

Preventing Burnout

Setting up students and teachers for
research success

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Michelle Beineman

Science Teacher

- 8 years of sponsoring student research in 8th grade
- 5 years overseeing campus wide student research in 7th and 8th grade
- 2020 Melinda Mills SEFH laughs often



HOW TO MAKE IT SUCCESSFUL?

Students need:

Inspiration from a teacher who has a passion for it

Support for checkpoints along the way

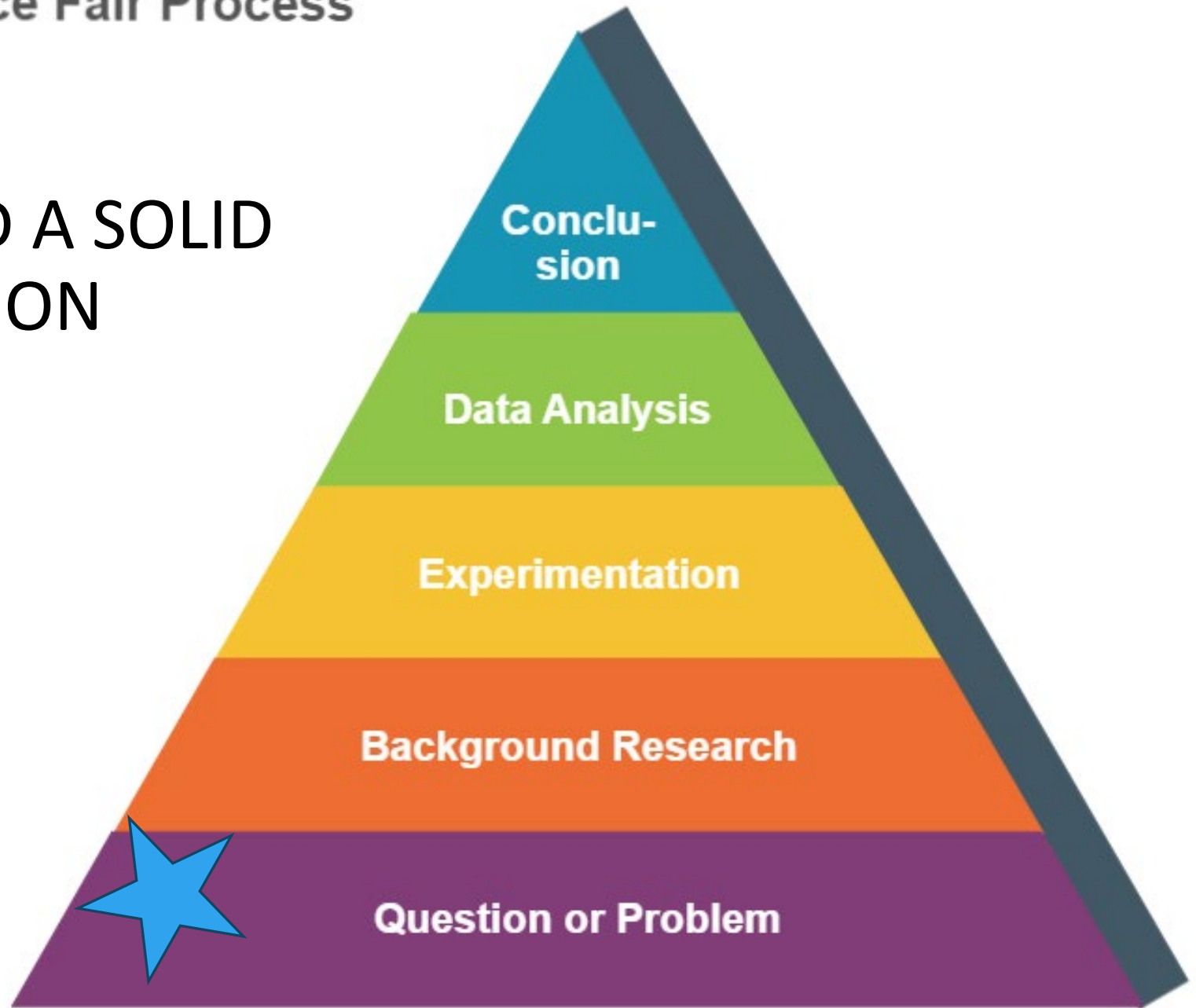
Support for parents along the way

Resources made available, if necessary

Assistance in research and getting started

Science Fair Process

**STUDENTS NEED A SOLID
FOUNDATION**



HOW TO GET STUDENTS STARTED?

