



# STEAM Challenge

## *Dear Data Discovery*

Designed for Middle and High School Students

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## Introduction

This Digital Story Telling Challenge will take two to four weeks to complete. This Challenge targets key Human Life Skills – creativity, collaboration, critical thinking, digital literacy, and presentational skills – in equal measure with the curricular content. Delivering on all those learning goals requires student immersion and time. The

results, as based on our research, are a high level of student engagement, deep learning, and 100% teacher endorsement.

The following Challenge:

- Should be completed by collaborative teams of two to four students but can be completed independently, if desired.
- Is aligned to nationally recognized Curricular Standards.
- Contains an Evaluation Rubric that allows the teacher to clearly score and appraise the students' work.
- Is designed to be integrated into the classroom in alignment with existing curricula.
- Can be assigned as an extra credit project to teams of students that you think would benefit from this kind of immersive, deep learning experience. Additionally, will work well in informal educational settings.
- Should follow the rules of Digital Citizenship in their proper usage and/or citation of images, music and text taken from other sources. See the Digital Rules area in the free Media Resources section of the Meridian Stories site for guidance.

The [\*\*Media Resources\*\*](#) section also contains many other **free support materials** from short videos featuring professionals in the field – Artists and Innovators– to short written documents that cover everything from storyboarding to creative brainstorming, interviewing techniques to game design.

While it is helpful to have a Technology Integrator involved, they are not usually necessary: the students already know how to produce the media. *The teacher's primary function in these Challenges is to guide the students as they engage with the content. You don't need to know editing, sound design, shooting or storyboarding: you just need to know your content area.*

At the end of the Challenge, it is often fun and useful to have a screening of all the media productions – they are all designed to run under 4 minutes each. Students can vote for their favorite videos that can then be screened in a larger assembly-like setting for the whole grade to see. Or this work can be presented as part of a student showcase for parents and friends. Presentational Skills is another Human Life Skill that this project enables.

Our research indicates this to be a really useful exercise for two additional reasons:

1. Students actually learn from their peers' presentations – it is useful to hear a perspective that is not just the teacher's; and
2. The public setting – painful as it is for some students – provides them with an opportunity to 'own' their work and to be more accountable.

Finally, if you are interested to learn more about the community of schools who annually participate in the [\*\*Meridian Stories Competitions\*\*](#) – a community that is characterized by a friendly competitive spirit; feedback from Mentors on each submission; and the rewarding of digital badges in content, storytelling and digital literacy – please return to the Competitions section of the website or inquire at [info@meridianstories.com](mailto:info@meridianstories.com).

**Let's get started.**

## The Challenge

*Data (n): ‘Facts and statistics collected together for reference or analysis.’*

We don't realize it, but we create the potential for vast amounts of data each day. You can collect data from each action you perform, thought you think, emotion you feel, and more. Each time you hear music – Where are you? What kind of music is it? Are you with people or alone? Or, each time you reach for your phone – What caused you to check your phone? What time is it? How long did you use your phone for? Even though we often don't think of this type of “personal data” as data, these all create data points that you can reference and analyze.

Giorgia Lupi & Stefanie Posavec talk in [this video](#) about how they became friends by collecting personal data, converting it into hand-drawn visual representations, and snail mailing it across the Atlantic Ocean to each other over the course of a year. They call the project “Dear Data.”

Members of your team are tasked with doing a similar exploration: collecting and characterizing personal data concerning five topics of your choice, one topic per day.

- *Middle School Teams:* Choose data from two of these five days to aggregate data from each team member then present visually with a key. One of the data topics must be represented using the postcard format in the Dear Data video. The second must be represented using mathematical graphs.

- *High School Teams:* Choose data from three of these five days to aggregate data from each team member then present visually with a key. One of the data topics must be represented using the postcard format in the Dear Data video. Another must be represented using mathematical graphs. The third data category must be visualized in a format of your own creation.

Create a video presenting your data visualizations and explaining what this process taught you about a) the role of data in our world; and b) yourselves.

### **Deliverables include:**

- Documentary Video
- Data Summary Report (at teacher's discretion)
- Shooting Script (at teacher's discretion)

## **The Process**

Below is a suggested breakdown for the students' work.

### **During Phase I, student teams will:**

- Research the Dear Data project
  - This [video](#) explains the concept and provides a great example of a creative video explaining data choices and the process of discovery.
- Decide on five personal data categories to collect data from.
  - Each data topic will have multiple aspects that teams can focus on, so clarify in advance exactly what data will be collected. For example, if a team chose to note how many times they check the time in a day, they could collect data each instance they check time on their mood, the actual time of day, how they check the time (phone, watch, clock, ask another person), why they check the time (Bored? Anxious? Excited?), etc.
  - For an example and suggestions about how to break down an action and represent it visually, see advice from Giorgia and Stefanie towards the bottom of [this article](#).
  - Discuss ideas for the shape and design of your video that will document your results. It's important to do that here because you may want to record some of your processes of data collection.

