

Gray Matter Fall 2018 - Course Catalog

Electives

Creative Problem Solving

Teacher: Mary Arme

Grades: 9, 10, 11, 12

Class Schedule: Thursdays Only

Class Time: 1:00 – 2:30 pm

Duration: 1.5 hours per week, 32 wks

Fee(s):

Full Tuition

Supply Fee

\$603.00

\$30

Description:

Learn to redefine the problems and opportunities that you encounter, generate ideas using divergent thinking techniques, and build a portfolio of soft skills that are relevant to success in work, school, and life!

Loosely based on the concepts of the Odyssey of the Mind program, this class is designed to help give students the tools to transform their inner creativity into solutions for the types of problems and opportunities encountered in real life. Class members will work in groups in class to solve quick spontaneous problems as well as more detailed long-term problems. Through fun puzzles and challenges, we will explore creative problem solving and divergent thinking techniques, learn about convergent thinking processes and idea evaluation methods, and build important skills, such as teamwork, communication, problem solving, time management, and more.

We will work on developing/enhancing the following skills:

- Defining a problem/opportunity (e.g. determining objectives, framing criteria, etc.)
- Idea generation techniques (e.g. brainstorming, SCAMPER, reverse thinking, etc.)
- Idea analysis techniques (e.g. checklists, decision matrix, paired comparison, etc.)
- Creative methods (e.g. observation, making connections, thinking hats, etc.)
- Teamwork (e.g. collaboration, adaptation, “yes and...”, group communication, etc.)
- Project management and time management

Prerequisites: None

Homework: None

Class Materials: No textbook required
Supply fee of \$30 allows the instructor to provide resources.

Payment Options:

1. Full tuition of \$603.00 due at time of registration.
2. Semester tuition of \$302 due at time of registration and second semester payment of \$302 due by January 15th
3. Monthly payments of \$67. First month is due at time of registration. Subsequent monthly payments of \$67 on 9/1, 10/1, 11/1, 12/1, 1/1, 2/1, 3/1, 4/1. No tuition is due in May.

Critical Thinking

Teacher: Laura Woolley

Grades: 6, 7, 8

Class Schedule: Wednesday Only

Class Time: 1:00 – 2:15 pm

Duration: 1.25 hours per week, 32 wks

Fee(s):

Full Tuition

Supply Fee

\$720.00

\$0

Description:

This class teaches students how to critically examine ideas, philosophies, and current events. Students learn how to use and develop higher-order thinking skills in all areas of life. In addition, they learn about several different philosophers and their interesting perspectives on the world.

Students learn how to:

- Recognize simple forms of argument
- Identify logical fallacies in oral arguments and all forms of media presentation
- Determine common propaganda techniques used in advertising, politics and other media
- Critical thinking is a skill that must be practiced in order to develop effectively. Class discussion is essential in helping to develop this skill. Students learn to think critically by expressing their opinions and hearing rebuttals from their classmates, plus listening to the discussions among their classmates.

Prerequisites: None

Homework: Students can expect to spend 1-3 hours per week.

Class Materials: **NEW Textbook:** *The Art of Argument: An Introduction to the Informal Fallacies* by Aaron Larsen and Joelle Hodge, ISBN-10: 1-600-51018-3 ISBN-13: 978-1-60051-018-2
Publisher: Classical Academic Press; Student Edition edition (January 1, 2010), 247 pages.

1 1/2" binder
Lined paper
A set of 5 dividers
Index cards
2 pencils

NOTE: Each student needs to bring with them on the first day of class the class materials listed below and a NEW copy of the textbook. The textbook has consumable exercises.

Payment Options:

4. Full tuition of \$720.00 due at time of registration.
5. Semester tuition of \$360 due at time of registration and second semester payment of \$360 due by January 15th
6. Monthly payments of \$80. First month is due at time of registration. Subsequent monthly payments of \$80 on 9/1, 10/1, 11/1, 12/1, 1/1, 2/1, 3/1, 4/1. No tuition is due in May.

