John Jay Science & Engineering Academy

2021 Class Meetings

SEA Administration Team 2021-2022

Ms. Mitchell
SEA Principal

Ms. Luna
Associate Principal

Ms. Karst
Program Coordinator

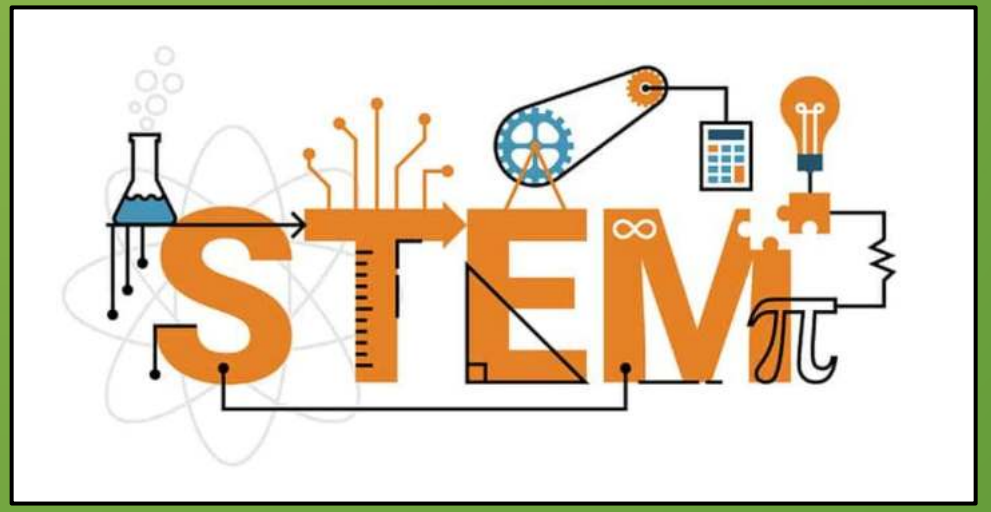
SEA Counseling Team 2021-2022

DeeAnn Montanez
SEA Counselor
Alpha A-L

Rory Briggs
SEA Counselor
Alpha M-Z

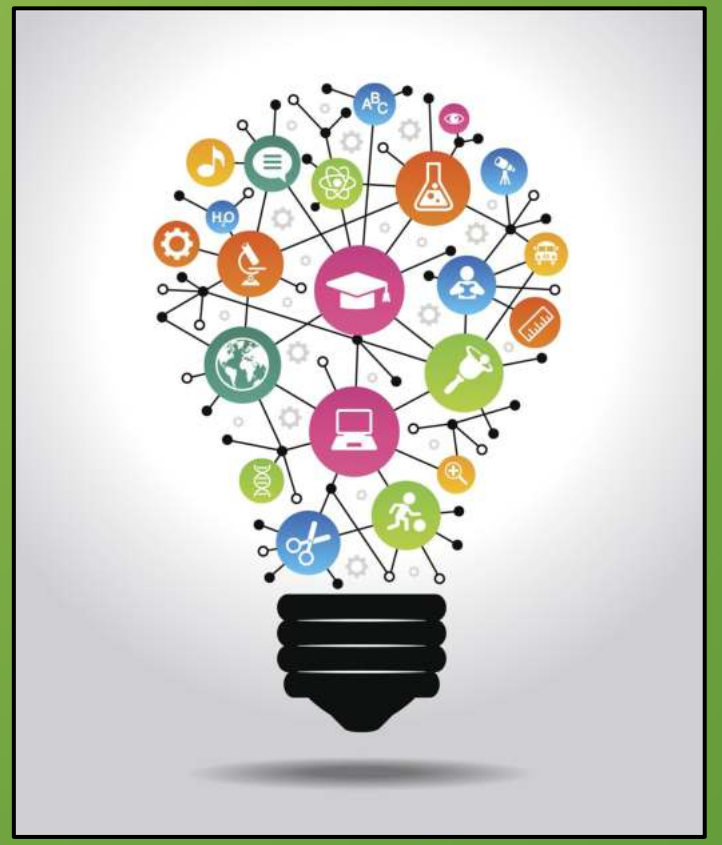
Mission

Provide all students with a relevant and rigorous learning experience to cultivate a robust STEM environment.



Vision

SEA students explore their STEM interests, discover their passions, and graduate as innovators and leaders in society.