- Collect data from each personal data topic over the course of a day, five days total.
  - Each team member will collect data for each topic, so each team member will have a collection of five sets of data (each about a unique category)
  - **Teacher's Option: Data Summary Report** – Teachers may require that teams hand in a report summarizing the data they collected.

**During Phase II, student teams will:**

- Decide which of the five days of data you will create visual representations for to feature in the video.
  - *Middle School Teams*: Choose a minimum of two.
  - *High School Teams*: Choose a minimum of three.
- Aggregate the team data from the chosen topics.
- Create data representations for the chosen data categories.
  - One must follow the postcard format, with the visualization on one side and key, or legend, on the other.
    - The key should enable anybody reading the postcard to understand the visualization on the other side.
  - One must be mathematical in nature, though still hand-drawn. Teams must choose how to represent data mathematically.
    - Options include xy-graph, number line, dot plot, histogram, pie chart, box plot, and more.
  - *High School Teams*: One must be in a format of your own creation.
- Discuss as a team what you have learned from the process of choosing personal data topics, collecting personal data, collating the data across the team and visually representing the data. Based on this, brainstorm your approach to your video. This Challenge is a very open digital storytelling format, with a proclivity toward a documentary approach. But that is not required. In brainstorming, consider the following:
  - First and foremost, what story does your data analyses tell about you and your team?
  - Is the tone of your video serious, humorous, earnest, or simply unfiltered and genuine?

- What is the most important feature of your video: the process of discovery and collection, or the outcome – the analysis? And how are you going to communicate that?
- How does your video begin – what is the hook? And how does your video end? What do you want your audience to take away from their experience of watching?
- What does your film sound like? Given the story that your data has revealed about you your team, how will you use music and/or sound effects to tell that story?

**During Phase III, student teams will:**

- Write and finalize the script
  - **Teacher's Option: Shooting Script** – Teachers may require that teams hand in their Shooting Script.
- Pre-produce the video:
  - Scout locations for shooting (if this is being shot on location);
  - Create costumes, props and other set pieces, as needed;
  - Prepare the logistics for the actual shooting of the video; and
  - Rehearse the different scenes or moments.
- Shoot the video
- Edit the video, adding stills and other graphics as desired
- Post-produce the video, adding music and sound effects as desired.

## Meridian Media Support Resources

*Meridian Stories* provides two forms of support for the student teams:

1. Media Innovators and Artists – This is a series of three-to-four-minute videos featuring artists and innovative professionals who offer important advice, specifically for Meridian Stories, in the areas of creativity and production.
2. Meridian Resources – These are short documents that offer student teams key tips in the areas of creativity and production.

Recommended review, as a team, for this Challenge include:

Meridian Innovators and Artists	Media Resource Collection
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<i>On Nonfiction</i> – Margaret Heffernan <i>On Documentary Films</i> – Sarah Childress <i>On Sound Design</i> – Chris Watkinson <i>On Producing</i> – Tom Pierce	“Creative Brainstorming Techniques” “Sound Recording Basics” “Six Principles of Documentary Film Making” “Video Editing Basics”
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## Evaluation Rubric – *Dear Data Discovery*

CONTENT COMMAND			
Criteria	1-3	4-7	8-10
<b>Communication of Content – Math Graph Visualization</b>	Mathematical graphs representing at least one data topic are not present or the graphs are incorrect	Mathematical graphs representing at least one data topic are accurate and presented clearly	Mathematical graphs representing at least one data topic are accurate, creatively presented, and well-explained
<b>Communication of Content – Non-Math Visualization</b>	<p><i>Middle School:</i> The postcard format is not used for a data topic or not explained</p> <p><i>High School:</i> The postcard format is not used or one of the formats is not an original creation</p>	<p><i>Middle School:</i> The postcard format is present and explained adequately</p> <p><i>High School:</i> The postcard format and original format are present and explained adequately</p>	<p><i>Middle School:</i> The postcard format is present and explained clearly, and the visualizations are compelling and creative</p> <p><i>High School:</i> The postcard format and original format are present and explained clearly. Both visualizations are compelling and creative</p>
<b>Communication of Content – Analyses and Conclusions</b>	The analysis of the specified scientific criteria is not present or not well explained	The analysis of the specified scientific criteria is adequately portrayed	The analysis of the specified scientific criteria is clearly explained and smoothly incorporated