Computer Programming

Teacher: Collin Eye

Grades: 6, 7, 8, 9, 10, 11, 12

Class Schedule: Tuesdays Only

Class Time: 2:45 – 4:00 pm

Duration: 1.25 hours per week, 32 wks

Fee(s):

Full Tuition

Supply Fee

\$702.00

\$0

Description:

Have you ever wondered how a computer works? We use computers everyday, but for many they remain a black box, a magical device which can display images and video, play music and games, hold all our data and send it out over the Internet. If you learned how the magic behind this machine worked you could do anything imaginable! Fortunately, computers are not actually mysterious, in fact, they are quite simple; all they do is a bit of math and logic, which anyone can learn.

Our class focuses on learning how the parts of a computer work. Some of these parts you have heard about, Central Processing Unit (CPU), Random Access Memory (RAM), Storage (HardDrive); however others may be totally new: register, cache, arithmetical-logic-unit, memory-management-unit. You learn how to manipulate these parts to do what you want them to by programming: the art of transforming data. We cover everything from the lowest level of how electricity flows thru the computer, to the highest level where we can speak to the computer in human-designed programming languages.

The first semester is focused on becoming familiar with a computer, and how we interact with it to write and run programs. The second semester moves on to building more advanced programs by interfacing with the operating system and drawing 2D graphics to the screen.

You will learn about:

- The C programming language
- The logic implemented in circuits and how we use it to move and transform data.
- Data structures, how we organize and think about data in the computer's memory.
- How to think about problems mathematically, and represent processes in an algorithmic way.

Some example projects:

- Simple games such as tic-tac-toe, rock-paper-scissors, connect4
- Random number generators
- Text adventures
- Sentence, image, and music generators
- Conway's Game of Life
- 2D video games!

Students will have access to video lectures which cover the topics. Class time will be spent asking questions, experimenting with computers, discussing ideas with classmates, and showing off projects. There will be weekly assignments which students are expected to be to complete before class.

Prerequisites: None

Homework: Students can expect to spend 1-3 hours per week.

Class Materials: Every student is expected to have a dedicated computer on which they can program. I recommend the Raspberry Pi 3, as they're much cheaper than other computers, and are easy to experiment with. In addition to the computer they'll also need a monitor, keyboard, and mouse.

Payment Options:

1. Full tuition of \$702.00 due at time of registration.
2. Semester tuition of \$351 due at time of registration and second semester payment of \$351 due by January 15th
3. Monthly payments of \$78. First month is due at time of registration. Subsequent monthly payments of \$78 on 9/1, 10/1, 11/1, 12/1, 1/1, 2/1, 3/1, 4/1. No tuition is due in May.

Introduction to Formal Logic

Teacher: Laura Woolley

Grades: 6, 7, 8

Class Schedule: Monday/Wednesday

Class Time: 9:30 – 10:45 am

Duration: 2.5 hours per week, 32 wks

Fee(s):

Full Tuition

Supply Fee

\$720.00

\$0

Description: After providing an introductory overview of logic fundamentals, students will study propositions and their relationships. Students translate statements from ordinary language to categorical syllogism and test these arguments for validity. Concepts are cumulatively mastered, each new idea requiring the student to employ concepts from previous lessons. Students also learn about the importance of using clear, precise, and purposeful terms in their assertions and arguments. Understanding the role language plays in all arguments is essential. Defining terms is a must when practicing logic!

Some of the concepts covered include:

- Formal vs. informal logic
- Deductive vs. inductive reasoning
- Categorical vs. propositional logic
- The Three Acts of the Mind
- Relationships of Opposition
- Relationships of Equivalence
- Syllogisms
- Defining terms

The skills gained in this class help students to more fully evaluate information encountered in higher-level education. Additionally, they should be able to draw their own conclusions, rooted in the basic understanding of what constitutes a valid argument and what does not.

