Notes for teachers:

This game involves knowledge of the subject as well as the roll of the die (for lucky but unknowledgeable students!)

You will need:

One six-sided die

The knowledge cards printed (double-sided) and cut into individual cards

A card holder is handy

This is my own invention: Dr. Vikki French, 2017

Enjoy!

**The Atoms Game**

It’s about atoms and chemistry

To play:

When it is your turn, choose an “Atoms Game” card from the stack

Hand it to the person to your right

That person will read the card’s question for you to answer

If you get the answer right, keep the card

If you get the answer wrong, put the card in the dump and roll the die:

If you get: a 5 or 6 – you get 1 point

 a 3 or 4 – 0 points

 a 1 or 2 – you lose 1 point

At the end of the game:

Everyone calculates their points:

2 points for every card you answered correctly plus your dice points

The person with the most points wins

**My total points were: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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|  | Which of these choices is not a major part of an atom?ElectronsProtonsNeutrons**All are parts of an atom** |  |  | An isotope is a form of an atom with a different number of...ElectronsProtons**Neutrons** All of the Above |  |  | The atomic number of an element tells you the number of \_\_\_\_\_\_\_\_\_\_\_ in a neutral atomElectrons and Neutrons**Electrons and Protons**Protons and Neutrons |
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|  | An ion is a form of an atom with a different number of...**Electrons** ProtonsNeutronsAll of the Above |  |  | Which of these particles is found in the atomic nucleus?Electrons and NeutronsElectrons and Protons**Protons and Neutrons** |  |  | Which scientist is NOT associated with the study of atomic structure?Niels BohrErnest Rutherford**Michael Faraday**All of these scientists worked with atomic structure |
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|  | All electrons orbit the nucleus in regions shaped like spheresTrue**False** |  |  | Scientists use spectroscopy to identify elements**True**False |  |  | You cannot know the exact location of an electron**True**False |
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|  | Atoms in the same families of elements share similar characteristics**True**False |  |  | Which of these is NOT a basic piece of an atom?Electron**Quanton** ProtonNeutron |  |  | Which atomic particle has a negative charge?**Electron** ProtonNeutronNone of the Above |
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|  | An electron has a mass that is much less than a proton**True**False |  |  | An electron can only stay in one of the seven possible atomic shellsTrue**False** |  |  | An atom with a neutral charge has the same number of...Protons and NeutronsNeutrons and Electrons**Protons and Electrons** |
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|  | There is no particle of matter smaller than an atomTrue**False** |  |  | Atoms of an element may have more or fewer neutrons or electrons than other atoms of the same element.**True**False |  |  | The innermost atomic shell can hold a maximum of 18 electronsTrue**False** **(only 2)** |
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|  | When atoms bond with each other, they exchange...ProtonsNeutrons**Electrons**  |  |  | How many protons in a Hydrogen (H) atom?**One**TwoThreeFour |  |  | How many neutrons in a Hydrogen (H) atom? **Zero**OneTwoThree |
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|  | If an atom has 13 electrons, how many shells will it have?OneTwo**Three** Four(max 2 in 1st shellmax 8 in 2nd shellmax 8 in 3rd shell) |  |  | What is the name of the compound NaCl?Hydrogen bromidePotassium chlorideSodium dichlorideSodium chloride |  |  | If you pour liquid nitrogen into a glass at room temperature, it will change its physical state to a solidTrue**False** |
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|  | How many electrons in a Hydrogen (H) atom?**One**TwoThreeFour |  |  | Plasmas are all made of the same ions. They have different colors due to different amounts of electricity.True**False**(The color of plasma depends on what elements are being charged and ionized) |  |  | Name a force that keeps molecules togetherFriendshipDetraction**Attraction** Phlegmatic |
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|  | Which is an example of a crystal lattice?Plastic**Diamond** CementSand |  |  | Atoms in a liquid are farther apart than the atoms in a gasTrue**False** |  |  | Which has the least energetic molecules?**Solids** LiquidsGasesPlasmas |
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|  | What force pulls liquids towards the ground?PressureTemperature**Gravity** Centrifugal |  |  | When a substance goes from being a solid to a liquid, it is a...Chemical Change**Physical Change** |  |  | If one substance combines with another to make a new compound, it is a ...**Chemical Change**Physical Change |
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|  | You may find plasma in a star**True**False(Plasma is what makes a star a star) |  |  | Which of these choices will NOT change the state of matter?Temperature**Crushing a Crystal**PressureElectricity |  |  | If you leave water in a glass and some molecules turn into a gas, it is called...Egasoration**Evaporation** ExtinctionSolidification |
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|  | Which of these choices is NOT an example of a plasma?Aurora BorealisFluorescent Light BulbNeon Sign**Incandescent Light Bulb** |  |  | What is usually the total charge of a plasma?PositiveNegative**Neutral**  |  |  | Mixtures are always combinations of compounds that are in different states of matterTrue**False** |
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|  | You can separate all mixtures by filtrationTrue**False** |  |  | Would it be possible to have a mixture made of all carbon atoms and compounds with only carbon atoms?**Yes**NoEx: mix coal, graphite, and diamonds |  |  | Mixtures are generally separated by what methods?Chemical**Physical**  |
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|  | Only specific compounds can be combined to form mixturesTrue**False** |  |  | All solutions are mixtures, but not all mixtures are solutions**True**False(Solutions are liquid, mixtures can be any phase of matter) |  |  | As the temperature of a mixture increases, one part of the mixture may melt while the other parts remain solid.**True**False |
