## STEAM Education© Theme Planning and Lesson Brief Instructions

1. **Submit your work as a Word document** (i.e., .doc/.docx)
2. **Spell-check and grammar check** your lesson plan before submitting it
3. **Name this document to a unique working file name in the following format:** 
   * STEAMlessonBriefTEMPLATEtopicGradeLevel#SurnamesTrainingSiteSubmitDate
   * E.g., STEAMlessonBriefBargeShippingK12YakmanVTiSTEMed01Jan06

**Content Development**

1. Your goal is to create integrated lesson plans, not independent of one another, but that bring each of the nine subjects together to create a cohesive plan where all of the lessons tie to a central theme. This is intended to be a living document that evolves as you learn from teaching it.
2. Use this template and type over the instructions.
3. Begin working on the lesson plan as a team to put in preliminary notes/ideas into the sections on the first page called Lesson Overview. Your team will come back to this page after working on the individual subject areas to finalize this. The goal at this point it to make sure everyone understands the central theme.
4. Frame your thematic plan with a creative title that will engage students
5. Individual work Subject Area Sections – After deciding on a central theme, each member then develops the lesson plan for their respective subjects and fills out the subject area pages. If your team created a Curriculum Mapping or Brainstorming Sheet, use them as starting points to then fill in EACH subject’s areas in detail. If you haven’t filled out these documents and you are unsure of the process, you may wish to fill them out before proceeding. On the second page, under “all 8/9 subject instructions” you will find step-by-step instructions for filling in the sections for all of the subject areas. If there are instructions specific to a subject area, they will be found on that subject’s page.
6. Once all the individual subjects are filled in, return to the first page to complete the Lesson Overview of the lesson brief. **You may not omit any subject.**

\*If you are unsure how a subject area may fit in that is not in your field of expertise, please attempt a guess and put in a note that you need help in this area.

## Creative Title STEAM Education© Lesson Brief

Educators’ Names (with Titles):

Trained (When/Where):