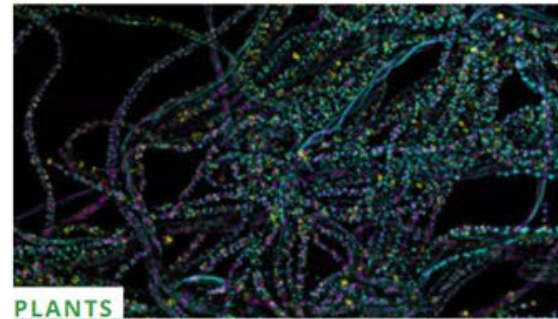
THERE ARE SEVERAL WAYS TO
START THIS PROCESS:

- I WONDER... PROJECT
- CURRENT SCIENCE RESEARCH
- TESTABLE QUESTIONS
- INTEREST SURVEY

The “I Wonder...” Journal Challenge

[Here's how to join the I Wonder Journal Challenge](#)

1. For two weeks, keep a notebook, journal, or some sheets of paper with you at all times as your “I Wonder...” Journal. Whether you are working, playing, eating, or sleeping, it should always be by your side.
2. Every day, record 10 questions you have about the world around you, never repeating a question. If you're not sure where to start, just look around you! Consider objects near and far. Think about what is above you, below you, around you, or inside of you. Watch for movements, listen for sounds, breathe in scents. Wonder about feelings and interactions. What don't you know about how these things work, what they are made of, where they came from, or how they affect one another?



PLANTS

A single particle of light can kick off photosynthesis

By Emily Conover • July 19, 2023



ANIMALS

Explainer: What is animal domestication?

By Bethany Brookshire • July 17, 2023

MATERIALS SCIENCE

This house is partly made of recycled diapers

By Carolyn Gramling • July 13, 2023

SPACE

Lightning dances through Jupiter's skies much like it

CURRENT SCIENCE RESEARCH

STUDENTS RESEARCH BY FINDING ARTICLES THEY ARE INTERESTED IN

Testable Question Sorting Mat

Testable Questions

- Something can be observed
- Something can be measured
- Two or more things can be compared
- Common materials found at home or school can be used for testing

Un-testable Questions

- Equipment needed for testing would be too hard to get
- Testing might be unsafe
- Question is too complex to investigate at home or school

TESTABLE VERSUS UNTESTABLE QUESTIONS

- HAVE STUDENTS SORT THE QUESTIONS USING THESE GUIDELINES
- THEN HAVE THEM SORT THEIR OWN QUESTIONS



To consider...

- **Consider the amount of time needed to successfully complete the chosen project.**
- **Ask students:**
 - **Will you be able to easily get the materials needed?**
 - **Is cost an issue?**
 - **What interests you about this project?**
 - **Is there a deeper question about this project you can investigate?**
- **Encourage students to begin with an idea they find interesting or are curious about.**

“1.5 cm per day”

Height

Multiple
days

“19 cm at the
end of 6 weeks”

Height

One time

PLAN WITH DATA IN MIND FROM THE START

- ONCE I HAVE THE QUESTION, HOW WILL I KNOW IF I FOUND THE ANSWER?
- WHAT WILL THE DATA BE?
- I HAVE FOUND THAT DATA IS A PLACE WHERE JUNIOR HIGH STUDENTS TEND TO STRUGGLE
- BY STARTING WITH THE DATA IN MIND, THEY HAVE A BETTER IDEA OF WHAT TO DO

BACKGROUND RESEARCH

- WIKIPEDIA AS A STARTING POINT, NOT A SOURCE
- RESEARCH PLAN DOCUMENT AIDS JUNIOR HIGH STUDENTS IN ORGANIZING THEIR THOUGHTS

Research Plan

Complete the table. Answer the questions carefully and thoughtfully.

TOPIC
WHAT DO I CURRENTLY KNOW ABOUT THIS TOPIC?
WHAT DO I WANT TO KNOW ABOUT THIS TOPIC?
WHAT IS MY QUESTION?

DEFINING QUALITY



QUESTION

- TESTABLE
- MAKES SENSE
- AGE-APPROPRIATE
- VALUABLE AND
USEFUL TO THE
STUDENT
RESEARCHER

RESEARCH

- THOROUGH
- RELIABLE SOURCES
- MULTIPLE TRIALS

BOARD

- LEGIBLE
- FOLLOWS TEMPLATE
- CONCISE
- ACCESS TO THE RUBRIC
- HEALTHY COMBINATION
OF CONTENT AND
AESTHETICS

COMMUNICATION WITH PARENTS IS **KEY!**

01


FACE TO FACE AND VOICE COMMUNICATION IS DRASTICALLY MORE EFFECTIVE THAN EMAILS.


02


THEIR QUESTIONS ARE USUALLY GOOD, AND WARRANT BEING ANSWERED BUT THEY OFTEN ASSUME THE ANSWER, JUST LIKE THEIR CHILDREN.

