps sideways

light mirrors and reflection chapter exam study com - Jul 03 2022

web light mirrors and reflection chapter exam free practice test instructions choose your answer to the question and click continue to see how you did then click next question to answer

## types of lenses and mirrors quiz proprofs quiz - Feb 27 2022

web mar 22 2023 plane correct answer a convex explanation a magnifying glass is a type of lens that is convex a convex lens is thicker in the middle and thinner at the edges causing light rays to converge and focus at a point this allows the magnifying glass to enlarge the size of an object when viewed through it

#### and convex pbworks - Nov 07 2022

web concave lenses are often used together with convex lenses they help the convex lenses give sharper images most eyeglass lenses have combinations of concave and convex curves questions understanding lenses six lenses are shown in figure a study them then answer the questions by writing the correct letters many questions will have more mirrors and lenses 8th grade science worksheets and answer key study - Jul 15 2023

web mirrors and lenses science worksheets and study guides 8th grade this topic is about physical science students learn about energy and about comparing ways to transfer information sound light radio microwave energy mirrors and lenses study guide flashcards quizlet - Aug 16 2023

web study with quizlet and memorize flashcards containing terms like what is a mirror what are the 3 types of mirrors what is the shape of a plane mirror and more

#### optics mirrors lenses chapter exam study com - Oct 06 2022

web test and improve your knowledge of optics mirrors lenses with fun multiple choice exams you can take online with study com

## mirrors and lenses study guide sung flashcards quizlet - $Feb\ 10\ 2023$

web mirrors and lenses study guide sung study guide by greenowl includes 36 questions covering vocabulary terms and more quizlet flashcards activities and games help you improve your grades

mirrors and lenses review worksheet m doczz net - Jun 02 2022

web mirrors and lenses review worksheet m download report transcription

#### gk questions and answers on lenses and mirrors jagran josh - Aug 04 2022

web oct 23 2019 let us find out what are mirror and lenses phenomena's associated with them applications convex lens concave lens convex mirror concave mirror in the form of mcgs

## lights mirrors lenses study guide worksheet with answer key - Dec 08 2022

web lights mirrors lenses study guide worksheet with answer key 25 terms on topics of light sources mirrors lenses the human eye and light technologies good companion worksheet to a textbook chapter on light technologies in our world today good review sheet for a quiz also applicable to phy

## lens and mirrors study guide flashcards quizlet - Apr 12 2023

web study with quizlet and memorize flashcards containing terms like difference between mirrors and lenses plane mirror characteristics of concave mirrors and more

## geometric optics physics library science khan academy - Jun 14 2023

web unit 15 geometric optics about this unit this unit is part of the physics library browse videos articles and exercises by topic reflection and refraction learn specular and diffuse reflection specular and diffuse reflection 2 refraction and snell s law refraction in water snell s law example 1 snell s law example 2 total internal reflection

#### mirror and lenses worksheet studylib net - Mar 31 2022

web mirror and lenses worksheet advertisement name activity 2 5 images formed in curved mirrors purpose 1 to demonstrate how an image is formed 2 to demonstrate how real image differs from virtual image materials optical bench apparatus curved mirror concave mirror flashlight black paper procedure 1

## experiment 7 mirrors and lenses phy 022 studocu - Mar 11 2023

web in this lab we will learn about the formation of images formed by spherical concave mirrors and thin lenses image and object distances will be measured when the screen and lens mirror are moved to find the image we will graph these values to

## image formation by mirrors and lenses answers to - Jan 29 2022

web image formation by mirrors and lenses chapter outline 26 1 26 2 26 3 26 4 26 5 images formed by flat mirrors images formed by spherical mirrors images formed by refraction thin lenses context connection medical fiberscopes answers to questions q26 1 with a concave spherical mirror for objects beyond the focal length

## study guide the optics of mirrors lahs physics - May 13 2023

web study guide use with text pages 564 567 the optics of lenses j uses a concave mirror a plane mirror and a convex lens to magnify distant objects d h f c a j e g b i abere f ract i ng m i cros cop e a l d answer the following question on the lines below use complete sentences 11

#### optics mirrors lenses videos lessons study com - Sep 05 2022

web 1 mirrors difference between plane spherical a mirror surface can produce clear reflections due to its smooth surface explore the difference between the two types of mirrors plane and

difference between mirror and lens byju s - Dec 28 2021

web difference between mirror and lens mirror lens this works on the principle of reflection this works on the principle of refraction an ideal mirror reflects 100 of light an ideal lens refracts 100 of light the uses of mirrors can be seen in houses automobiles solar appliances etc

