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| **Lesson Title : Devising an Optimized Business Plan** | **Unit #:1** | **Lesson #:2** | **Activity #:1** |
| **Activity Title: Supporting a plan with data.** |

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| **Estimated Lesson Duration:** | **5 days** |
| **Estimated Activity Duration:** | **2 days** |

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| **Setting:** | **Middle school classroom, 8th grade students in an urban setting.** |

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| **Activity Objectives:**  **The students will:**  **Collect appropriate data and organize it in a user friendly way.**  **Communicate the results of data collection to their peers and evaluators.** |
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| **Activity Guiding Questions:**  **What is the real world relevance for data collection?**  **How do I select the appropriate data display?**  **Why do I need to create data displays to prove a point?**  **How could data be considered misleading?** |

| **Next Generation Science Standards (NGSS)** | |
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| **Science and Engineering Practices (Check all that apply)** | **Crosscutting Concepts (Check all that apply)** |
| ☐ Asking questions (for science) and defining problems (for engineering) | ☒ Patterns |
| ☐ Developing and using models | ☐ Cause and effect |
| ☐ Planning and carrying out investigations | ☒ Scale, proportion, and quantity |
| ☒ Analyzing and interpreting data | ☐ Systems and system models |
| ☒ Using mathematics and computational thinking | ☐ Energy and matter: Flows, cycles, and conservation |
| ☒ Constructing explanations (for science) and designing solutions (for engineering) | ☐ Structure and function. |
| ☒ Engaging in argument from evidence | ☐ Stability and change. |
| ☐ Obtaining, evaluating, and communicating information |  |

| **Ohio’s New Learning Standards for Science (ONLS)** |
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| **Expectations for Learning - Cognitive Demands (Check all that apply)** |
| ☐ Designing Technological/Engineering Solutions Using Science concepts **(T)** |
| ☐ Demonstrating Science Knowledge **(D)** |
| ☐ Interpreting and Communicating Science Concepts **(C)** |
| ☐ Recalling Accurate Science **(R)** |

| **Common Core State Standards -- Mathematics (CCSS)** | |
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| **Standards for Mathematical Practice (Check all that apply)** | |
| ☒ Make sense of problems and persevere in solving them | ☒ Useappropriate tools strategically |
| ☒ Reason abstractly and quantitatively | ☒ Attendto precision |
| ☒ Construct viable arguments and critique the reasoning of others | ☒ Look for and make use of structure |
| ☒ Model with mathematics | ☒ Look for and express regularity in repeated reasoning |

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| **Unit Academic Standards (NGSS, ONLS and/or CCSS):** |

**8.SP.1 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.2 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.**

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| **Materials**: (Link Handouts, Power Points, Resources, Websites, Supplies) |

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| **Teacher Advance Preparation:** |

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| **Activity Procedures:**   1. **Review previous day’s instruction.** 2. **Formatively evaluate the previous day’s assignment.** 3. **Review learning from previous day.** 4. **Constructing a scatter plot.** 5. **Instruction of how to build a scatter plot. Identify its advantages with in data collection. How could it be applicable for us to use on our projects.** 6. **Height v/s Wing Span activity. Students construct all of the needed pieces to build an accurate scatter plot. The various parts of a scatter plot can be identified with in the assignment.** 7. **Students use data to build their own scatter plots.** 8. **Students use scatter plots to summarize information and make arguments toward a solution of a problem.** 9. **Students brainstorm about possible scatter plots that could be formed in their groups as a way to make sense of the data they are collecting with regards to their projects.** 10. **They will be given a partial rubric which outlines the parameters of the future challenge. This way they can come up with a potential plan for data collection.** 11. **They will be given work time in their challenge groups to develop a rough prototype.** |

**Formative Assessments:** Link the items in the Activities that will be used as formative assessments.

Solution selection – rubric specific to choosing and implementing the correct data display.

**Summative Assessments:** These are optional; there may be summative assessments at the end of a set of Activities or only at the end of the entire Unit.

None

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| **Differentiation:** Describe how you modified parts of the Lesson to support the needs of different learners.  Refer to Activity Template for details.  Students will be assisting each other through the process of measuring their height and wingspan. They should be able to work in a collaborative manner to generate the needed data. The scatter plot can also be pre built for students that struggle with keeping up with the pace of whole group instruction. This will allow them to just place dots verses creating the entire scatter plot. |

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| **Reflection:** Reflect upon the successes and shortcomings of the lesson.  The students enjoyed the height verse wingspan comparison. The activity proved to help students to understand how to use data displays to determine the relationship between two separate data sets. The fact that students were out of their seats and working cooperatively to help each other measure their wing span and height assisted my kinetic learners by giving them the opportunity to move about the room and relate each point on a scatter plot to a specific piece of data. I have used this activity in the past to teach students about scatter plots and have often found it to be highly engaging.  A short-coming of the lesson is its connection to the up coming challenge. The students really struggled with making the connection between scatter plots and developing supporting data for their shirt design. I feel as if most were able master the content of scatter plots which was my ultimate goal, however it would have been nice if more students could have incorporated it into their design presentations for the challenge. |