

Essential Question Ideas

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Social Studies

Essential Questions in the Social Studies

History/Historical Analysis and Interpretation

- What happened in the past?
- How can we know if we weren't there?
- Why study history? What can we learn from the past?
- How am I connected to those in the past? In what ways is the past about me?
- How do we know what *really* happened in the past?
- Whose "story" is it?
- Whom do we believe and why?
- Is history the story told by the "winners"?
- Is history inevitably biased?
- Who were the "winners" and who were the "losers" in _____? (*for any historical event*)
- Was anyone at fault? (*for examining any historical or literary event*)
- What causes change? What remains the same?
- What can we legitimately infer about the artifacts we find?
- What should we do when the primary sources disagree?
- How does the legacy of earlier groups and individuals influence subsequent generations?
- How do patterns of cause/effect manifest themselves in the chronology of history?
- How has the world changed and how might it change in the future?
- Is it true that those who do not learn from history are doomed to repeat it?
- Who am I?
- What happened in the past?
- How am I connected to those in the past?
- How has the world changed and how might it change in the future?
- Why does our personal sense of relatedness to the past change?
- How can the perspective we have about our own life experiences be viewed as part of the larger human story across time?
- How do our personal stories reflect varying points of view and inform contemporary ideas and actions?
- Where are things located?
- Why are they located where they are?
- What patterns are reflected in the groupings of things?
- What do we mean by region?
- How do landforms change?
- What implications do these changes have for people?

Civics/Government

- How are governments created, structured, maintained, and changed?
- What are the roles and responsibilities of government?
- How do the structures and functions of government interrelate?
- What would happen if we had no government?
- What are the roles and responsibilities of citizen's in a democracy?
- What kinds of things to "good" citizens do?
- How do personal and civic responsibilities differ?
- Can an individual make a difference?
- How do citizens (both individually and collectively) influence government policy?
- What is power? What forms does it take?
- How do competing interest influence how power is distributed and exercised?
- How is power gained, used, and justified?
- How can abuse of power be avoided?
- Who should govern/rule?
- Should the majority always rule?
- When should society control individuals?
- Why do we have rules and laws? o What would happen if we didn't?
- Who should make the rules/laws?
- Is it ever o.k. to break the law?
- What are "inalienable rights"?
- How do governments balance the rights of individuals with the common good?
- Should _____ be restricted/regulated? (*e.g., immigration, alcohol/drugs, media, etc.*)
When? Who decides?
- How do different political systems vary in their toleration and encouragement of change?
- What is power? What forms does it take? Who holds it? How is it gained, used, and justified? What is legitimate authority?
- How are governments created, structured, maintained, and changed?
- How can we keep government responsive to its citizens' needs and interests?
- How can individual rights be protected within the context of majority rule?
- What is civic participation and how can I be involved?
- How has the meaning of citizenship evolved?
- What is the balance between rights and responsibilities?
- What is the role of the citizen in the community and the nation, and as a member of the world community?

Economics

- Why do we have money?
- What is the difference between 'needs' and 'wants'?
- How does something acquire value? What is it worth?
- How much should it cost? Who decides?
- Who should produce goods and services?
- What impact does scarcity have on the production, distribution, and consumption of goods and services?

- How does the free market system affect my life? ...community? ...society? ...the world?
- Who should produce goods and services?
- Should government regulate business/economy or be its partner?
- Why do people work? Should everyone be expected to work?
- What does it mean to "make a living"?
- What is the 'best' job for you?
- How does technological change influence people's lives? ...society?
- What social, political and economic opportunities and problems arise from changes in technology?
- What goods and services should government provide? Who should pay for them? Who should benefit from them? Who should decide?
- How do different economic systems vary in their toleration and encouragement of change?
- What is to be produced?
- How is production to be organized?
- How are goods and services to be distributed?
- What is the most effective allocation of the factors of production (land, labor, capital, and management)?