03

ANNUAL PARENT NIGHT SPECIFIC TO SCIENCE FAIR HAS MADE A MARKED IMPROVEMENT IN THE QUALITY OF PROJECTS STUDENTS CREATE AND REDUCED THE NUMBER OF PARENT COMPLAINTS AND ISSUES

 T2L Intro to Science Fair

 Research and Project Design 2022-2023

 Research and Project Design #2 2022-2023

 Project Ideation/Scientific Method

 Experimentation and Data Collection



@t2l



T2L Overview



T2L Science Fair Resources

Courier Article

LinkedIn



Teach 2 Learn

Mission Statement

“Teach 2 Learn is a student-led organization that aims to help young students pursue their passions. It is our belief that everyone is made for something; the key to the extraordinary is doing what you’re passionate about.”

Founders

- Alex Deng (CS and Econ at Yale)
- Arman Sharma (Pre-med track at Stanford)
- Michael Gerhard (CSB at UT)
- Ashton Mehta (CS at UT)

T2L Mentor Achievements

- 18x ISEF Qualifying Mentors
- 14 ISEF Projects
- 10+ Awarded at ISEF

INTEREST SURVEY



Teach 2 Learn

Science Fair Idea Survey

Part 1 Directions: For each statement below, give each statement a 1 to 10 rating based on how much you agree with it. If you strongly disagree, rate it one. If you strongly agree, rate it 10. If you are unsure, rate it 5. (Please try to avoid writing a 5 for all questions).

1. I enjoy working with plants/gardening.
2. I enjoy making and understanding graphs.
3. I have experience with computers (coding).
4. I enjoy learning about illnesses and how people get them.
5. I enjoy building structures, models, legos, etc.
6. I am interested in how humans interact with the Earth.
7. I use a computer to make drawings or edit pictures.
8. I would enjoy doing my project mostly outside.
9. I enjoy taking care of/ feeding animals and being with animals for long periods of time.
10. I enjoy learning about memory, learning, and why people do things.
11. I prefer thinking about a problem in my head more than doing work with my hands.
12. I take things apart to see how they work.
13. I'm good at math and would do it for fun.
14. I am interested in why animals do what they do.
15. I would be ok going up and asking lots of people do participate in my project
16. I have the responsibility to take care of something for a long time.
17. I would take the time to learn to make an educational game.
18. I enjoy coming up with sketches/designs for different things.
19. I am interested in the human body and how people stay healthy.
20. I am interested in the non-living aspects of our world (soil, nature, weather).
21. I enjoy building and/or am interested in robots and how they work.
22. I want to learn how to code.
23. I am interested in the big problems the Earth faces such as climate change and pollution.
24. I am interested in learning the concepts of the forces of nature (gravity, magnetism, etc.).

Part 2 Directions:

Now, add up the answers you put to the following questions and write the total next to the bottom. For example, if the numbers column says 1, 4, 9, & 13, you would add up the results from question numbers 1, 4, 9, & 13.

Numbers	Total	Numbers	Total	Numbers	Total
(A) 1, 9, 14, 16		(C) 4, 10, 15, 19		(E) 6, 8, 20, 23	
(B) 3, 7, 17, 22		(D) 5, 12, 18, 21		(F) 2, 11, 13, 24	

Science Fair Clusters and Subtopics

For the cluster that you got from the quiz, circle the three most interesting subtopics to research more about. This is completely optional and intended to be used as a starting point for your exploration. If you don't know what something means, look it up or ask!

Overall Clusters

A - Plant Science and Animal Science

B - Computer Science

C - Medicine/Health and Behavioral Sciences

D - Engineering

E - Earth/Enviro

F - Mathematics and Physics

A - Plant Science and Animal Science

Projects studying the living, non-human components of the natural world

[Hydroponics] [Agriculture] [Animal Behavior] [Plant Diseases] [Animal development/life cycles]
[Animals and the environment]

B - Computer Science

Projects involving making or coding something (developing software) in order to accomplish a goal

[Encryption/Decryption] [App development] [Broad - program to solve a problem] [Data Analysis]
[Computer hardware]

C - Medicine/Health and Behavioral Sciences

Projects dealing with humans, either physical or mental studies or things that affect the human body

[Human Nutrition] [Hygiene/Sanitation] [Study of diseases (epidemiology)] [Disease/Germ Control]
[Psychology] [Behavior/Response] [Linguistics] [Public Opinion/Survey]

D - Engineering

Projects intended to directly solve a problem by creating something

[Robotics] [Structures] [Renewable Energy] [Material Sciences] [Electronics/Circuits]
[Radio/Communications] [Transportation]

E - Earth/Environmental Science

Projects studying the non-living components of our natural world

[Water Quality] [Pollution] [Climate change impacts] [Irrigation] [Waste and disposal]

F - Mathematics and Physics

Projects that are mainly theoretical and aim to analyze/explain the most basic laws of physical sciences

[Statistics] [Applied Physics] [Game theory/probability] [Algebra/Geometry/Calculus]
[Acoustics] [Magnetism] [Light and properties] [Forces/Dynamics]

Thank You

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Teach2Learn: linktr.ee/T2L

Scan the QR
code for the
resources
mentioned.

