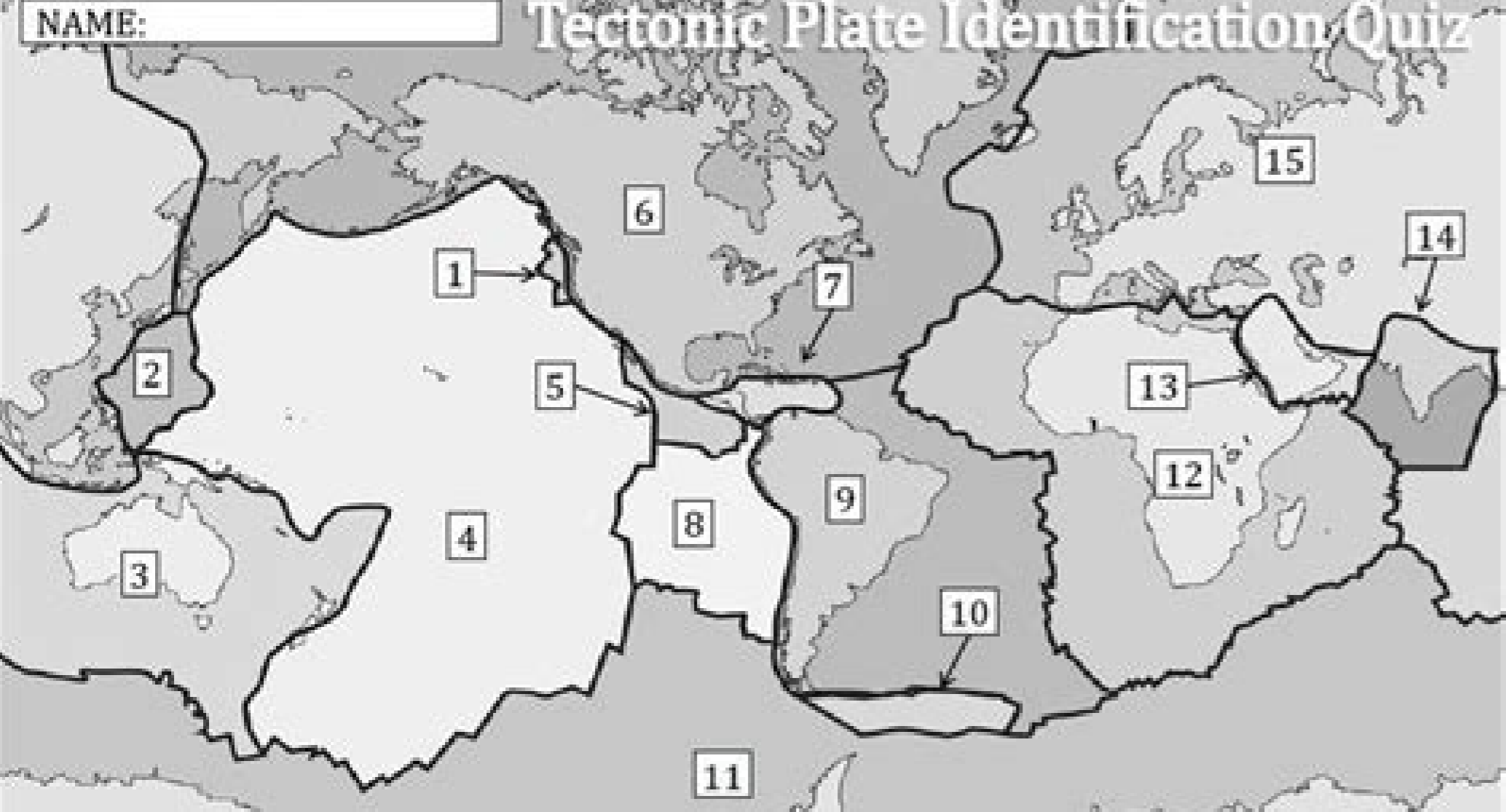


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Tectonic Plate Identification Quiz



The numbers above match the numbers below. Identify & write the name of each tectonic plate with its matching number.