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| **Lesson Overview** | | |
| **Skill Level**  (Grade Range) |  | |
| **Central Theme** | Overall theme of this lesson (E.g., Global Transportation) - often ties to a category that is universal – like Transportation Issues – ties all of the themes of the subject areas together | |
| **Topic Concept of Theme** | Specific topic concept within the lesson theme. (E.g., Barge Shipping) – the particular way to teach about the bigger topic | |
| **Summary of Essential Concepts** | This section should give any educator a clear overall idea of the scope of skills and concepts students will learn.  Draft this section as a team and then finalize it after developing the subject lesson plans. When ready to finalize, summarize each subject area’s Essential Concepts into a single comprehensive summary using over-arching verbs that tie to each subject.  This section should be about two to three short sentences, using over-arching verbs that tie to each subject. This statement(s) describes what the students will do and learn within each subject area as it relates to the Central Theme. Underline each verb and indicate the subject tied to the verb using an abbreviated symbol(s)\* in parentheses next to the verb.  \*S = Science; T&E = Technology and Engineering; SS = Social Studies; M = Math; PE = Physical Education; LA = Language Arts, FA = Fine Arts, Mu = Music  (E.g., “Students will research Trans-global (SS) shipping barges, how they work (S), what are the problems (SS) and then plan and design (E & FA) an improved barge and create or build (T) a prototype (E). Then engage a group of people on how it can be implemented (LA & FA). Barge operator’s safety, motions (PE) & hearing (Mu) will be considerations as well).  \*This statement is what you would tell a parent succinctly, clearly, and simply. This statement would also attract an educator of any type that conducted a Google search of the topic. | |
| **RBL**  (reality-based learning)  **Lesson Plan Overview**  **Integrated Basic Plan** | A general explanation of the scope of the project. (What you would tell an administrator.)  Start with a lesson plan overview.  Offer an exciting overall engagement piece.  Fill this section at the end by synthesizing the project elements from each subject into one concise one here. Show how the nine subjects will be integrated.  Explain the scope of the project (i.e., what you would tell an administrator).   1. What will be the engagement/introduction piece for each subject. 2. Explain how the project integrates all of the subjects. 3. Describe what the end product will be 4. What element of this project helps society solve a problem or interacts with real people/community members? (RBL)   This plan should address 21st Century Skills including:   * Collaboration * Communication – gather, interpret & report data, ask questions * Critical Thinking/Problem Solving – students decide on and pose questions * Creativity/Innovation – develop and/or evaluate solutions based on evidence | |
| **Assessment**  Evidence Based | This space is for a general scope of the range of assessments to be used to address various types of benchmarks across the subject areas. One project may have elements related to different subjects and therefore can be used as the same tangible for assessment in each relevant subject.  Specific assessments should be located in each subject area section.  Portfolios are highly encouraged to be used for ongoing assessment.  Portfolio inclusions should include things such as: project and paperwork organization, hypothesizing, planning, researching & data collection, log entries, field-work, journaling, charting, designing, modeling, prototyping, implementing, experimenting, analyzing, amending, quizzes, reporting and presenting. These are usually grouped into clusters. | |
| **Student Team Selection**  (if applicable) | How are the students being assigned to meaningful teams that will enhance their access to information in multiple ways and methodologies?  What components are done as a group, on teams or individually? | |
| **Time Frame of Lesson** | Define the length and number of class sessions required for the overall lesson completion.   * Define the length and number of class sessions (also days/weeks) for each subject required for lesson completion. * How many days / class sessions / length of classes – be specific – either list as classes being in unison or time needed in each subject separately   *All Subjects:*  Weeks:  Days: Times per Day:  *Individual Subjects:*  By subject: | |
| **Basic Supplies** | Basic list of supplies required to complete the project.  You may want to break this down by subject. | |
| **IT and Additional Resources** | Specialized list (don’t list computers): Include specific recommended links and other programs for equipment, videos, ideas, etc. (E.g., Photoshop as a program or a scanner as equipment or a link to a specific video). Can break this down by subject area. | |
| **Career Clusters**  Professional / Community Connections | People or organizations that could be used as resources.  How is their work a current and/or future opportunity for students engaged in the lesson plan?  How are students engaged in the lesson plan going to have experiences that relate what they are learning to a current and/or future opportunity for work?  Consider people or organizations within careers associated with the subject lessons and how students may connect with them as a resource for their project (e.g., site visit, Skype, video, etc.).  Name - Title - Connection to Project - Website/Contact Info | |
| **Audience** | Who will see the final products or presentations of this lesson? | |
| * Student * Educator * Other students in class * Other students in grade level * Students throughout school | * Other educators * Parents/guardians * Community members * Local professionals * Printed/On-line Publications |
| **Miscellaneous** (Extensions and Variations) | General or specific to a subject area.   * Enrichment for learners * Modifications for Challenged learners * Variations to appeal to learning strengths/preferences * Extensions for deeper learning | |
| **Photos** | Pictures should show examples of student work or pictures that you would show to students to help set the parameters of what you expect from them.  If you have done this project, please add some process pictures, if not, please at least find something that might be similar on the internet and put the link to the picture  Please label what the photos represent. | |