Geography

- Why is "where" important?
- Why is/was _____ located there? (*e.g., capitol, factory, battle, etc.*)
- What makes places unique and different?
- How does geography, climate and natural resources affect the way people live and work?
- How does *where* I live influence *how* I live?
- Why do people move?
- What do we mean by 'region'?
- What story do maps and globes tell?
- How and why do maps and globes change?
- How do maps and globes reflect history, politics, and economics?

Culture

- What does it mean to be "civilized"?
- What makes a civilization?
- How have civilizations evolved?
- Are modern civilizations more 'civilized' than ancient ones?
- Why should we be interested in/study other cultures?
- Who are the "heroes" and what do they reveal about a culture?
- How and why do we celebrate holidays?
- Who and what do we memorialize?
- What are the significant symbols and icons of civilizations/cultures? What function(s) do they serve?
- Do the arts reflect or shape culture?
- What can we learn about a culture through its art forms?
- What happens when cultures collide?

- Why do people fight? Is conflict inevitable? ...desirable?
- What is worth fighting for? Is there such a thing as a "just" war?
- What is a revolution?
- What causes people to 'revolt'?
- Are revolutions inevitable?
- How are all religions the same?
- How does belief influence action?
- How and why do beliefs change?
- What is civic participation and how can I be involved?
- How has the meaning of citizenship evolved?
- What is the balance between rights and responsibilities?
- What is the role of the citizen in the community and the nation, and as a member of the world community?
- How can I make a positive difference?

Science, Technology & Society

- Is new technology always better than that which it will replace?
- What can we learn from the past about how new technologies result in broader social change, some of which is unanticipated?
- How can we cope with the ever-increasing pace of change, perhaps even with the feeling that technology has gotten out of control?
- How can we manage technology so that the greatest number of people benefit from it?
- How can we preserve our fundamental values and beliefs in a world that is rapidly becoming one technology-linked village?

Mathematics

Enduring Understandings (Principles and Generalizations) with Companion Essential Questions in Mathematics

General

- Mathematics is a language consisting of symbols and rules.
 - *How is mathematics a universal language?*
 - *What is a symbol?*
 - *What is a rule?*
 - *How do they help us?*
- Sometimes the "correct" mathematical answer is not the best solution.
- A problem's context determines the reasonableness of a solution.
 - *When is the "correct" mathematical answer not the best solution?*
- Mathematical models simplify reality to enable useful solutions.
 - *What are the limits of mathematical modeling?*
 - *When is simplification helpful? ...harmful?*

- *In what ways does a model illuminate and what ways does it distort the phenomena?*
- Mathematical rules, functions, formulas and algorithms depict mathematical relationships. (For example, a function denotes a special relationship between variables.)
 - *How can we show mathematical relationships?*
 - *Can a formula be developed for any given data situation?*
 - *If axioms are like the rules of the game, when should we change the rules?*
- Strategies (heuristics) can help solve difficult problems. (For example, breaking a complex problem into chunks; using a visual representation; working backward from the desired result; relating to a similar problem)
 - *How do we solve difficult problems?*
 - *When are particular strategies most effective?*
 - *What kind of problem is it?*
 - *What should we do when we're stuck?*
- Technology can enhance problem solving.
 - *How and when can technology enhance problem solving?*

Numeration

- Numbers are inventions that represent quantities, rates, sequence and characteristics of things and experiences.
- Numbers can be used to count, label, order, identify, measure, and describe things and experiences.
 - *What is a number?*
 - *Why do we have numbers?*
 - *What couldn't we do if we didn't have/use numbers?*
 - *What are the limits of mathematical representation/modeling?*
 - *Can everything be quantified?*
- The value of a number is determined by its position.
 - *When does placement (position) matter?*
- There are different number systems (e.g. bases) that can represent the same quantities. (For example, computers operate using a binary number system.)
 - *What is a number system?*
 - *What can numbers show?*
- The same thing can be shown in different ways.
- Mathematical ideas can be represented numerically, graphically, or symbolically.
- Quantitative data can be collected, organized and displayed in a variety of ways.
- The use of exponentials and scientific notation offer efficient ways of representing large numbers.
 - *How might we show (represent) _____?*
 - *In what other way (how else) ?*