- | | | |
|----------|-----------|-----------|
| 1. _____ | 6. _____ | 11. _____ |
| 2. _____ | 7. _____ | 12. _____ |
| 3. _____ | 8. _____ | 13. _____ |
| 4. _____ | 9. _____ | 14. _____ |
| 5. _____ | 10. _____ | 15. _____ |

Cells



- Put these words in order of complexity: cell, organism, organ, system, tissue. (1)
- List the main structures you would expect to find in a human cell (2)
- Name the three extra structures that are only found in plant cells and not animal cells (2)

Nucleus	Strengthens the cell and gives it support
Vacuole	Where protein synthesis takes place
Ribosome	Controls the movement of substances in and out of the cell
Chloroplast	Controls all activities of the cell, holds the chromosomes
Mitochondria	Contain chlorophyll, is the site of photosynthesis
Cell wall	Filled with cell sap, keeps the cell rigid to support the plant
Cell membrane	Site of aerobic respiration, released energy to the cell

- Describe what flagella are and describe one use of flagella to a prokaryote (2)

One-Electron Atom/Ions And Two-Electron Atoms/Ions:

A QMC Study

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Abstract

This paper aimed at determining the ionization energies of some one-electron (hydrogen-like) atoms/ions and some two-electron (helium-like) atoms/ions. The Quantum Monte Carlo (QMC)-CASINO code or package was utilized in the computation, employing the Variational Monte Carlo (VMC) and Diffusion Monte Carlo (DMC) methods. The calculated values obtained were in close agreement with literature values.

Keywords: Ionization energy, CASINO-code, VMC, DMC.

1. Introduction

Understanding the chemistry of the elements in the periodic table and other fundamental concepts such as lattice energy of inorganic solids can be achieved from a sound knowledge of their ionization energies [1]. With the development of quantum theory, the two-particle problem can be solved exactly and the kinetic energy of the electron in a hydrogen atom can be calculated using the Schrodinger equation:

$$\frac{\partial \psi}{\partial t} = H\psi \quad (1.1)$$

Since this Schrodinger equation does not take account of relativistic effects, Dirac [2] produced an equation which included a relativistic correction for the electron energy levels. However, Lamb and Retherford [3-5] in a series of experiments showed that there is a small shift in the energy levels of the hydrogen atom not accounted for by Dirac equation. This energy shift is now commonly called the Lamb shift. Theoretical atomic energy levels were calculated from a nonrelativistic model, and then relativistic and quantum electrodynamic effects were accounted for by treating them as perturbation corrections. The advent of powerful computers, have aided highly complicated theoretical calculations of the energy levels and ionization energies of hydrogen-like ions [6] and helium-like ions [7] to be performed. These sophisticated equations for one-electron atomic ions and two-electron atomic ions, which need complex computer routines to compute, include corrections for variations of mass with velocity, reduced mass, mass polarization and Lamb shift. Also, corrections for interactions between the two-electrons in the case of the two-electron ions.

Updated theoretical ionization energies and Lamb shifts for one-electron atomic ions and two-electron atomic ions have been published and are generally accepted as very accurate [8,9]. These recent results differ very little from the earlier computed values of [5] and [6]. However, Lang and Smith [10] and Sabir et al [11] in their various publications devised a simple empirical equation to reproduce literature values for the ionization energies of one-electron atomic ions and two-electron atomic ions respectively with very good agreement.

INTRODUCTION TO FORENSIC SCIENCE STUDY GUIDE FROM TEXT

Chapter 1

- Define forensic science/criminalistics.
- Recall the major contributions to the development of forensic science.
- Give examples of typical crime laboratories as they exist on the national, state and local levels of government in the U.S.
- Describe the services of a typical comprehensive crime laboratory in the criminal justice system.
- Explain the different approaches espoused by the Frye and Daubert decisions to the admissibility of scientific evidence in the courtroom.
- Explain the role and responsibilities of the expert witness.
- Review the proper collection and packaging of common types of physical evidence (see Appendix A).