Prerequisites: None

Homework: Students can expect to spend 1-3 hours per week.

Class Materials: **NEW Textbook: ?????**

1 1/2" binder
Lined paper
A set of 5 dividers

Index cards
2 pencils

NOTE: Each student needs to bring with them on the first day of class the class materials listed below and a NEW copy of the textbook. The textbook has consumable exercises.

Payment Options:

1. Full tuition of \$720.00 due at time of registration.
2. Semester tuition of \$360 due at time of registration and second semester payment of \$360 due by January 15th
3. Monthly payments of \$80. First month is due at time of registration. Subsequent monthly payments of \$80 on 9/1, 10/1, 11/1, 12/1, 1/1, 2/1, 3/1, 4/1. No tuition is due in May.

LEGO Mechanisms

Teacher: Laura Woolley

Grades: 6, 7, 8

Class Schedule: Mondays Only

Class Time: 1:00 – 2:30 pm

Duration: 1.5 hours per week, 32 wks

Fee(s):

Full Tuition

Supply Fee

\$900.00

\$0 - supply fee is included in tuition

Description:

Students learn how to build machines and mechanisms using the LEGO® Technic system and the LEGO Power Functions motors and accessories. Learn the foundations of LEGO® Technic building, from simple machines to advanced mechanics. Gain unique insight into mechanical principles like torque, power translation and gear ratios. LEGO mechanisms can work as building blocks to create more complex creations.

Students learn how to:

- Create sturdy connections that can withstand serious stress.
- Re-create specialized LEGO® pieces like castings and u-joints
- build solutions like Schmidt and Oldham couplings, when no standard piece will do.
- Learn how to employ simple ideas such as cam mechanisms, ratchets, and basic four-wheel drive to make larger, more complex machines

With the knowledge gained in this class, students can apply these foundations to any number of simple machines, wheeled vehicles, and creative contraptions using LEGO® Technic and LEGO Power Functions!

Prerequisites: None

Homework: None

Class Materials: None. All supplies and materials are provided by the teacher.

Payment Options:

1. Full tuition of \$900.00 due at time of registration.
2. Semester tuition of \$450 due at time of registration and second semester payment of \$450 due by January 15th
3. Monthly payments of \$100. First month is due at time of registration. Subsequent monthly payments of \$100 on 9/1, 10/1, 11/1, 12/1, 1/1, 2/1, 3/1, 4/1. No tuition is due in May.

Ludology (Fall semester)

Teacher: Collin Eye

Grades: 7, 8, 9, 10, 11, 12

Class Schedule: Tuesday Only

Class Time: 4:00 – 5:00 pm

Duration: 1 hour per week, 16 weeks

Fee(s):

Full Tuition

Supply Fee

\$270.00

\$0

Description: This class will meet for the Fall semester and may continue in the Spring.

This class can serve as a high school elective, or a humanities credit.

Games such as Chess and Go have been with us for ages, but computers have given games a new expressive ability to explore ideas and tell stories only possible in an interactive medium. It's important to think critically about any media we consume, and while we have a rich history of doing this with literature, art, music, and film, far too little thought is put into how and what video games communicate.

We play and discuss several genres of games, each type offering unique perspectives:

Games that

- * improve problem solving and critical thinking,
- * present thought experiments about how time and space behave
- * foster a sense of empathy by taking on other roles in life,
- * allow experimenting with the consequences of one's actions
- * require planning and strategic thinking
- * explore themes of choice and fate

Students will do "close readings" of games and analyze how the game communicates ideas thru the mechanics of play. We will play and discuss games in class, and there will be weekly assignments of videos, lectures, or writings on games. Students will also write several analysis papers on these games.

Prerequisites: None

Homework: 1-3 hours since they'll have some writing/reading/watching assignments.

