**Choosing a Claim**

Deciding on a claim for an EBA activity can be challenging, especially for teachers new to argumentation. No set formula exists for selecting claims. Claim can derive from statements or questions, broad ideas or specific applications of a concept.

Consider the following tips when selecting a topic:

Use the essential questions: A helpful place to start is to reframe the essential question guiding the unit of study. Some of these can directly translate into a debatable topic. These questions have the benefit of engaging students in a discussion on the most important aspects of the materials being studied.

Consider the type of activity: The type of activity will determine the type of topic the class should use. If a small number of students will be discussing a given issue or the discussion is intended to be brief, the topics can be fairly narrow (e.g. the best way to solve this particular system of equations is with the substitution method). For large group activities, broader questions will allow more student perspectives to come into play, keeping the class interested (e.g. in general, which approach to solving systems of equations is the most best?).

Use comparison or value statements: An easy way to turn a question with a descriptive answer into one that requires someone take a side is to use comparison words. Instead of asking the class to list the characteristics of the organs in the human body, ask them to argue about the most important organ in the human body. In defending their side and attacking others, students will learn about not only their team’s organ, but also those being discussed by their opponents. The following list includes words that will help turn straightforward descriptive course questions into debatable topics:

|  |  |
| --- | --- |
| **SHOULD** | * A person should take a dollar now instead of two dollars next year. * Rome should not have attacked Carthage. |
| **BEST / WORST** | * Which energy source is the best? * Romeo had the worst motivation for his actions compared to other characters. |
| **WEIRDEST / COOLEST** | * Which kingdom of life is the coolest? * Which absolute emperor is the weirdest? |
| **MOST** | * Which mathematical property is the most important: the associative, commutative, or the distributive property? * Which character in a play is the most heroic? * Which organic compound is the most important? |
| **BIGGEST** | * Gamma radiation has a bigger impact on humanity than alpha or beta radiation. |
| **INNOCENT / GUILTY** | * Macbeth should be declared innocent of killing King Duncan due to extenuating circumstances. |

Middle School Science Claims

**Unit 1: Planetary Science**

* All arguments have structure.
* Ancient astronomers’ observations of the sky played an important role in human activities.
* It is reasonable to think that the Earth is the center of the universe.
* It is obvious that the Earth is not the center of the Universe.
* All heavenly bodies give off light.
* Stars twinkle.
* Planets are moving stars.
* Eclipse of the Moon occurs at night.
* Stars appear at night

**Unit 2: Five Kingdoms of Life**

* [ example organism ] is a member of the [ ] kingdom
* My alien organism belongs to [ ] kingdom.
* Classification of living things is one of the most important tasks of scientists.
* The Five Kingdoms were once two kingdoms.
* Microscopes aided scientists in learning about cells structures.
* One Kingdom has organisms can have plant like characteristics and animal like characteristics.
* 1950 was an important year for classifying living things
* Yeast should be the 6th kingdom.

**Unit 3: Matter and Its Properties: Mass, Volume, Weight, and Density**

* Matter is a term best used in science.
* Matter exists is four states.
* The word matter has been used to refer to different things throughout history.
* State of matter can change at different temperatures.
* Matter can be measured.
* Helium and air are *different/both matter/both gases.*
* The balloon with helium would *sink/ float* if a *larger/smaller* balloon is used.
* A small rock will sink in the water faster than a stack of graded tests.
* There are no important solids that are less dense than some liquids.

Biology Claims

**Unit 1: Cell Biology and Biochemistry**

* *Nutrition/Transport/Reproduction* is the *most important/ coolest/ least important* life function.
* *Leeuwenhoek/Hooke/Brown/Schleiden/Schwann/Virchowhad* the greatest impact on the development of the Cell Theory.
* [Example organelle] is the *most important/ coolest/ least important* part of the cell.
* *Temperature/Substrate/Concentration/pH* has the most effect on enzymes.

