

CONDUCTING SCIENCE RESEARCH IN THE CLASSROOM

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WHAT IS INDEPENDENT SCIENCE RESEARCH?

- Independent Science Research entails the students researching a problem, developing a hypothesis, testing the hypothesis, analyzing the results, developing a conclusion and presenting the findings to their peers.
- The students research a scientific problem of their interest.
- Students have the opportunity to practice the scientific method on a problem that they value.

THE SCIENTIFIC BENEFITS OF STUDENTS CONDUCTING RESEARCH.

- Research a scientific problem of their interest.
- Develop an understanding of the research process.
- Given the opportunity to think like a real scientist.
- Given the opportunity to learn new scientific techniques.
- Creativity expands as they design the experiment and develop techniques to test their experiment.
- Understand how to analyze data.
- Develop skills in the interpretation of results.

OTHER BENEFITS OF CONDUCTING SCIENTIFIC RESEARCH

- Take ownership of their education.
- Student motivation increases as they have the opportunity to learn about and test a problem that interests them.
- Creativity expands as they design the experiment and develop techniques to test their experiment.
- Develop a tolerance for obstacles.
- Learn How to work independently.
- Develop self confidence
- Understand that assertions must be supported by real data.
- Begin to get student to think about a career path.

STUDENT REWARDS OF CONDUCTING SCIENCE RESEARCH

- Win Cash Prizes.
- Win college scholarships.
- Win all expense paid trips to present at National and International Science Fairs.
- Win scholarships to attend summer sciences camps or research institutes.
- Students get the opportunity to meet and communicates with leading scientists in their field of study.
- Gain a good understanding of how to complete a multidisciplinary project.

TEACHER REWARDS

- You learn new scientific techniques and expand your science knowledge as you guide your students through the research process.
- Increase in student motivation to learn as they are working on a project that interests them.
- Move from the role of teacher to the role of science mentor as the students plan their class time around what they need to get done to conduct research.
- *Win your students win you win an all expenses paid trip to the National and International Science Fair.
- Science knowledge gained connections made when you attend American Junior Academy of Sciences Symposium and International Science and Engineering Fair

PAST SUCCESS

- Levi Woodward
 - Two Time Qualifier for AJAS.
 - Nebraska FFA State Agri-science Fair Winner.
- Coleman Kneifl
 - Two Time Qualifier for AJAS.
 - Two time Nebraska State Agri-science fair winner.
 - Won the Greater Nebraska Science & Engineering fair and qualified for the international Science & Engineering Fair.
- Katie Bathke
 - Three Time Qualifier for AJAS
 - Nebraska FFA State Agri-science Fair Winner.
 - Two time winner of the Greater Nebraska Science & Engineering fair and qualified for the International Science and Engineering Fair.
 - Third place in Microbiology at the 2018 International Science and Engineering Fair.



HOW TO GET YOUR STUDENTS DOING SCIENCE RESEARCH

- At the start of the school year have your students do a class project to help them learn the scientific method.
- Middle School students make and record observations of a living thing such as a *Daphnia magna*.
- After making some observations have the students generate some testable questions about the organism.
- Pick a testable question and get the students started on their research.