## neuroradiology the requisites 4th edition elsevier - Aug 16 2023

web may 15 2016 now in its 4th edition this bestselling volume in the popular requisites series by drs rohini nadgir and david m yousem thoroughly covers the extensive field of neuroradiology in an efficient and practical manner neuroradiology the requisites e book 4th ed ebooks com - Nov 07 2022

web write a review publisher elsevier health sciences published may 2016 copyright 2017 isbn 9780323278218 edition 4 title neuroradiology the requisites e book series the core requisites author rohini nadgir david m yousem imprint elsevier language english number of pages 620 disclaimer read online

## neuroradiology the requisites in searchworks catalog - Jun 02 2022

web select search scope currently catalog all catalog articles website more in one search catalog books media more in the stanford libraries collections articles journal articles other e resources

## neuroradiology the requisites neuroradiology the requisites e - Jan 09 2023

web sep 12 2016 focusing on high yield information neuroradiology the core requisites 5th edition emphasizes the basics to help you establish a foundational understanding of neuroradiology during rotations prepare for the core and certifying exams and refresh your knowledge of key concepts

#### neuroradiology the requisites google books - Aug 04 2022

web now in its 4th edition this bestselling volume in the popular requisites series by drs rohini nadgir and david m yousem thoroughly covers the extensive field of neuroradiology in an efficient and practical manner

neuroradiology the requisites google books - Jul 15 2023

web jan 1 2010 bibliographic information in neuroradiology the top selling book in the requisites in radiology series dr david yousem et al presents a new way to think about neuroradiologic diagnoses

neuroradiology the requisites e book google books - Sep 17 2023

web apr 29 2010 elsevier health sciences apr 29 2010 medical 640 pages neuroradiology the top selling book in the requisites in radiology series by dr david yousem et al efficiently presents

#### neuroradiology the requisites 3rd ed radiology - Oct 06 2022

web oct 1 2011 neuroradiology nuclear medicine obstetric gynecologic radiology oncologic imaging other pediatric radiology physics and basic science

## neuroradiology the requisites e book the core requisites - Jul 03 2022

web may 15 2016 now in its 4th edition this bestselling volume in the popular requisites series by drs rohini nadgir and david m yousem thoroughly covers the extensive field of neuroradiology in an efficient and practical manner neuroradiology the requisites google books - Apr 12 2023

web this volume in the popular requisites in radiology series concisely presents all of today s need to know information in neuroradiology completely revised and updated it progresses from the  $\frac{1}{2}$ 

neuroradiology the requisites e book google books - May 13 2023

web may 15 2016 elsevier health sciences may 15 2016 medical 620 pages now in its 4th edition this bestselling volume in the popular requisites series by drs rohini nadgir and david m yousem

#### neuroradiology the requisites clinical radiology - Mar 31 2022

web neuroradiology the requisites by r i grossman d m yousem second edition philadelphia mosby 2003 price 63 00 **neuroradiology the requisites american journal of neuroradiology** - May 01 2022

web neuroradiology the requisites robert i grossman and david m yousem 2nd ed st louis mo mosby 2003 908 pages 730 illustrations 95 00 a new edition of any highly successful medical textbook is always welcome because rapid changes in technology tend to render first editions out of date with the concept that a new edition should disclose neuroradiology the requisites digital in searchworks catalog - Feb 10 2023

web select search scope currently catalog all catalog articles website more in one search catalog books media more in the stanford libraries collections articles journal articles other e resources neuroradiology 3rd edition the requisites pmc national - Sep 05 2022

web neuroradiology 3rd edition the requisites 2010 mosby elsevier inc isbn 978 0 323 04521 6 and neuro surgery libraries as well as a must read for radiology residents interested in neuroradiology and as a reference for non radiologists utilizing neuroimaging for evaluation and management of patients

neuroradiology the requisites e book e kitap rohini nadgir - Dec 08 2022

web bir rohini nadgir md eseri olan neuroradiology the requisites e book e kitap olarak en cazip fiyat ile d r de keşfetmek için hemen tıklayınız

#### neuroradiology the requisites 4e requisites in radiology ciltli - Feb 27 2022

web neuroradiology the requisites 4e requisites in radiology nadgir md rohini yousem md mba david m amazon com tr kitap

#### download neuroradiology the requisites by rohini nadgir - Jan 29 2022

web description now in its 4th edition this bestselling volume in the popular requisites series by drs rohini nadgir and david m yousem thoroughly covers the extensive field of neuroradiology in an efficient and practical manner ideal for both clinical practice and abr exam study it presents everything you need to know about diagnostic

## neuroradiology the requisites the core requisites - Jun 14 2023

web jul 21 2016 now in its 4th edition this bestselling volume in the popular requisites series by drs rohini nadgir and david m yousem thoroughly covers the extensive field of neuroradiology in an efficient and practical manner neuroradiology the requisites 3rd ed air - Mar 11 2023

web neuroradiology the requisites is an excellent well organized text that is easy to read up to date and packed with essential imaging and clinical information this third edition is 6 years in the making and includes all of today s cutting edge modalities and protocols