**Unit 2: Life Processes in Living Things**

* Heterotrophs are the coolest type of organism.
* Autotrophs can survive the best in an environment.
* Active transport is the better mode of transport in a cell.
* *Leaves/Stems/Roots* are the *most important/ coolest/ least important* part of a plant.
* *Aerobic/Anaerobic* respiration is the *best/worst* type of respiration.
* *Respiration/Dehydration synthesis/ Protein metabolism/ Certain metabolic processes* is/are the *best/ coolest/ least important* mode of excretion.
* Regulation involves the control and coordination of life activities.
* *Dendrites/Cell Body/Axon* is/are the *best/ coolest/ least important* part of a neuron.
* It is better to be *motile/sessile.*
* *Nutrition/Respiration/Excretion/Regulation/Locomotion* is the most important life process in living things.

**Unit 3: Human Anatomy and Physiology**

* The *circulatory/skeletal* system is the most *interesting/complex* system in the human body.
* *White blood cells/ Red blood cells/ Platelets/ Plasma* are/is the coolest part of blood.
* The sense of *sight/smell/touch/taste/hearing* is the *most important/ coolest/ worst to have a problem with* sense.
* The *pituitary/adrenal/thyroid* gland is the *most important/ coolest/ worst to have a problem with* gland in the nervous system.
* *Skeletal/Smooth/Cardiac* muscles are the *most important/ coolest/ worst to have a problem with* type of muscles.
* Using *steroids/opiathes/meth/marijuana* *will/will not* do the most damage to your body.
* Vaccines *are 100% safe/ don’t cure everything*.
* Childhood immunizations should be mandatory for all children under the age of 18.
* If given the option in Call of Duty to “level up” your character’s body systems, the best system to enhance to superhuman levels is the *digestive/ circulatory/ respiratory/ nervous/ musculoskeletal/ reproductive/ endocrine/ integumentary* system.

**Unit 4: Reproduction and Development**

* *Prophase/Metaphase/Anaphase/Telophase* is the *most important/ coolest/ worst to have a problem with* phase of mitosis.
* *Sexual/Asexual* reproduction is the most advantageous form of reproduction.
* *External/Internal fertilization* is the most advantageous form of fertilization.
* *Males/Females* have a more complex reproductive system.
* FSH/LH is the *most important/ most interesting* hormone in the menstrual cycle.
* Testing and treating procedures are essentially the same for all STDs.
* STDs all have similar symptoms.
* Anyone can get an STD (an STD can get passed on to sex partner and babies).
* There are no complications from STDs.
* The *pistil/stamen* is the *most important/ coolest* part of a flower.
* *Interphase/Mitosis/Cytokinesis* is the *most important/ coolest/ worst to have a problem with* phase of the Cell Cycle.

**Unit 5: Genetics, Heredity, and Molecular Genetics**

* *Dominance/Genotype/Rcessive/Homozygous/Heterozygous/Phenotype* is the *most important/ coolest/ worst to have a problem with* topic in genetics
* *Addition/Deletion/Substitution/Translocation* is the worst type of mutation
* *Nondisjunction/Polyploidy* is the most damaging type of chromosome alteration
* An inherited defect is one in which the defective gene has been inherited from one or both of the parents.
* Given the genetic disease crisis in purebred dogs, researchers and breeders should focus on genetic disorders that follow a *dominant/recessive/sex-linked/codominant/incomplete dominant* inheritance pattern.
* *DNA/mRNA/tRNA/rRNA* is the *most important/ coolest/ worst to have a problem with* nucleic acid.
* Electrophoresis is the better type of biotechnology than genetic engineering.
* Cloning is bad for humans.

**Unit 6: Evolution, Classification, Ecology, and the Environment**

* Comparative *anatomy/embryology* is the *most important/ coolest* type of comparative science.
* There are *no/very few* places on Earth today that are like Primitive Earth
* *Competition/Overpopulation/Natural Disaster* has the *least effect/most worrisome effect for humans* on a population.
* [ example kingdom ] is the coolest kingdom.
* It would be most devastating to humans if it isolated and exterminated all *producers/consumers/decomposers*.
* The *Carbon-Hydrogen-Oxygen/Water/Nitrogen* cycle is the most important for the *earth/humans*.
* *Terrestrial/Marine/Freshwater* biomes are the *most important/ coolest/hardest to live in* biomes.
* *Punctuated Equilibrium/Gradualism* is the more reliable time frame for evolution

Chemistry Claims

**Unit 1: Alchemy: Matter, Atomic Structure, and Bonding**

* *Wind/Music/Clouds* is/are the *strongest/ coolest/ least important* form of matter.
* Using *calculations/water displacement* is the best way to measure volume.
* *Metals/Metalloids/Nonmetals* are the *most important/coolest/most dangerous* type of element.
* *Radioactive decay/fission/fusion* is the *most useful/coolest/most dangerous* type of nuclear reaction.
* *Lithium/Calcium/Barium/Potassium* is the most useful element to have for a fireworks display.  
  *Ionic/Molecular Covalent/Covalent Network/Metallic* bonds are the *strongest/ coolest/ least important* type of bond.