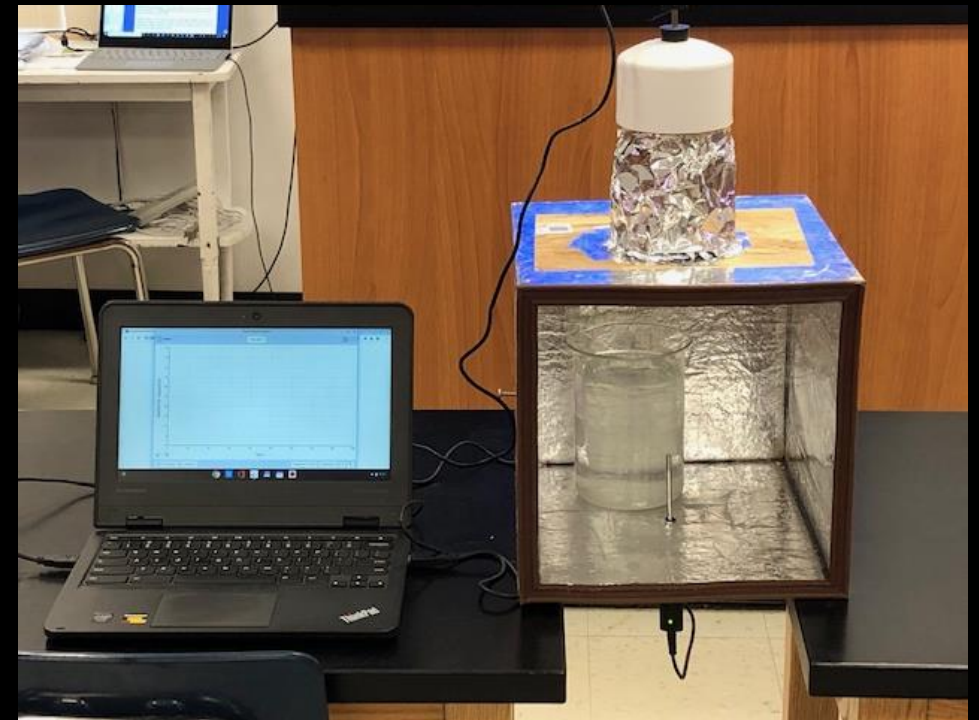
HOW TO GET YOUR STUDENTS DOING SCIENCE RESEARCH

- Crazy Koozie Contest.
- Have students research the modes of Heat transfer, then design and construct Koozie.



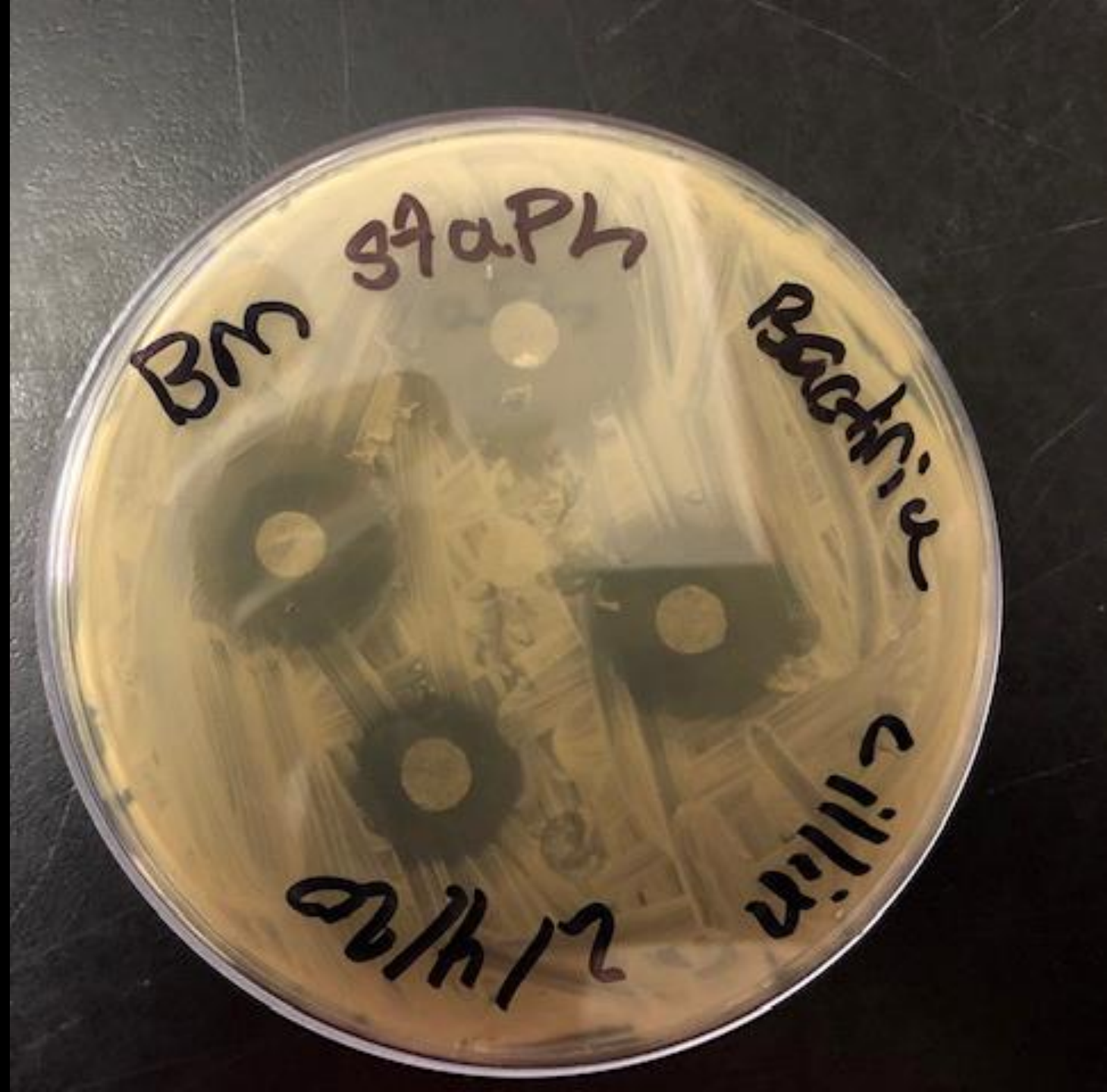
HOW TO GET YOUR STUDENTS DOING SCIENCE RESEARCH

- For individual research projects students need to choose a project of their interest.
- Students are more likely to complete a project they are passionate about.
- A good project is much like a hobby it is something that you will find time to do and perfect.