STORYTELLING COMMAND			
Criteria	1-3	4-7	8-10
<b>Script/Narrative Flow</b>	The narrative is hard to follow and/or the	The narrative is presented clearly, but	The narrative is presented clearly and

	scripting is lackluster and ineffective	the scripting is inconsistently engaging	the scripting is engaging and effective
The Role of You	The narrative does not communicate thoughtful concluding information about you, the authors and subjects of the analyses	The narrative does communicate thoughtful concluding information about you, the authors and subjects of the analyses	The narrative ends with a thought-provoking and insightful set of conclusions about you, the authors and subjects of the analyses
Visual Representation of Narrative	The visual choices do not support the narrative or engage the audience	The visual choices support the narrative and engages the audience	The visual choices expand upon the narrative and thoroughly engage the audience

MEDIA COMMAND			
Criteria	1-3	4-7	8-10
<b>Editing</b>	The video feels patched together and the overall editing detracts from the video narrative	The video generally flows, servicing the video narrative	The video is edited cleanly and effectively, propelling the video forward
<b>Sound and Music</b>	The selective use of sound effects and music detracts from the video's effectiveness	The selective use of sound effects and music supports the video's effectiveness	The selective use of sound effects and music enhances the video's effectiveness

HUMAN SKILLS COMMAND			
Criteria	1 – 3	4 – 7	8 – 10
<b>Collaborative Thinking</b>	The group did not work together effectively and/or did not share the work equally	The group worked together effectively and had no major issues	The group demonstrated flexibility in making compromises and valued the contributions of each group member
<b>Creativity and Innovation</b>	The group did not make a solid effort to create	The group was able to brainstorm new and	The group brainstormed many

	anything new or innovative	inventive ideas, but was inconsistent in their evaluation and implementation of those ideas	inventive ideas and was able to evaluate, refine and implement them effectively
<b>Initiative and Self-Direction</b>	The group was unable to set attainable goals, work independently and manage their time effectively	The group required some additional help, but was able to complete the project on time with few problems	The group set attainable goals, worked independently and managed their time effectively, demonstrating a disciplined commitment to the project

## Essential Questions

1. What is data and how do you collect, collate and visually represent it in a way that can be understood by others?
2. What is data analysis, how is it done and why is it important?
3. What is personal data?
  - a. What have you learned through the process of collecting and sharing personal data?
4. How has immersion in the creation of original content and the production of digital media – exercising one's creativity, critical thinking and digital literacy skills - deepened the overall educational experience?
5. How has working on a team – practicing one's collaborative skills - changed the learning experience?

## Student Proficiencies

1. The student will have a solid understanding of how to collect, collate and visually represent data in a variety of ways.
2. The student will understand how to analyze data in order to understand something – a pattern or behavior or narrative – that was not clearly evident before.
3. The student will learn that personal data is a type of data dealing with specific people and their lives, which could range from standard data such as height and weight to more imaginative data such as how many times a person smiles in a day.

- a. The student will be able to articulate what the process of completing this project has taught them about themselves, the ubiquity of data, and connecting with other people.
4. The student will utilize key 21<sup>st</sup> century skills, with a focus on creativity, critical thinking and digital literacy, in their process of translating STEAM content into a new narrative format.
5. The student will have an increased awareness of the challenges and rewards of team collaboration. Collaboration – the ability to work with others - is considered one of the most important 21<sup>st</sup> century skills to develop in students as they prepare for life after secondary school.

## Curricular Correlations

The *Dear Data Discovery Challenge* addresses a range of curricular objectives that are articulated in Common Core Mathematics Standards. Below please find the standards that are addressed, either wholly or in part.

### Common Core - Mathematics

#### Statistics and Probability (Grade 6)

Students who demonstrate understanding can:

- Display numerical data in plots on a number line, including dot plots, histograms, and box plots. (6.SP.B.4)
- Summarize numerical data sets in relation to their context, such as by:
  - Reporting the number of observations. (6.SP.B.5.A)
  - Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. (6.SP.B.5.B)
  - Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. (6.SP.B.5.C)
  - Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered. (6.SP.B.5.D)

## **Statistics and Probability (Grade 7)**

Students who demonstrate understanding can:

- Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. (7.SP.B.3)

## **Statistics and Probability (Grade 8)**

Students who demonstrate understanding can:

- Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. (8.SP.A.1)
- Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line. (8.SP.A.2)

## **Functions (Grade 8)**

Students who demonstrate understanding can:

- Construct a function to model a linear relationship between two quantities. (8.F.B.4)

## **High School – Functions**

Students who demonstrate understanding can:

- Distinguish between situations that can be modeled with linear functions and with exponential functions. (HSF.LE.A.1)
- Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. (HSF.LE.A.3)

## **High School – Statistics and Probability**

Students who demonstrate understanding can:

- Represent data with plots on the real number line (dot plots, histograms, and box plots). (HSS.ID.A.1)
- Fit a linear function for a scatter plot that suggests a linear association. (HSS.ID.B.6.C)