Chapter 2

- Define physical evidence.
- Discuss the responsibilities of the first officer who arrives at the crime scene.
- Explain the steps to be taken for thoroughly recording the crime scene.
- Describe proper procedures for conducting a systematic search of crime scenes for physical evidence.
- Describe the proper techniques for packaging common types of physical evidence.
- Define the chain of custody.
- Discuss the implications of the Mincey and Tyler cases.

Chapter 3

- List the common types of physical evidence encountered at crime scenes.
- Explain the differences between the identification and comparison of physical evidence.
- Define individual and class characteristics. Give examples of physical evidence possessing these characteristics.
- Discuss the value of class evidence to a criminal investigation.
- Explain the purpose physical evidence plays in reconstructing the events surrounding the commission of a crime.



It is possible that it does not realize, but almost all around them are rare metals from the earth. In its phono, computer or any other LCD screen, for example, you will find a pinch of Indian, a soft and malleable metal that is in the shortage of supplies in the earth's crust. Gallium, which can emit light from a shaking of electricity, is used in semiconductors, LED, liners and solar industry. The Renio, one of the most rare elements of the earth's crust, is more commonly necessary in the reaction engines. In other words, in our daily lives, we trust many metals that are unusual, environmentally or almost unusual in places like China, Bolivia or the democratic democratic democratic of the Congo (that is, not nations with the The United States is always in good terms). What is the risk that we can not depend on any of these elements? That is the question asked by Yale University researchers, who have now cataloged how much we are in danger of danger of putting all our eggs in a basket. The concentration of elements on a printed circuit plate. Taking advantage of each of the 62 metals that we use today, including the shortage of each element, the concentration in a birth and the difficulty of finding adequate replacements, the study creates a periodic risk table (or as the researchers call it, "Criticality". Metals such as zinc, copper and aluminum ", the most used in manufacturing industries long before the informal revolution" have little risk and, therefore, have relatively relatively low scores of "Criticality". However, unlike the metals that were common in the past, those used in today Dcas, no So reliable favors of achieving, shows the evaluation. Some of these elements, such as arsa 6 nico and selenium, cannot even be extracted alone. They are usually the byproduct of other mining processes. Elements with the best risk, risk. Red is high, blue is low.The study, published in the Proceedings of the National Academy of Sciences, found that supply limits are most important for metals used in electronics, such as gallium and selenium. For environmental implications, metals like gold and mercury proved the biggest risks. Imposed supply restrictions could affect the supply of metals like chromium and niobium, which go into forming important steel alloys, and tungsten and molybdenum, which are used for high-temperature alloys.The larger point for the studyeAAAs authors is to underscore the need for greater electronics recycling programs as well as a change in thinking about design. The more these metals are put back into circulation, the less the demand for fresh mining becomes, notes the lead author, industrial ecologist Thomas Graedel.eAAAt think these results should send a message to product designers to spend more time thinking about what happens after their products are no longer being used,eAAA he says. Public Domain/2012rc/Wikimedia Commons You may be familiar with the chemical periodic table from school, but thereeAAAs more than meets the eye with this seemingly simple scientific chart. Learn more about the periodic table, including how it was developed and which elements have some interesting history that you may not know about.It Has a Single Author With a Singular InspirationYou may already know that one man, Dimitri Mendeleev, is responsible for creating the periodic table. But what you may not know is that he was inspired by a deck of cards to write out each element on a separate card and arrange