PROJECT IDEAS

- Test the effectiveness of natural antibiotic or antibacterial hand sanitizers.
- Extract essential oils from plants then test the oils antimicrobial properties.
- Perform competitions studies to see how two bacterium compete when grown in the same environment.



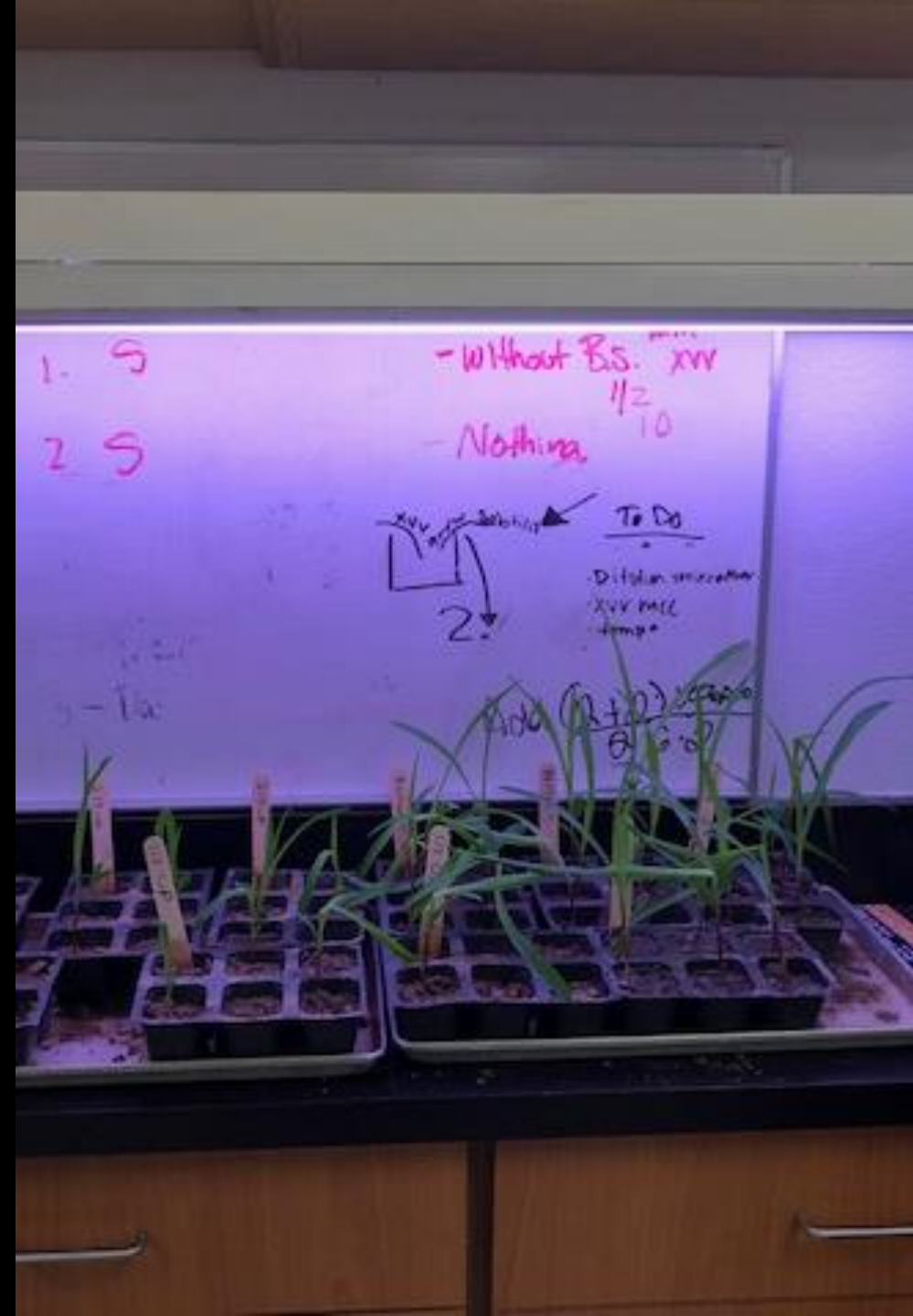
PROJECT IDEAS

- Some students come up with project ideas that need to be performed in the shop.
- These projects appeal to the students that may not learn like the traditional student.
- FFA agri-science fair has categories for students that complete the non-traditional research projects.
- These projects can also be used for students to earn their FFA State Degree.