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|  | Which of these is not a mixture?SolutionAlloyAmalgam**They are all mixtures** |  |  | Which of these is not a mixture?Oil and WaterSand and SodaDiet Soda**All are mixtures** |  |  | Which of these is a solution?14K GoldSalt WaterCarbonated Water**All of the Above**(Gold starts as a molten mixture) |
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|  | Solutions with low concentrations of solutes are...Concentrated**Dilute** SolventsNone of the Above |  |  | Colloids are solutions with very small particles suspended in a liquid**True**False |  |  | The concentration of solutions is directly related to...SolubilityTemperaturePressure**All of the Above** |
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|  | The most common solvent on Earth is...Gasoline**Water** TurpentineNone of the Above |  |  | All liquids can be mixed to create solutionsTrue**False** |  |  | An increase in pressure can lead to an increase in dissolved gases**True**False |
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|  | You can remove salts from a water-based solution by using the process of...**Evaporation** CondensationQuantification |  |  | A positively charged ion is called a…Dogion**Cation** NeutrionNone of the Above |  |  | An aqueous solution is one that has compounds dissolved in water**True**False |
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|  | Liquids and gases expand as the temperature increases**True**False |  |  | If Isaac Newton was the father of classical mechanics, who would be the father of relativity?Isaac Newton**Albert Einstein**Johann KeplerCharles Darwin |  |  | Fusion breaks atoms apart for energyTrue**False**(That would be fission…) |
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|  | In Einstein’s famous equation, e =?ma**mc2**mc |  |  | What are the basic pieces of an atom?Electron, Positron, NucleonNeutron, Positron, Electron**Proton, Neutron, Electron**Neutral, Positive, Negative |  |  | If you looked at an atom of antimatter, the small particles orbiting the nucleus would have a \_\_\_\_\_\_ charge**Positive**NegativeNeutral |
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|  | Radioactive isotopes can give off what types of radiation?Alpha ParticlesBeta ParticlesGamma Rays**All of the Above** |  |  | Nuclear fission uses hydrogen to generate energyTrue**False**(That would be fusion…) |  |  | Gravitational forces are one of the accepted four fundamental forces of the Universe**True**False |
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|  | Half-life is the amount of time it takes for \_\_\_\_\_\_\_\_ of the atoms of a radioactive sample to decayOne-quarter**One-half**One-third |  |  | An element is determined by the number of: atoms electrons neutrons **protons** |  |  | A single proton has what electrical charge? no charge **positive charge** negative charge either a positive or negative charge |
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|  | Which particles have approximately the same size and mass as each other?neutrons and electrons electrons and protons **protons and neutrons** none - they are all very different in size and mass |  |  | Which two particles would be attracted to each other? electrons and neutrons **electrons and protons** protons and neutrons all particles are attracted to each other |  |  | The atomic number of an atom is: the number of electrons the number of neutrons **the number of protons** the number of protons plus the number of neutrons |
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|  | What is the atomic number of a Cl atom which has 17 protons and 18 neutrons? **17**  18  35  |  |  | An atom has 7 protons and a mass number of 14. What is the number of neutrons in this atom?  **7**  14  21  |  |  | An atom as a whole is \_\_\_\_\_\_\_ **electrically neutral**  positively charged  negatively charged  |
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|  | The mass number of an atom is the sum of the numbers of the \_\_\_\_\_\_\_**protons and neutrons** electrons and protons neutrons and protons  |  |  | The atoms in an element are:**All the same type** Two types joined together About a hundred different types |  |  | The center of the atom is the **nucleus**protonneutronelectron |
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|  | The smallest particle of an element to still be that element is the nucleuselectron**atom**neutron |  |  | How many total atoms are in a molecule of water (H2O)?12**3** |  |  | How many different types of atoms are in a molecule of water (H2O)?1**2****3** |
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|  | Which of these is the smallest particle?**an atom** a molecule a speck of dust |  |  | Which statement about elements is correct?**most elements are metals**most elements are non-metals there are about the same number of metals and non-metals |  |  | Which of the following is not a general property of metals?shinygood conductor of heat **poor conductor of electricity** |
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|  | Which of the following is not a general property of non-metals? brittle**strong** poor conductor of heat |  |  | An element sinks in water and makes ringing sound when hit. It is most likely to be:**a metal** a non-metal an alloy |  |  | A hydrogen atom does not contain:a proton**a neutron**an electrona hydrogen atom has all of these |
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|  | Which atom has the smallest atomic weight?  oxygen**hydrogen** carbon none of the above  |  |  | Subatomic particles are found inside atoms**true** false |  |  | The modern periodic table is organized by atomic number \_\_\_\_**Increasing**  Decreasing  Reducing  Developing  |
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|  | Which of these changes is a chemical change?**iron rusting** crushing a crystal ice melting |  |  | Which of these changes is a chemical change?crushing ore**gasoline burning** water evaporating |  |  | An electron can only stay in one of the seven possible atomic shellsTrue**False** |
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|  | The innermost atomic shell can hold a maximum of 18 electronsTrue**False** **(only 2)** |  |  | Which of these is a chemical suspension:Salt water**Snow globe**Raisin branWaterMayonnaise |  |  | Which of these is a colloid:Salt waterSnow globeRaisin branWater**Mayonnaise** |
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|  | Which of these is a chemical mixture:Salt waterSnow globe**Raisin bran**WaterMayonnaise |  |  | Which of these is a chemical solution:**Salt water**Snow globeRaisin branWaterMayonnaise |  |  | Which of these is a chemical compound:Salt waterSnow globeRaisin bran**Water**Mayonnaise |
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