- Estimation can be more efficient than counting everything when accuracy and precision are not required.
 - *When is estimation OK.?*

Statistics and Probability

- Patterns exist in the natural world and can be represented numerically and graphically.
- Patterns reflect the past and forecast the future.
- Statistical analysis and data display often reveal patterns that may not otherwise be evident.
 - *What is a pattern?*
 - *How do we find patterns?*
 - *How do we show patterns?*
 - *What can patterns reveal?*
 - *How can patterns forecast the future?*
- Sometimes sampling is better than counting everything.
- A larger sample generally provides more reliable information about the probability of an event than does a smaller sample.
 - *When should we sample?*
 - *When is better than counting?*
 - *How much/many (of a sample) is enough (sufficient)?*
- Correlation does not insure causality.
 - *What causes ____?*
- Statistics (data) can "lie" as well as reveal. (Data presentations can be biased...designed to communicate a particular point of view.)
- The ways in which data are collected and displayed influences interpretation. (Interpretation can be skewed by the way in which data is collected and displayed.)
 - *How can statistics (data) lie/mislead?*
- All data displays are not equal. (Certain graphic displays more accurately represent some types of data than others; e.g., bar chart for fixed quantities; graph w/ slope for acceleration).
- Graphical displays can show a variety of possible relationships between two variables.
 - *How can we best show this data?*
- The identification of patterns and trends enables prediction.
 - *What will happen next? What will happen in the future?*
 - *What is the best way of predicting future events?*
 - *How can we mathematically predict the outcomes of some future events?*
- Probability describes the likelihood of phenomena occurring in a population.

- The probability of an event's occurrence (prediction) can be calculated with varying degrees of confidence.
 - *How sure are you?*
 - *How can we quantify our predictions about outcomes occurring?*
 - *How well can we predict the outcomes of some future events?*

Measurement

- Measurement helps us understand and describe our world.
- We measure our world in order to determine its' boundaries and limits.
 - *Why do we measure?*
 - *What would happen if we couldn't/didn't measure?*
 - *How big?*
 - *How far?*
 - *How heavy?*
 - *How much (time, money, ...)?*
- Measurement of distances is fundamentally different from measurement of area.
 - *How does what we measure influence how we measure?*
- An object or event can be measured in different ways.
 - *How do we measure _____?*
 - *What's the best measure for _____?*
- Standard units of measure enable people to interpret results or data in the same way.
 - *Why do we need standard units of measure?*
 - *What if we didn't have standard units of measure?*
- Every measure contains margins of error.
- The need for measurement precision varies based on the requirements of the task/situation. (There are circumstances where it is not always necessary to be precise.)
 - *How accurate (precise) is it?*
 - *How precise is precise enough?*
 - *How accurate (precise) does this need to be?*
- Classification (grouping items with similar features) highlights similarities and differences, enabling the formation of unique groups.
 - *What goes with what?*
 - *How are _____ similar? ...different?*
- Parts of a whole can be represented with different mathematical forms, such as fractions, decimals, percentages, ratios and odds.
- We can show parts of things in various ways.
 - *How do we show a part of something?*
- Rates of change vary (e.g., linear vs. exponential growth; constant vs. accelerated speed).
 - *How is ____ changing?*

- Changes can be represented mathematically and graphically. (For example, the slope of a line can represent acceleration.)
 - *How can we best show/describe changes?*