PROJECT IDEAS

- To grow plants in the winter you will need to set up some grow light stations.
- These stations consist of a four foot fluorescent lights with grow bulbs on a timer.
- Project ideas are endless as there are many variables that can be changed and it is easy for the students to measure growth each day.



PROJECT IDEAS

- Planaria are easy to collect all you need is a five gallon bucket and an ice cream bucket.
- Find an area where there are natural springs.
- Planaria are capable of regeneration.
- They can be used to test surgical sterilization techniques.
- May also be used to test the effectiveness of natural antibiotics.



Dugesia tigrina

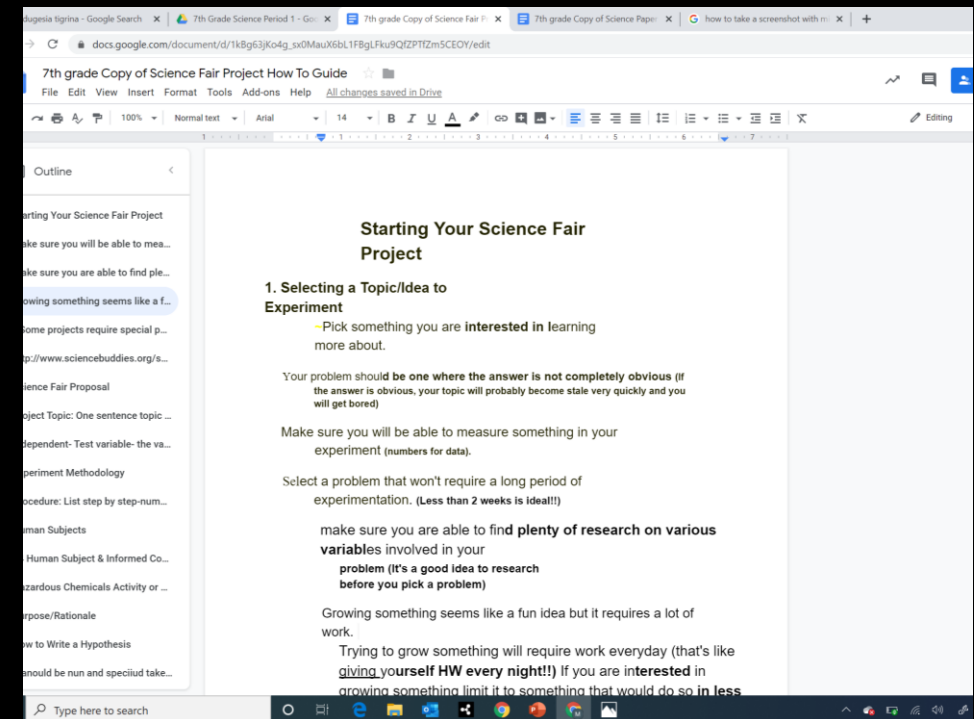
WRITING THE RESEARCH PAPER

- Use google classroom to create a class and share class material.
- Create a science research paper template to share with your students.
- The template should give detailed instructions on how to write each part of the research paper.

The screenshot shows a Google Docs interface with a document titled "7th grade Copy of Science Paper Template". The document is open in a browser window with several tabs. The document content is a template for a science research paper, with various sections listed in the left-hand "Outline" pane. The main text area contains several red labels: "Title", "Name", "Grade", "School", "Instructor", and "Date". The "Outline" pane lists the following sections: INTRODUCTION, HYPOTHESIS, PROCEDURE, RESULTS, CONCLUSION, REFERENCES, and APPENDICES. The document is currently blank, with only the red labels visible in the main text area.

HELPFUL RESOURCES

- Create or find resources that give your students a plan of how to complete the science project.
- Give your students a written or digital copy of this how to guide.



STATE & REGIONAL SCIENCE FAIRS

- March 20th -Northeast Nebraska Junior Academy of Sciences regional science fair at Wayne State College.
- March 24th- The Northeast Regional AHEC 8th grade science meet at Northeast Community College in Norfolk.
- March 28th- Greater Nebraska Science and Engineering Fair in Nebraska City
- April 1st – Nebraska FFA Agri-science Fair.
- April 16th – Nebraska Junior Academy of Sciences State Science Fair in Lincoln.