This Year's Theme for Jay Science & Engineering Academy

Jay Science & Engineering Academy Program Anchors

College-Going Culture

- 100% college acceptance rate
- College credit for Dual Credit, AP, and OnRamps courses
- College, Career, and Military readiness
- Industry certifications
- Career exploration

Jay Science & Engineering Academy Program Anchors

STEM Experiences

- Outreach events
- Industry field trips
- Job shadowing
- STEM leadership events
- Volunteering
- Mentoring
- Internships
- Networking
- Makerspace

Jay Science & Engineering Academy Program Anchors

Academic Research

- Research skills
- Practical applications
- Presentation skills
- Innovation & Problem-solving
- Competition / Advancement
- Collaboration & Teamwork
- Networking
- Scholarships & Prizes
- Travel

Fall Registration

AP Exam Fees for 2021-2022

	Description	Cost/Exam
Fall registration	Exam registered and paid and paid for by November 5th.	$27.10 $12.10 for qualifying students
Late registration	Exams Ordered Nov. 15–Mar. 11	$27.10 + $40 fee
Unused/ canceled exam	Exam that is canceled or not taken by the student	$40 fee
Challenging an AP Exam	Exam for class student is NOT enrolled in	$100.10

- **What's new?** College Board will charge a $40 cancellation fee for those who cancel beyond the registration deadline or do not show up to take the test.
- *Students enrolled in AP Calculus AB, AP Calculus BC, AP Physics (All physics), AP Env. Sci, Comp. Sci AP, AP Prin of Comp Sci. & AP English Lang (English 3 AP) will qualify for 50% off of their exam fee.

Payment Deadline: November 5, 2021

**Orders will be cancelled for anyone who does not meet the payment deadline.

We need your Feedback!

What are your interests?

What STEM experiences would you like more of?

We need your Voice!

SEA Student Advisory Council

Academic Research 2021-2022

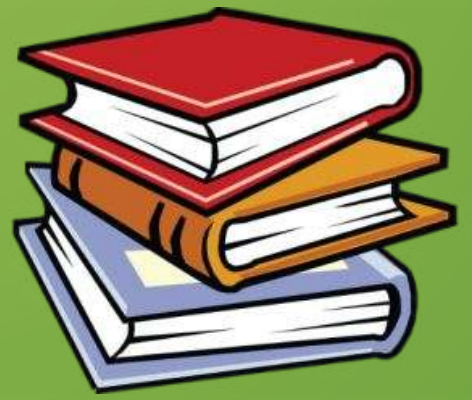
Mrs. Maretzki
Academic Research Coordinator
penney.maretzki@nisd.net
Room: A220

Academic Research

All SEA students participate in academic research every year.

Students will receive guidance through:

- Research Methods classes (9th)
- Emails from Mrs. Maretzki
- Reminders from your science teacher
- SEA newsletter
- Schoology



1. Research
2. Product
3. Presentation, with feedback from an expert

Connect your project to SOMETHING THAT INTERESTS YOU!
You'll be invested in your work, rather than it being a chore.

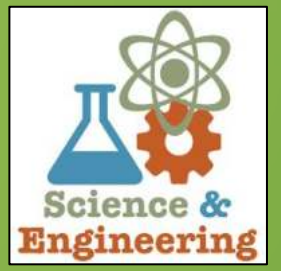
Benefits of Academic Research

- Builds Skills
- Scholarships
- Builds Resume
- Communication
- Leadership Skills
- Personal Growth
- Internships
- Confidence
- Collaboration
- Critical Thinking
- Problem Solving
- Careers
- Creativity
- Travel
- Cash Prizes
- Opportunity

For these reasons, it's important that YOU complete your own project. There is no benefit to having someone else (parent, sibling, friend) do it for you.

Types of Academic Research at JSEA

1. Science & Engineering Projects (9-12)
2. NASA VOLARE Program (10-12)
3. Art in STEM (10-12)
4. Destination Imagination (10-12)
5. Robotics Team (10-12)
6. ACE Mentorship Program (11-12)
7. Independent Study Mentorship (11-12)



Science OR Engineering Project

Sponsor: Mrs. Maretzki (A220)

Over 500 students participate each year and are judged by professionals from the community.

Students with the highest-ranking projects (SEA & JHS) will be invited to be part of the Academic Research Team, with opportunities to compete at local, state, national, and international competitions.

Individual projects only; no teams allowed.