Geometry

- *What is geometry?*
- *Is there more than one?*
- Both the real and the man-made world are designed using geometric figures.
 - *Where is geometry in the natural world? ...the man-made world?*
 - *Have all geometric figures already been identified and their properties defined?*
 - *Are geometric properties invented or discovered?*
- Geometric figures and relationships can be represented numerically, graphically, and with models.
 - *What are the limits of geometrical representation/modeling?*
- The properties of geometric figures determine how the figures can be used.
- Observable features and physical representations do not always determine properties.
- When the linear size of a shape changes by some factor, its area and volume change disproportionately.
 - *How do the properties of geometric figures influence their uses?*
- A proof covers all possible 'like' cases. It is much stronger than belief or conviction.
- Proofs are required to establish the truth of mathematical theorems.
- There are direct and indirect ways of coming to a conclusion or proving something (inductive and deductive logic).
 - *What is proof? Why do we need proofs?*
 - *How do we prove _____?*
 - *Given _____, what can we conclude?*

Algebra

- Equations depict patterns of change.
- A pattern of change can be described through a function.
- A variable represents an unknown that will change in different settings.
- Exponents and logarithms are inverse operations.
 - *When is it appropriate to write an equation?*
 - *Why use algebraic equations? What kinds of things in life can equations help us do?*
 - *Are there things or relationships for which equations can't be used?*
 - *Do these fit any sort of pattern?*
- Matrices can be used to represent multi-dimensional data.

- *How do we show (represent) multi-dimensional data? When and why?*
- Slope is a number that represents a rate of change.
- Slope and intercept can be graphically represented.
 - *How do we show rate of change? When and why is this useful?*
- Symbolic statements can be manipulated by rules of mathematical logic to produce other statements of the same relationship.
 - *Where do algebraic "properties" come from? Are they invented or discovered (like the properties of magnetism)?*
 - *How do we know something has been "proved" in mathematics?*
 - *Is a "proof" in algebra the same as evidence provided in a jury trial?*

Trigonometry

- Trigonometric functions describe triangular and circular relationships.

Calculus

- Mathematical functions over a specified interval can be used to model the behavior of actual situations
- If a situation implies, however subtly, a rate of change, the process of differentiation can be applied to the solution
- Derivatives can be used to precisely locate "ideal" points (max., min., inflection) or confirm a conjecture regarding them.
 - *What's a derivative "for"?*

English Language Arts

Enduring Understandings with Companion Essential Questions in Language Arts and Literature

Literature

- Great stories/books address universal themes of human existence and conflict.
- Great stories raise questions (and sometimes provide answers).
 - *What makes a great book/story great?*
 - *Is a "good read" always a great book?*
 - *What is the relationship between popularity and greatness in literature?*
 - *Why read fiction?*
 - *Can fiction reveal truth? Can novels reveal truths about human nature?*
 - *What is the relationship between "fiction" and "truth?"*
 - *Can a fictional story be "true"?*
 - *Is "historical fiction" a contradiction?*
 - *How are stories from other places and times about me?*
 - *What can fairy tales from around the world teach us?*
 - *What's new and what's old?*

- *Have we run across this idea before?*
- *So what?*
- *Why does it matter?*
- *What does it mean?*
- Fiction can entertain while revealing truths.
 - *What is a story?*
 - *Can fiction reveal truth?*
 - *What can we learn from fiction?*
 - *What is the relationship between "fiction" and "truth?"*
 - *Can a fictional story be "true"?*
 - *Is "historical fiction" a contradiction?*
 - *Should a story teach you something?*
 - *Must a story have a moral?; heroes and villains?*
- Literature can reflect, clarify and criticize the times it portrays.
 - *Does literature reflect culture or shape it?*

Reading

- *Why read?*
- *What can we learn from print?*
- *How do reading and listening differ?*
- *What would happen if people couldn't read?*
- *What do good readers sound like?*
- *Can a machine (e.g., scanner, robot) learn to read?*
- Letters represent sounds.
- Letters can blend to make a single sound.
- The same letters combinations can produce different sounds.
- Letters combine in specific ways to form words.
 - *What sounds are in letter? words?*
 - *What if all letters made only one sound?*
 - *How are letters, words and sentences formed?*
 - *Why does letter order matter? What if the letters were scrambled?*
- Words have meaning – they represent objects, ideas, situations, and feelings.
- Some words describe what we see, hear, taste, touch and smell.
- Some words tell what we think.
- Some words tell what we feel.
 - *What if words could mean anything at all?*
 - *Why does word order matter? What if the words were scrambled?*
- Punctuation marks aid comprehension by signaling how to read and interpret text.
- Punctuation marks are like traffic signs and signals. They keep the reader on track so they do not get "lost".
 - *Why have punctuation marks?*