**Unit 2: Smells: Molecular Structures and Properties**

* *Lewis Dot Diagrams/ Structural formulas* are easier to *write/understand*.
* A particular functional group is related to a particular smell
* *Electron domains/Molecular shapes* are *cooler/easier to draw*.
* *Sweet/Minty/Camphor/Putrid/Fishy* has the coolest shape
* *Polar/nonpolar* molecules are the *most important/coolest* type of molecule
* Intermolecular forces are not important
* *Polar covalent/Nonpolar covalent/Ionic* bonds are the bes*t/ coolest/ least important* type of bond.
* Only the best molecules can be superimposed on their mirror images.
* Amino acid molecules are essential to life as we know it.
* Earth would be most pleasant if *carboxylic acid/ester/ketone/alcohol/amine* groups did not exist.

**Unit 3: Weather: Phase Changes and Behavior of Gases**

* Earth has the most impact on weather.
* Air has the least impact on weather.
* Water is the best part of weather.
* Sun is the worst part of weather.
* [ ] is the best shape for a rain gauge.
* Height and volume are equally important values for rain/snow.
* Ice is the easiest substance to calculate the density of
* Gas thermometers are the coolest thermometers.
* Liquid thermometers are the best type of thermometer
* Low pressure systems are more dangerous than high pressure systems
* The *manometer/barometer* is the *easiest/most reliable* way to measure air pressure.
* *Charles/Boyles/Gay-Lussac’s/Combined/Ideal Gas* Law is the *best/most important/hardest* gas law
* *Global Warming/Hurricanes* is/are the most dangerous extreme physical change.

**Unit 4: Toxins: Stiochiometry, Solution Chemistry, and Acids and Bases**

* It is hard to predict change from chemical equations.
* Garbage will be around forever.
* *Combinatino/exchange* reactions are the *most important/coolest* type of chemical reaction.
* Every substance on the planet is a potential toxin.
* Most toxic substances have health benefits.
* There are different ways to compare amounts of a chemical.
* *Fluorine/Iron* is the *most/least* toxic element in tap water.
* Acids are made of main group metal ions bonded covalently.
* A substance with a pH of 7 is a base.
* All bases have hydroxide ions.
* All acids have hydrogen ions.
* *Moles to grams/ Grams to grams/ Moles to moles* is the *most complicated/easiest* chemistry problem to solve.
* Using *mass calculations/ precipitation reactions* is the best way to determine what a mystery solution is.

**Unit 5: Fire: Energy, Thermodynamics, and Oxidation-Reduction**

* *Exothermic/Endothermic* reactions are the most *useful/dangerous* types of reactions
* The first/second law is the most important Law of Thermodynamics.
* *Bread/Potato chips/ Walnuts/ Coca-Cola* is/are the best source of “fuel”.
* *Hydrogen/Carbon* bonds are hard/easy bonds to break.
* *Steam engines/Internal combustion engines* are the best way to convert chemical energy to work.
* [Example element] is more/less active than [example element].
* Pairing *Tin and Gold/Iron and Lead* will produce the *most/least* amount of energy.
* A *solid/liquid/gas* is the easiest phase to change to.

**Unit 6: Showtime: Reversible Reactions and Chemical Equilibrium**

* The best demonstrations include *smoke/fire/color change*.
* The best reactions are reversible.
* There are different models of equilibrium.
* A large equilibrium constant is better than a small equilibrium constant.
* Changes in *concentration/temperature/pressure* are the *most common/easiest/coolest* type of change.