Display Board & Research Paper

Projects will be showcased at the SEA Research Symposium, on December 4th.

9th – 12th

Academic Research Team Member

Jessica Romero
SEA Class of 2021

3 years on the Academic Research Team

AWARDS

- Multiple Grand Prizes
- Meteorological Society Award
- Association for Women Geoscientists Award
- NASA Earth System Science Award
- Ricoh Sustainable Development Award
- Society for In Vitro Biology Award
- Stockholm Junior Water Award

CASH PRIZES

- $390

UNIVERSITY SCHOLARSHIPS

- $26,000

Science vs. Engineering Projects … what's the difference?

SCIENCE PROJECTS

Have a Hypothesis – If you do *this*, then *this* happens. It's an educated guess, based on research.

ENGINEERING PROJECTS

Have an Engineering Goal - A requirement that demonstrates a real-world problem that could be solved as a result of the project.

Science & Engineering projects are more than just research!

RESEARCH PROJECT:

Look things up, and present what you find. (aka: Google search)

vs.

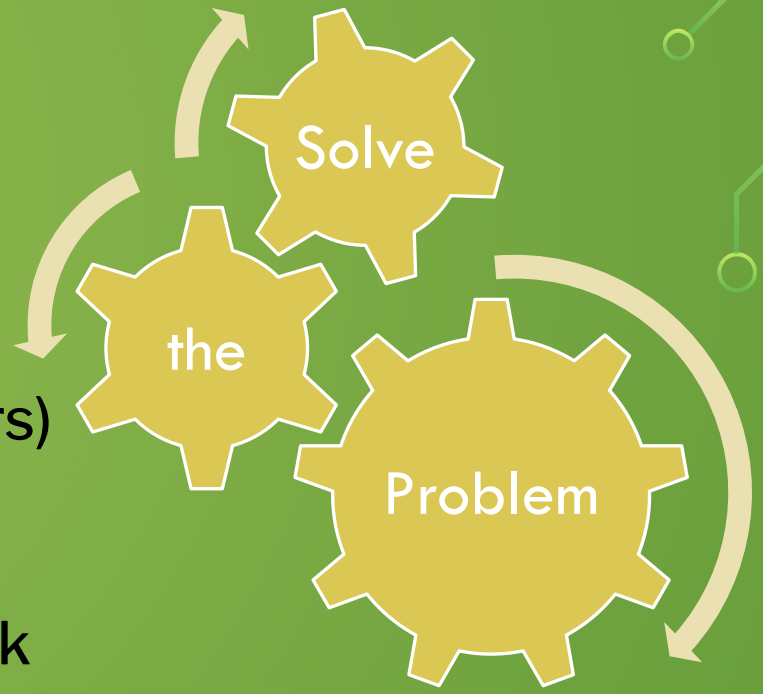
SCIENCE or ENGINEERING PROJECT:

Research, plan, hypothesize, create goals, apply, collect, test, solve problems, observe, build, analyze, make connections, conclude …

Research (sit) or Science/Engineering (stand)?

1. Designing a robot that can climb stairs.
2. Looking up how to prevent and treat brain injuries.
3. Collecting information on infectious diseases.
4. Writing complicated code for a video game you're creating.
5. Investigating the growth rate of bacterial cultures.
6. Creating a computer simulation of a project you would like to build, because it's way too big and expensive to build in your backyard.
7. Finding science articles online from various authors and telling the judges about the similarities and differences between them.
8. Building a small-scale prototype to display ways farmers could reduce soil erosion in rainy seasons.

The hardest part is finding a great idea!



Talk to people (friends, parents, teachers, mentors)