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| **Subject Templates & Instructions** | |
| **Essential Concept(s)** | This should give an idea of the big picture concept that you want the students to understand from the lesson.  This should relate to the theme.  (E.g., Water Quality, Robotics, Wearables). |
| **Goal/Objectives** | When all of the benchmarks for the lesson are considered, what is the overall goal and objectives for students by mastering those standards? What capabilities and understandings will they have that go beyond the individual content and structure of each standard?  What is the purpose of what the students are studying? What concept or issue of reality are they addressing? (E.g., Water Quality, Robotics, Wearables). When completing the goals and objectives for each subject area, use verbs that tie to each subject’s targeted skills. |
| **Standard(s)** | What benchmarks are you aligning with? Please list: international, national, state, code and full text of each aligning standard. These should come from published education standards. (If you completed the Curriculum Mapping Chart and/or the Brainstorming Sheet, the standards should already be listed there.)  Please include the written-out version of the standards or goals in order to verify alignment. |
| **Vocabulary** | Are there particular vocabulary words that should be targeted and assessed for this lesson? |
| **Career(s) Tie-In** | These careers must relate to the direct activities and research of the project. If you are ‘stumped’, refer to the divisions of S-T-E-A-M for broad career topics. For specific fields, Google search ‘scientist + topic.’  In what way will the project element show the tie-in to the career(s)? What component makes it valid?  How are students more deeply understanding by connecting to people working in these ways? |
| **Project Element**  **and**  **Educator / Student Feedback**  (student application of standard/benchmark/goal)  RBL Component &  Product | Create a descriptive paragraph to explain to other educators what students will do. How will students apply their knowledge of the content standards? What feedback and checkpoints will students receive?  What element of this project helps society solve a problem or interacts with real people/community members? (RBL)  Begin with: “Students will…”. If there is an on-line DIY video of someone doing the process, include the link.   * + Links   + Supplies   + Equipment   + Documents     - Educators     - Students * RBL – Component - What element of this project helps society solve a problem or interacts with real people/community members? * What is the final product of the project? |
| **Assessment**  Evidence Based  End Product + Interview | Include how students’ work will be evaluated, typically by a set of criteria within a rubric.  It is expected that every assessment be rubric-based. Rubrics with a clear set of criteria for students’ work that includes descriptions of levels of performance quality on the criteria. Use the educational standards associated with each subject to develop criteria.  Be sure to align the educational standards within each subject to the outcomes of performance, project and reporting that prove conceptual understanding.  Remember to put a focus on the process as well as the result.  Recommended: place 40% value on the process, 20% on the product, 40% on the report after the process.  How are each of the standards and the overall goals assessed from entries in a portfolio, the end product, and the report?  What tangible evidence is used to determine the results?    PLEASE do not say ‘use a rubric’ without saying what categories and basic parameters will be on it. It is expected that every assessment be rubric-based.   * Please provide the categories and basic parameters that will be included in these rubrics. * What specifically will be assessed to align with the benchmarks? How will you group these into rubric categories? * Be sure there are categories and components added in here that are appropriate for including in a scoring rubric.   \*understand – need evidence for things like ‘understand, self-evaluation, peer-evaluation, observing, discussion, interviewing, etc. \*Saying, telling and stating should be accompanied by some tangible evidence that indicates the students understanding such as storyboards or chronicling images instead of writing.   * Did students accurately:   + verb.... |
| **Miscellaneous** | * Enrichment * Modifications * Variations to appeal to learning strengths/preferences adaptation or alternate methodology * Extensions for deeper learning using |

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| 1. **Science** | |
| **Essential Concept(s)** |  |
| **Goal/Objectives** |  |
| **Standard(s)** | National Science Teachers Association (NSTA): [NSTA Standards](http://www.nsta.org/preservice/docs/2012NSTAPreserviceScienceStandards.pdf)  Next Generation Science Standards: [Next Generation Science Standards](http://www.nextgenscience.org/get-to-know)  English National Curriculum: [Science Standards](https://www.gov.uk/government/publications/national-curriculum-in-england-science-programmes-of-study/national-curriculum-in-england-science-programmes-of-study) |
| **Vocabulary** |  |
| **Career(s) Tie-In** |  |
| **Project Element**  **and**  **Educator / Student Feedback**  (student application of standard/benchmark/goal)  RBL Component &  Product |  |
| **Assessment**  Evidence Based  End Product + Interview |  |
| **Miscellaneous**  (Enrichment, modification, extension, alternate methodology) |  |

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| 1. **Technology & 3. Engineering** | |
| **Essential Concept(s)** | T = Describe what students are doing to fulfill specific requirements  E = Describe what part of the lesson has design and innovation elements. |
| **Goal/Objectives** |  |
| **Standard(s)** | International Technology and Engineers in Education Association (ITEEA): Standards for Technological Literacy [ITEEA Standards](http://www.iteea.org/File.aspx?id=67767&v=691d2353) (See Appendix B, p. 210)  English National Curriculum: [Design and Technology Standards](https://www.gov.uk/government/publications/national-curriculum-in-england-design-and-technology-programmes-of-study/national-curriculum-in-england-design-and-technology-programmes-of-study)  American Society for Engineering Education (ASEE): [ASEE K-12 STEM Standards](https://www.asee.org/member-resources/councils-and-chapters/corporate-member-council/special-interest-group/cmc-k12-stem-guidelines-for-all-americans.pdf)  English National Curriculum: [Computing Standards](https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study)  International Society for Technology in Education (ISTE): [ISTE Standards](http://www.iste.org/standards) \* \*(ISTE & the Computing Standards should be reflected as being used throughout **all** subjects when IT/ET is available to students. Using only ISTE IT/ET standards will rarely cover the scope of technology and engineering in an integrated lesson plan. These standards can usually only be relied on to cover engineering when creating a computer program). |
| **Vocabulary** |  |
| **Career(s) Tie-In** | When filling out the section for Technology and Engineering, remember that the primary ties are often who develops the equipment, used or new things (E), and; who uses the equipment (T). Make sure you put both elements in that category. |
| **Project Element**  **and**  **Educator / Student Feedback**  (student application of standard/benchmark/goal)  RBL Component &  Product | T = using tools, E = designing a new element  Engineering includes students doing research to be able to propose a new tangible or systems design and/or make an evaluative test to show something new. Computer programs and systems planning are not tangible, but they are creating something new. Tangible projects are usually best for meeting this lesson plan component and covering a broader scope of technology and engineering. |
| **Assessment**  Evidence Based  End Product + Interview | T = Did the process, use of devices and the end product meet the specs?  E = PARTLY if their innovation worked, but MOSTLY if they understand why their innovation worked or didn’t work and/or how it can be improved |
| **Miscellaneous**  (Enrichment, modification, extension, alternate methodology) |  |