- *What if we didn't have/use punctuation marks?*
- The goal of reading is to make meaning from text.
 - *What is the author saying?*
 - *What does the text mean?*
- Different types of texts (e.g. narrative, mystery, biography, expository, persuasive) have different structures.
- Understanding a text's structure helps one understand its meaning.
 - *How do texts differ?*
 - *How should I read different types of texts?*
 - *What is a "beginning"? an "ending"?*
 - *Must a story have a beginning, middle, and end?*
- Titles signal the text's meaning.
 - *What if we didn't have/use titles?*
- Effective readers use specific strategies to help them better understand (e.g., using context clues, predicting what will come next, questioning the text, re-reading).
- Readers can use words they know to help them read new words.
- Effective readers question the text.
 - *What do good readers do?*
 - *What do good readers when they don't understand?*
 - *What do good readers when the text doesn't make sense?*
- Pictures, graphics, illustrations can enhance text.
 - *Why include pictures (graphics, illustrations, etc.)?*
 - *How do you "read" a picture?*
- Effective readers bring various stances (e.g., global, critical, personal) to make meaning from text.
 - *What is the gist? What is the main idea?*
 - *Does experience and belief influence reading?*
 - *What does this mean to me?*
- Everybody is entitled to an opinion about what a text means, but some opinions are more supportable by the text than others.
 - *What does it mean? How do I know?*
 - *What is the author saying? How do I know?*
- Writers sometimes convey ideas indirectly (e.g., satire, irony).
 - *How can you read "read between the lines"?*
 - *What does the author really mean?*
- There is no such thing as a "neutral" text since writers bring their personal experiences, perspectives and philosophies to their writing.

- Critical readers question the text, consider different perspectives, and look for author bias.
 - *What can we believe?*
 - *From whose viewpoint are we reading?*
 - *What is the author's angle or perspective?*
 - *What should we do when texts/authors disagree?*

Writing

- Writing conveys meaning.
 - *Why write?*
 - *What if writing didn't exist?*
 - *How do writers express their thoughts and feelings?*
 - *What is a "complete" thought?*
 - *Does a writer have an obligation to help the reader understand?*
 - *Why and how do people create? How do we express ourselves?*
 - *Why share personal experiences through writing?*
 - *Is the pen mightier than the sword?*
- Writing is a timeless form of communication.
- Writing enables you to "talk to" people who aren't there.
 - *How is written language different from spoken language?*
 - *How can the dead speak to the living?*
 - *Can a machine (e.g., scanner, robot) learn to write?*
- Effective writers use specific techniques (style, word choice, organization) to better inform, entertain, and persuade.
 - *What makes writing worth reading?*
 - *How do effective writers hook and hold their readers?*
 - *Where do ideas for writing come from?*
 - *How do writers decide what to write?*
 - *What makes writing flow?*
 - *What makes writing easy to follow?*
 - *Does a writer have an obligation to help the reader understand?*
- Audience and purpose (e.g., inform, entertain, persuade, provoke) influence literary technique (e.g., style, word choice).
 - *Why am I writing? For whom?*
 - *What am I trying to achieve through my writing?*
 - *Who will read my writing?*
 - *What will work best for my audience?*
- Genre influences organization, technique and style.
 - *How do great mystery writers hook and hold their readers?*
 - *How do great biographers hook and hold their readers?*
 - *How do great storytellers hook and hold their readers?*
 - *How does an effective persuader persuade their readers?*
 - *What is the best "beginning"? ending?*

- *What is the best order (sequence)?*
- *What makes writing easy to follow?*
- *What is "flow"? What makes writing flow?*
- Writing helps us clarify, as well as express, our thoughts.
 - *Why write?*
 - *How can writing lead to self-discovery?*
 - *A writer once said, "How do I know what I think until I see what I write." Agree?*
- Writers may convey ideas indirectly (e.g., satire, irony).
 - *How can you say something without saying it?*