Use your hobbies

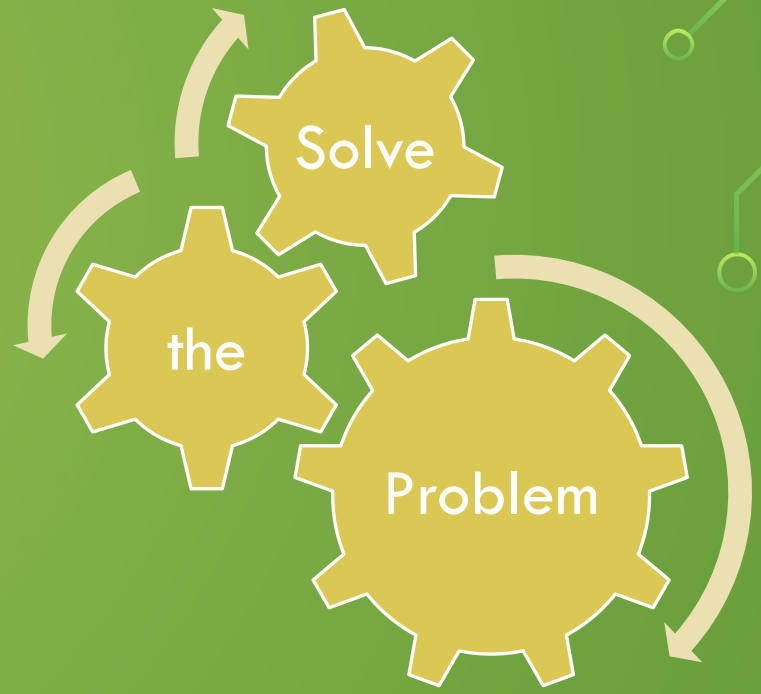
- Robotics - build a robot to complete a specific task
- Coding - make a helpful app
- Outdoors - design the perfect camping equipment
- Computer Science/Engineering - program a swarm of drones
- Welding/Automotive – design a better roll cage, improve engine performance, etc.

Solve a problem …

Be a Problem-Solver

Identify a problem in your home, community, or in the world. Work to find an innovative, faster, or more cost-effective way to solve that problem.

- Housing solutions for flood zones
- Save marine life from pollution
- Reduce soil erosion
- Improve accessibility for disabled people (or pets)
- Design a drone that safely removes wasp nests
- Make improvements to prosthetics
- Help those who suffer from memory loss
- Design a better student desk and chair for our tall athletes
- Assistive equipment or technology for our veterans



Relate your project to something that is meaningful to you!

What are YOU interested in?

Turn to your neighbor and tell them about TWO topics or ideas you might be interested in working on this year.

If you can't think of ideas yet, talk about your current hobbies and how you could incorporate them into a project.

Categories

Animal Sciences

Behavioral & Social Sciences

Biochemistry

Biomedical & Health Sciences

Biomedical Engineering

Cellular & Molecular Biology

Chemistry

Computational Biology & Bioinformatics

Earth & Environmental Sciences

Embedded Systems

Energy: Chemical

Energy: Physical

Engineering Mechanics

Environmental Engineering

Materials Science

Mathematics

Microbiology

Physics & Astronomy

Plant Sciences

Robotics & Intelligent Machines

Systems Software

Translational Medical Science

Scan for descriptions of all categories & subcategories

Science & Engineering Fair Reminders

MICROBIOLOGY Projects

- MUST be approved by the **Scienteer** SRC committee
- Talk to your science teacher!
- Mold may **not** be grown at home (this means NO moldy food projects)
- Bacteria studies must be completed in **closed** containers and properly disposed of in a BSL-1

Science & Engineering Fair Reminders

Projects involving VERTEBRATE ANIMALS

- Includes any species with a backbone or spinal column
- Must obtain written permission from a **veterinarian** or certified animal care specialist
- Must be approved by the **Scienteer** SRC committee

Science & Engineering Fair Reminders

Projects using HUMAN PARTICIPANTS

- This includes ANY project that involves observing reactions in people, or asking people to participate in the testing portion of your project
- If you plan to complete a Behavioral Study, you must note this on the 1st Checkpoint form by Oct.8th
- Should have minimum of 50 participants
- Surveys must be approved **BEFORE** they are sent out
- You must have a Jay or SEA counselor as your mentor if you plan to complete a MENTAL HEALTH project
- Human Participant Projects **without Scienteer IRB approval** will be disqualified

Science & Engineering Fair Reminders

SPONSORS

Please request **permission** from your teacher or coach before listing them as your mentor!

TAKE PRIDE IN YOUR WORK

ALL projects should reflect a significant amount of effort and should be **High School** level projects. If an elementary student could complete the same project, you shouldn't be doing it.