them in groups aCCOrdng to their atomic weight.CC0/Arcanon/Pixabay Mendeleev was so confident in his system that he was able to create spaces on the table for elements that had not yet been discovered, including gallium. However, his pride also caused him to initially reject elements, like helium and other noble gasses, that didn't fit with his structure.CC0/Pexels/Pixabay IteAAAs Still GrowingIt may seem that weAAAVE discovered all there is to know about the natural world at this point, but scientific breakthroughs happen all the time. New elements are still being added in the 21st century.CC0/PublicDomainPictures/Pixabay That'sAAAs BananasBananas are well known to contain a high concentration of potassium, which is both an essential nutrient and an element on the periodic table. This fact often gets blown out of proportion, bananas actually contain a mildly radioactive form of potassium. TheyeAAAre completely safe to eat, though, and you should ignore any implications to the contrary.CC0/StockSnap/Pixabay Golden HourGold is not only an element on the periodic table, iteAAAs also a color unto itself. The metal has its warm yellowish hue thanks to energy level shifts in gold electrons, which causes the metal to absorb the blue end of the light spectrum.CC0/Stevebidmead/Pixabay Gallium: A Chemistry Demo FavoriteGallium, one of the elements that Mendeleev predicted, is a favorite choice for chemistry classroom demonstrations. This solid metal liquefies at a relatively low temperature (around 85 degrees Fahrenheit), meaning you can shape it into a spoon that will melt into liquid if you use it to stir a hot cup of tea.CC0/TerriC/Pixabay Mercury MadnessSir Isaac Newton is widely known as a genius, but he famously struggled with mental illness late in his life. Modern scholars believe this is likely due to mercury exposure during his experimentation with alchemy.CC BY 2.0/James St. John/Flickr Over-the-Counter Mercury Poisoning?Other historical figures had run-ins with mercury as well. Lewis and Clark are said to have brought mercury-based laxatives with them on their westward journey. The pills were charmingly named eAAARusheAAAs Thunderbolts.eAAACC BY 3.0/jurii/Wikimedia Commons Leaded Gasoline and Crime RatesMercury isn'eAAAt the only element on the periodic I'm not sure. ?? ?? ?? n'Aicartsulf, setnallirb res a nedneit selatem sol.L selatem nos socimAuq sotnemele sol ed a'royam al. ahcered roirepus antiqse al ne n'Atse socij'Atem on s'Am sotnemele sol euq sartneim .acid'Airep albat al ed adreiuqzi roirefni antiqse al ne olla s'Am se oculj'Atem retc;Arac IE .selatem on y socij'Atemimes o sediolatem .selatem nos sotnemele ed selareneg sa'rogetac sert sal .Jsednitca y sedinshatnal sol/ acid'Airep albat al ed lapicnirp opreuc led ojabed sodo'Arep sod sol ne etsisnoc f euqolB IE .n'Aicainsart ed selatem nos euq 21 a 3 sopurg eyulcni d euqolB IE .81 a 31 ed sopurg eyulcni oeuqolB IE .oileh y ones'Ar'dih .)sanilacla sarroit sal y sonilacla selatem sol(sopurg sorerirp sod sol eyulcni oeuqolB IE .omof;A led anrexe senortcele ed llehsbus al nacidni euq acid'Airep albat al ed senoicces nos seuqolB soL soeuqolB anrexe s'Am aracs;Ac al ed n'Ar'tcele nu ratiuq lic;Af s'Am evleuv es euqrop sajab s'Am etnemavisecus n'Aicazinoi ed sa'Agrene neneit sotnemele sol .opurg nu odnazalpsed .oelc'eAn led sojel s'Am aienelav ed senortcele sol ajupme senortcele ed aracs;Ac anu ed n'Aicida al euqrop opurg nu ed otnemivom le eyunimsid dadivitagenortcele al .senortcele a'Agrene ed levin nu nanag sovisecus sotnemele sol euq ay .opurg nu ed otnemivom le atnemua ocim'Ata oidar IE .n'Aicazinoi ed a'Agrene y dadivitagenortcele .ocim'Ata oidar a otepsere noc n'Artap nu nartseum opurg nu ed ortned sotnemeleE .ecnelav ed senortcele ed n'Aicarugifnoc anu netrapmoc opurg nu noc sotnemele soL .)selbon sesag sol(81 a)sonilacla selatem sol(1 ed sodaremun nos sopurg soL .sailimaf o sopurg nanimoned es sotnemele ed sanmuloc saL sopurgG .senortcele ed aracs;Ac aveun anu eda±Aa asem al erbos odo'Arep nu rajaB .selatem on nos ohcered odal led sol euq sartneim .selatem nos odo'Arep nu ed odreiuqzi odal le aicah sotnemele soL .odo'Arep nu ed s©Avart a ahcered a adreiuqzi ed odnasap atnemua tmemelE ed ocim'Ata orem'An IE .sodo'Arep namall es euq .acid'Airep albat al ed salif eteis yaH hard, conductive and capable of forming alloys. 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