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| 1. **Mathematics** | |
| **Essential Concept(s)** |  |
| **Goal/Objectives** |  |
| **Standard(s)** | National Council of Teachers of Mathematics (NCTM): [NCTM Standards](http://www.nctm.org/standards/)  Common Core: [Math Standards Common Core](http://www.nctm.org/standards/)  English National Curriculum: [Math Standards](https://www.gov.uk/government/publications/national-curriculum-in-england-mathematics-programmes-of-study/national-curriculum-in-england-mathematics-programmes-of-study) |
| **Vocabulary** |  |
| **Career(s) Tie-In** | Math careers have similar titles for most projects, as industry will hire people with similar skills for various applications. |
| **Project Element**  **and**  **Educator / Student Feedback**  (student application of standard/benchmark/goal)  RBL Component &  Product | Math is integral to almost all building, testing, analyzing, and marketing of projects. |
| **Assessment**  Evidence Based  End Product + Interview |  |
| **Miscellaneous**  (Enrichment, modification, extension, alternate methodology) |  |

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| 1. **Language Arts** | |
| **Essential Concept(s)** |  |
| **Goal/Objectives** |  |
| **Standard(s)** | National Council of Teachers of English (NCTE): [Language Arts Standards](http://www.ncte.org/standards)  Common Core: [English Language Arts Standards](http://www.corestandards.org/ELA-Literacy/)  English National Curriculum: [English Standards](https://www.gov.uk/government/publications/national-curriculum-in-england-english-programmes-of-study/national-curriculum-in-england-english-programmes-of-study) |
| **Vocabulary** |  |
| **Career(s) Tie-In** |  |
| **Project Element**  **and**  **Educator / Student Feedback**  (student application of standard/benchmark/goal)  RBL Component &  Product | These elements are often research with reporting or technical writing and marketing projects. If students are required to write essays or reports, give them a purpose for the essay such as composing a letter or a postcard to someone, creating a pamphlet, or bulleted as a PowerPoint© presentation. Students will perform and understand the concept better when there is an engaging reason to write. Better plans include technical and social writing. |
| **Assessment**  Evidence Based  End Product + Interview |  |
| **Miscellaneous**  (Enrichment, modification, extension, alternate methodology) |  |

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| 1. **Social Studies** | |
| **Essential Concept(s)** |  |
| **Goal/Objectives** |  |
| **Standard(s)** | National Council for Social Studies (NCSS): [Social Studies Standards](http://www.socialstudies.org/standards)  Common Core: [ELA = History/Social Studies Standards](http://www.corestandards.org/ELA-Literacy/RH/6-8/)  English National Curriculum: [Geography Standards](https://www.gov.uk/government/publications/national-curriculum-in-england-geography-programmes-of-study/national-curriculum-in-england-geography-programmes-of-study) [History Standards](https://www.gov.uk/government/publications/national-curriculum-in-england-history-programmes-of-study/national-curriculum-in-england-history-programmes-of-study) [Citizenship Standards](https://www.gov.uk/government/publications/national-curriculum-in-england-citizenship-programmes-of-study/national-curriculum-in-england-citizenship-programmes-of-study-for-key-stages-3-and-4) |
| **Vocabulary** |  |
| **Career(s) Tie-In** |  |
| **Project Element**  **and**  **Educator / Student Feedback**  (student application of standard/benchmark/goal)  RBL Component &  Product | **Social Studies is often the driver of the central theme for the project.** Many times the time period and geography/location of the project setting frames the scope of the project. It is important that the Social Studies component be reflective of historical understandings of the topics with relevance to current times and the student. Remember to include STS (the relevant intersections of Science, Technology and Society) & Futurology (Further, engage the student with how this project or concept could be relevant or used in the future.) |
| **Assessment**  Evidence Based  End Product + Interview |  |
| **Miscellaneous**  (Enrichment, modification, extension, alternate methodology) |  |