Science & Engineering Project Deadlines

Sept. 17th – Declarations Due (For ALL options!)
Sept. 17th – ACE applications due at 4pm
Sept. 24th – Applications Due (for upperclassmen options)
Oct. 8th – Checkpoint #1
Oct. 25th – Checkpoint #2
Nov. 5th – Project Registration Due
Nov. 29th – Research Papers Due
Dec. 1st – Display Boards Due
Dec. 4th – Science Fair Judging (9am-1pm)

Applications for ACE are due Sept.17 at 4:00
(Invitations for the Academic Research Team will be sent out before Christmas Break)

Upperclassmen Research Options

Science & Engineering Projects (9-12)

NASA VOLARE Program (10-12)

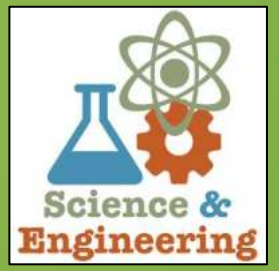
Art in STEM (10-12)

Destination Imagination (10-12)

Robotics Team (10-12)

ACE Mentorship Program (11-12)

Independent Study Mentorship (11-12)



Do you like collaborating with teammates?

Are you interested in solving real-world problems?

Do you have engineering, robotics, and/or computer science skills?

Then you may be interested in ...

The NASA VOLARE Program

Sponsor: Mr. Jordan (A218)

Teams of students will work with NASA mentors and UTSA peer mentors to create solutions to problems in the following areas:

- Acoustic damping
- Hydrology
- Power management & distribution
- Remote sensing
- Simulated lunar operations

Application is required

This option will be capped at 25 - 30 students.

Students meet Thursdays after school.

$10^{th} - 12^{th}$

Do you like working with your hands?

Are you creative and love a good engineering problem?

Do you wish there was a way to combine your love of art, science fiction, and mechanics?

Then you may be interested in ...

Art in STEM

Sponsors: Ms. Karina Garcia (L114) & Ms. Saenz (A205)

21-22 Theme: STEAMPUNK

- **Research** the history, culture, and innovations of the Steampunk movement
- Create a free-standing **sculpture** that reflects your research
- Include moving parts

Application & checkpoint meetings required.

Projects may be completed individually, or in teams of 2.

Showcase your sculpture and display board at the SEA Research Symposium, on December 4th.

10th – 12th

Do you prefer working in a team environment?

Do you love to challenge yourself?

Are you looking for an option that incorporates science, technology, engineering, visual art AND performance art?

Then you may be interested in ...

Destination Imagination

Sponsors: Mrs. Maretzki (A220), Shawn Lopez (A207) & Adriane Caga (B134)

Teams of 5-7 will solve one of five challenges:

- Fine Arts
- Scientific
- Engineering
- Technical
- Project Outreach

Students will write a script, build a set, make costumes & design every element of the solution without outside help, while staying on budget.

Attendance at the Regional Tournament is required.

1st Place teams will advance to the State Tournament in Arlington, TX on March 25-27.

$10^{th} - 12^{th}$

Application required

* Teams will meet weekly

Do you love taking things apart and redesigning them to make them better?

Are you interested working as a team and teaching new skills to others?

Do you have robotics, computer science, engineering and/or marketing skills?

Then you may be interested in ...

Robotics

10^{th} - 12^{th}

Application required

Sponsor: Mr. Szarka (E112/F118)

The goal of the Robotics Team is to apply engineering principles to solve complex problems in a collaborative manner. Students are assigned a role by team captains & teams are assigned by the Robotics sponsor.

Robotics Academic Research Team will be capped at 30 students

Anyone may join the Robotics CLUB, however, to use Robotics as your Research Credit, you must be

- a Sophomore, Junior, or
- a Senior who competed in Robotics in their Junior year

For Academic Research Credit:

- Regular attendance at after school meetings
  Poor participation will result in being reassigned to Science Fair for your research option

Do you wish you could work with a team and have regular input from a mentor?

Are you interested in solving community-based problems?

Do you have architecture, construction, and/or engineering skills?

Then you may be interested in ...

ACE Mentorship (Architecture, Construction, Engineering)

Sponsors: Mr. Rivera (A212) & Mr. Jordan (A218)

Team Project: Only accepts 30 students per year. Meet after school with a mentor every other Wednesday 4:30-6:30.

2-Step application process required
APPLICATIONS DUE Sept.17 by 4:00pm

In May, students will present their projects to a panel of architects and engineers.

In previous years, seniors received over $27,000 in scholarships.