**Physics Claims**

**Unit 1: Motion**

* Most objects you see that have zero acceleration have a nonzero velocity.
* Most automobiles that have the same acceleration on the road have the same velocity.
* In a drag race a car that starts and ends at a consistently high (constant) velocity will beat most cars that are able to accelerate for the entire race.
* Speed-limit signs should be renamed velocity limit signs.
* It is important for parents to install a computer chip in the car of their teen to receive 1-dimensional graph driving reports.
* The most important force keeping an apple in your hand is *gravity/normal force/ force of muscle*.
* A ball that is in your hand has a more complex free body diagram than a ball being thrown.
* Getting rid of *gravity/normal force/ friction* would create the most unbalanced forces.
* Static friction plays a more important role in sports than kinetic friction.
* The ability to violate Newton’s *1st/2nd/3rd* Law of motion would create the best *superhero/pro-athlete*.
* *Flat/curved/inclined/declined* parts of roads should be repaired first to make car driving safer.

**Unit 2: Conservation of Energy and Momentum.**

* *Jumping/Resting after a meal/Running* is a better example of the Law of Conservation of Energy.
* While a ball is rising or falling, the sum of the gravitational potential energy and the kinetic energy remains constant.
* *People/Cars/Boats* provide the most examples of mechanical energy than.
* Jack and Jill ran up a hill. Jack is twice as massive as Jill; yet Jill ascends the same distance in half the time. *Jack/Jill* has more power on the ground.
* A rock climber and a trail hiker are making their way to the top of a mountain. The *hiker/rock climber* has more power.
* A weightlifter is in a weight room lifting a 200-lb weight. An offensive lineman is block a defender. The *weightlifter/lineman* has more power.
* The principle of conservation of momentum most influences how safety systems are designed to protect us against collisions with massive objects.
* The violation of the *Conservation of momentum/Friction/Kinetic energy/Gravitational potential energy* will create the most thrills seeking roller coaster.

**Unit 3: Heat and Heat Transfer**

* *Convection/Conduction/Radiation* is the most effective form of heat transfer.
* *Mass/Initial temperature* is the most influential in the process of a more comfortable thermal equilibrium being reached when a bucket of cold water is dumped into a bathtub of hot water
* The process of *water coming to a boil/water beginning to freeze/cold liquid drinking cups vs hot liquid drinking cups* is best described through the concept of *Mass/Initial temperature*.
* Condensation is a better form of alternative energy than evaporation because of its warming ability.
* *Mass/Starting temperatures/Specific heat* is the most influential factor of a mixture reaching equilibrium.
* *Conduction/Convection/Radiation* heating plans are the safest, most environmentally friendly, and most effective at keeping a house warm.

**Unit 4: Waves**

* *Velocity/Frequency/Wavelength/Amplitude/Period* is the most important property of a wave to distinguish between different types of waves.
* Based on relevance to everyday life, compressional/transverse waves are more important for the average American to know.
* *Mechanical/Electromagnetic* waves are more dangerous based on the amount of exposure and likeliness to cause damage.
* *Reflection/Refraction* is the weirdest behavior of light.
* The ability to manipulate *s-waves/p-waves/radio waves/microwaves/infrared rays/visible light/ultraviolet light/x-rays/gamma rays* will make the best super villain.
* The Doppler effect can be an effective way of measuring the precise speed of a moving vehicle.

**Unit 5: Electromagnetism**

* In physics, a black box is a system whose internal structure is unknown, or need not be considered for a particular purpose.
* A group of siblings are creating a clubhouse in their backyard. They have permission to have electricity run to their clubhouse but cannot use too much in fear of a huge spike in their parent’s electricity bill. A *series/parallel* circuit is the best option for an electrical circuit for the clubhouse.
* You uncle is continuously having issues with static electricity. He asks you for advice for which solution would be the best at eliminating static electricity. It will be easy to solve your uncle’s problems with static electricity.
* A country should invest in building an electric power infrastructure with *consistent high voltage/consistent high current wires/ less expensive and have citizens buy house surge protectors from the government that can offer varied resistance*.
* If you had to clean up scrap metal found all over the ground of a construction site, it would be better to clean it up with an electromagnet than with a permanent magnet.
* The best option for an alternative energy source is *solar power energy/wind turbines/solar water power pumps*.