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| 1. **Fine Arts** | |
| **Essential Concept(s)** | This component is much more than just making a project look aesthetically pleasing or ‘pretty’. There should be reasoning for the mediums chosen, the colors, style, client appeal, etc. |
| **Goal/Objectives** |  |
| **Standard(s)** | We often cross-correlate to standards for other subjects in these areas: science (materials), technology (processes), research (LA, history, SS) engineering (creation) and math (structure).  National Art Educators Association (NAEA): [NAEA Fine Arts Standards](https://www.arteducators.org/learn-tools/articles/18-naea-standards)  National Core Art Standards: [NCAS Fine Arts Standards](http://www.nationalartsstandards.org/)  English National Curriculum: [Art and Design Standards](https://www.gov.uk/government/publications/national-curriculum-in-england-art-and-design-programmes-of-study/national-curriculum-in-england-art-and-design-programmes-of-study) |
| **Vocabulary** |  |
| **Career(s) Tie-In** |  |
| **Project Element**  **and**  **Educator / Student Feedback**  (student application of standard/benchmark/goal)  RBL Component &  Product |  |
| **Assessment**  Evidence Based  End Product + Interview | For this assessment there should be a tangible rubric structure, color balance, appropriate medium choice, durability, ergonomics, etc. as related to the grade-level arts standards. |
| **Miscellaneous**  (Enrichment, modification, extension, alternate methodology) |  |

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| 1. **Physical Arts** | |
| **Essential Concept(s)** |  |
| **Goal/Objectives** |  |
| **Standard(s)** | Shape America: [National PE Standards](http://www.shapeamerica.org/standards/pe/)  English National Curriculum: [PE Standards](https://www.gov.uk/government/publications/national-curriculum-in-england-physical-education-programmes-of-study/national-curriculum-in-england-physical-education-programmes-of-study) |
| **Vocabulary** |  |
| **Career(s) Tie-In** |  |
| **Project Element**  **and**  **Educator / Student Feedback**  (student application of standard/benchmark/goal)  RBL Component &  Product | This should be related to physical activity. Think of ways to bring the physics of the project alive for students to perform with their bodies. This component may include a health activity that is also linked to science. Ideally, this element links to both a physical activity and how it relates to health topics, but one or the other is valid to be included. |
| **Assessment**  Evidence Based  End Product + Interview |  |
| **Miscellaneous**  (Enrichment, modification, extension, alternate methodology) |  |

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| 1. **Musical Arts** | |
| **Essential Concept(s)** |  |
| **Goal/Objectives** |  |
| **Standard(s)** | National Association for Music Education: [Music Standards](http://www.nafme.org/my-classroom/standards/)  English National Curriculum: [Music Standards](https://www.gov.uk/government/publications/national-curriculum-in-england-music-programmes-of-study/national-curriculum-in-england-music-programmes-of-study) |
| **Vocabulary** |  |
| **Career(s) Tie-In** | Often Music careers are similar titles for most projects, as industry will hire people with similar skills for various applications. E.g., composers, performers, conductors, lyricists… |
| **Project Element**  **and**  **Educator / Student Feedback**  (student application of standard/benchmark/goal)  RBL Component &  Product | Often this is accomplished by finding songs relating to the project, creating lyrics, poems, chants and raps about the project or creating jingles to advertise the product. Sometimes it can be making music with the elements of the project or the project itself. It can also be the physics of sound to recognize what is happening with a project, a product, an environment, a tone for something on a device needing attention, etc. |
| **Assessment**  Evidence Based  End Product + Interview | Do not emphasize performance for a non-performing music element outside of a performance class. |
| **Miscellaneous**  (Enrichment, modification, extension, alternate methodology) |  |