NORTHEAST NEBRASKA JUNIOR ACADEMY OF SCIENCES

- https://www.wsc.edu/info/20025/natural_and_social_sciences/751/science_fair

The screenshot shows a web browser window displaying the Wayne State College website. The page is titled "Science Fair" and is part of the "School of Natural and Social Sciences" section. The navigation menu includes "ADMISSIONS", "TUITION & AID", "ACADEMICS", "CAMPUS LIFE", "ATHLETICS", and "ABOUT". The main content area features a "Science Fair" sidebar with links for "Basic Information", "Abstract Registration", "Volunteer", and "Schedule". The main content area has a large banner for the "2020 Northeast Regional Nebraska Junior Academy of Science Science Fair". Below the banner, the text reads: "2020 NJAS Nebraska Science Fair. This year's teams of young scientists from all over Northeast Nebraska gather at Wayne State College for the annual NJAS Nebraska Science Fair. Friday, March 20, 2020. Abstracts and registration are due on Wednesday, March 11." The browser's address bar shows the URL "wsc.edu/info/20025/natural_and_social_sciences/751/science_fair". The Windows taskbar at the bottom shows the time as 8:48 AM on 2/9/2020.

Wayne State College

Current Students Faculty & Staff Alumni | Support WSC myWSC News Calendar Map Directory

Search this site SEARCH

ADMISSIONS TUITION & AID ACADEMICS CAMPUS LIFE ATHLETICS ABOUT

Home > Academics > School of Natural and Social Sciences > Science Fair

Science Fair

Science Fair
Basic Information
Abstract Registration
Volunteer
Schedule

Northeast **SCIENCE FAIR** Regional

20 20

Nebraska Junior Academy of Science

2020 NJAS Nebraska Science Fair

This year's teams of young scientists from all over Northeast Nebraska gather at Wayne State College for the annual NJAS Nebraska Science Fair.

Friday, March 20, 2020
Abstracts and registration are due on Wednesday, March 11.

NEXT PAGE >

Type here to search

8:48 AM
2/9/2020

NORTHEAST AHEC 8TH GRADE SCIENCE MEET

- <https://www.unmc.edu/familymed/education/ahec/education/regional-science-meets.html>

The screenshot shows a web browser displaying the University of Nebraska Medical Center (UNMC) website. The page is titled "8th Grade Science Meets" and is part of the "2019 UNMC / AHEC Regional Science Meets" section. A navigation menu on the left includes "Medical Student Education", "Nebraska Area Health Education Centers (AHEC)", "Education", and "8th Grade Science Meets". The main content area features a map of Nebraska with four colored stars indicating the locations of the science meets: Beatrice (blue star, February 12), Ainsworth (green star, February 20), Scottsbluff with NJAS (orange star, March 5), and York (red star, March 19). A legend below the map lists these events with their respective dates. The browser's address bar shows the URL: <https://www.unmc.edu/familymed/education/ahec/education/regional-science-meets.html>. The system tray at the bottom indicates the time is 8:53 AM on 2/9/2020.

GREATER NEBRASKA SCIENCE & ENGINEERING FAIR IN NEBRASKA CITY

- Qualifying fair for the International Science and Engineering Fair.
- <https://www.gnsef.org/>

The screenshot shows the GNSEF website with a navigation menu including Home, Overview, Schedule, Awards, Resources, News, Registration, and Technical Support. The main content area features a large photo of Katie Bathke, a young woman with long blonde hair wearing a blue top and a gold necklace. A pink banner over the photo reads "2019 Top of Fair Winner". To the right of the photo is a preview of her project page, which includes a title, a bar chart comparing "Xyv and B.S." across three conditions, an ANOVA test table, and a conclusion section. The project title is "The Development of Bacillus subtilis as an Environmental Competitor for Bacterial Leaf Streak".

Condition	Xyv	B.S.
Xyv and B.S.	1.4	79.2
Xyv then B.S.	10.8	69
Xyv then B.S. x 2	9.4	55.4

Condition	Xyv	B.S.
Xyv and B.S.	4.3	58.5
Xyv then B.S.	22.5	63.3
Xyv then B.S. x 2	4.29	73.3

Group	Count	Sum	Average	Variance
62742	23	15274	667.13	233.5274
28	14	850	60.71	86.73
66	14	928	66.2857	484.7472
75	14	1051	75.0714	56.07142
86	14	1051	75.0714	29.86

Katie Bathke is a Senior at Allen Consolidated School. The title of her project is "The Development of Bacillus subtilis as an Environmental Competitor for Bacterial Leaf Streak" Her teacher is Marc Bathke.

QUESTIONS?

- Contact me at mbathke@allenschools.org