Listening

- *How is listening different from reading?*
- *How is written language different from spoken language?*
- *What do good speakers sound like?*
- Effective listeners use specific techniques to help them understand the speaker.
 - *What is a good listener?*
 - *How could someone be a bad listener?*
 - *Can one "listen" but not hear?*
 - *Can a machine (e.g., Via Voice, robot) listen?*

Speaking

- Speaking conveys meaning.
 - *Why speak?*
 - *What do good speakers sound like?*
 - *What if people couldn't talk?*
 - *Can animals "talk"?*
 - *How is spoken language different from written language?*
 - *How do we express ourselves orally?*
 - *How do good speakers express their thoughts and feelings?*
 - *What is a "complete" thought?*
 - *What makes a speaker easy to follow?*
 - *Does a speaker have an obligation to help the listener understand?*
 - *How can I help the listener understand em?*
 - *Why learn another language?*
- Audience and purpose (e.g., inform, entertain, motivate, persuade, embarrass, provoke) influence speaker's technique (e.g., volume, pacing, word choice, intonation).
 - *Why am I speaking?*
 - *What am I trying to say?*
 - *To whom am I speaking?*
 - *Who will listen?*
 - *Why are they listening?*

- *How can I help them understand me?*
- Non-verbals (e.g., gestures, intonation, pace, posture, expression) enhance or detract from the message.
 - *How can you "speak" without words?*
 - *What is "body language"?*
 - *How can I help my listener(s) better understand me?*
 - *How can you make your words more effective?*

The Arts

Enduring Understandings

- The visual language of art is a means by which to express our personal world, ideas, and emotions.
- Available natural resources, tools and technologies influence the ways in which artists express their ideas.
- Great art addresses universal themes of human existence.
- Great artists often break with established traditions, conventions, and techniques to express what they see and feel.
- Visual art is composed of key elements – line, shape, form, value, color, texture, and space.
- Unity is achieved through the effective blending of the key art elements.
- Movement can be created through the combination of one or more of the key art elements.
- Line defines shape and adds meaning.
- Texture conveys nuance.
- Positive and negative space create balance.
- Color creates mood.

Essential Questions

- What is art?
- Where can we find art?
- Why create art?
- Why and how do people create?
- How does art communicate?
- How does art reflect as well as shape culture?
- What can artworks tell us about a culture or society?
- In what ways do artists influence society? In what ways does society influence artists?
- What makes art "great"?
- How do artists from different eras present similar themes?
- What is the artistic process?
- What factors influence artists and artistic expression?
- How/where do artists get their ideas?

- How do artists choose tools, techniques, and materials to express their ideas?
- How do artists use tools and techniques to express ideas?
- Are some media better than others... (for communicating particular ideas, emotions to particular audiences)?
- How can we use design principles to organize ideas?
- How can we 'read' and understand a work of art?
- What is beauty?
- How do different conceptions of beauty influence the visual image?
- Why do certain themes recur in art?
- What kinds of things can be used to make art?
- How is feeling or mood conveyed – musically?, visually?, through movement?
- Can color (rhythm, etc.) affect mood/emotions?
- What factors influence the development of a personal aesthetic?
- What can we learn from studying the art of others?
- In what ways have artistic traditions, cultural values, and social issues influenced and/or given rise to new traditions/artistic expressions?
- In what ways has technology enhanced and increased the value of the image as a form of communication?
- How are visual images infused in our daily life and work?
- Is the "medium the message"? Is a "picture worth a thousand words"?
- Do artists have a responsibility to their audiences?
- Do artists have a responsibility to society (e.g., to produce work that does not continue stereotypes or further prejudice)?
- Is the best art apolitical?
- Should we ever "censure" artistic expression?
- What is the role(s) of a museum?
- How do museums reflect continuity and changes in art?