11^{th} - 12^{th} only

ACE MENTOR PROGRAM

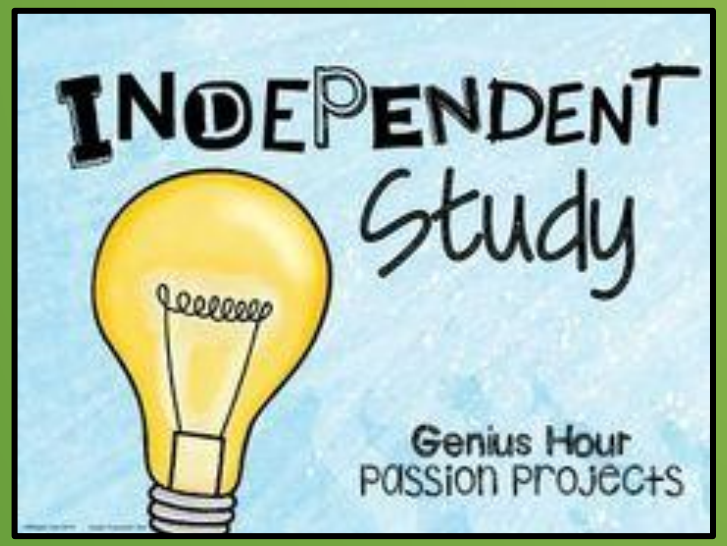
Do you prefer to work on projects independently?

Do you wish you could work with a mentor to learn more about a specific field?

Do you have talent or interest in a specific area and wish you had more time to spend exploring those skills?

Then you may be interested in ...

ISM
(Independent Study Mentorship)



11th & 12th only

Sponsor: Ms. Asbell (B102)

Students choose their own topic of study, network to obtain a mentor, and develop a research-based product which is presented during the last week of April.

Students must already be enrolled in ISM or the GT Leadership class.

Contact Ms. Asbell with any questions.

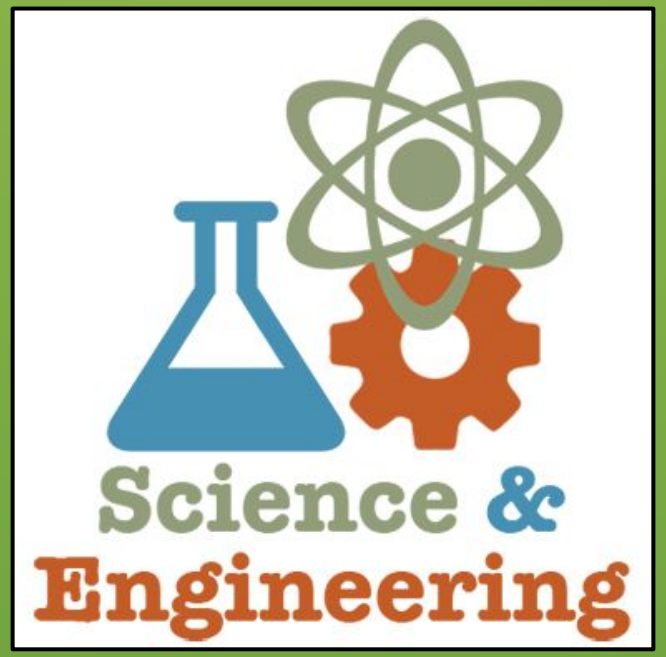
Are you like winning awards, prizes, and scholarships?

Would you like to improve your visual and oral presentation skills?

Are you interested in working independently on a project, while being supported by a team, and getting feedback from multiple professionals in your specific field of study?

Then you may be interested in ...

Competing in Science & Engineering Fairs!



Academic Research Declaration Form
Due Sept 17

THIS FORM ASKS FOR:

Your contact information & which research option you're choosing

IT DOES NOT ASK FOR:

Your topic, category, or project ideas

Finding Information About Academic Research on Schoology

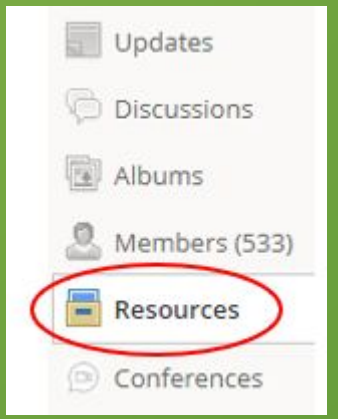
1.

Choose "GROUPS"

2.

Choose this one

3. Choose "Resources"



Finding Information About Academic Research on Schoology

4.

List of deadlines found here

Contact Info

5.

* Due Sept. 24th by 4:30pm

Free Shirt Pick Up Starting Monday, Sept 13