Class Materials: None

Payment Options:

1. Full tuition of \$270.00 due at time of Fall registration, since this is only a Fall semester class.
2. Monthly payments of \$68. First month is due at time of registration. Subsequent monthly payments of \$68 on 9/1, 10/1. 11/1. No tuition is due in December.

Middle School Public Speaking

Teacher: Julie Poe

Grades: 6, 7, 8

Class Schedule: Mondays Only

Class Time: 1:00 – 2:30 pm

Duration: 1.5 hours per week, 32 wks

Fee(s):

Full Tuition

Supply Fee

\$450.00

\$30

Description:

This class is designed to prepare students for those many situations in careers, community service, college courses, and even high school classes where they will be expected to speak in front of a few or perhaps many people. My goal is for students to emerge from this class full of self-confidence.

This class does not involve competition and is not focused on debate. We will learn some of the principles of effective public speaking, analyze some great speeches, gain some tools to deal with anxiety, and have frequent opportunities for impromptu speaking.

Prerequisites: None

Homework: Students can expect to spend 1-2 hours per week.

Class Materials: Internet access at home to use many resources, including online videos.

A three-ring binder devoted only to this class
Notebook paper
Pens or pencils
Colored pencils

No textbook required

Supply fee of \$30 allows the instructor to provide resources.

Payment Options:

1. Full tuition of \$450.00 due at time of registration.
 2. Semester tuition of \$225 due at time of registration and second semester payment of \$225 due by January 15th
 3. Monthly payments of \$50. First month is due at time of registration. Subsequent monthly payments of \$50 on 9/1, 10/1, 11/1, 12/1, 1/1, 2/1, 3/1, 4/1. No tuition is due in May.
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Online Computer Programming

Teacher: Collin Eye

Grades: 6, 7, 8, 9, 10, 11, 12

Class Schedule: self-paced

Class Time: self-paced

Duration: self-paced, 32 weeks

Fee(s):	Full Tuition	Supply Fee
	\$702.00	\$0

Description: This course is one-on-one, online instruction in computer programming, catered to the experience level of each student. Whether you're completely new to programming, have experience with programming in languages other than C, or want to continue your programming education, this is the class for you. Programming is an art form, and like any art form, mastery requires self-discipline, practice, and a bit of guidance.

You'll have access to videos on a variety of topics such as basic computer architecture, the C programming language, cryptography, systems programming in various operating systems, physics simulation, 2D game design, and many more. Each video is accompanied by exercises which will help you reinforce the topics with hands on experience. Students are able to explore the videos matching their skill-level and interests at their own pace.

New students will learn:

- The C programming language
- The logic implemented in circuits and how we use it to move and transform data.
- Data structures, how we organize and think about data in the computer's memory.
- How to think about problems mathematically, and represent processes in an algorithmic way.

New students will learn how to implement projects such as:

- Simple games such as tic-tac-toe, rock-paper-scissors, connect4
- Random number generators
- Text adventures
- Image and music generators
- RNA-DNA translation and transcription
- Conway's Game of Life

Advanced students will learn:

- Project architecture
- The math used to make graphics and simulate worlds
- Advanced data structures such as trees, graphs, and hash tables.
- How to develop cross-platform code-bases
- Computer networking
- Multithreading for faster computations
- A variety of topics from computer science like cryptography, language-theory, complexity theory, artificial intelligence

Advanced students will take these topics and develop their own projects which put them to use. They will also see how the following can be implemented:

- Ray tracing 3D-graphics
- Equation solvers and function plotters
- Cross-platform game engines
- Sentence parsers and generators

Students will be able to email me with questions anytime, schedule video-conferencing, or request videos on particular subjects they're interested in. I encourage everyone to develop their own projects, and seek advice on how to achieve their goals. This allows you to always reach a little beyond your current ability, and learn how an experienced programmer confronts new challenges.

Prerequisites: None

Homework: Students can expect to spend 1-3 hours per week.

Class Materials: Every student is expected to have a dedicated computer on which they can program. I recommend the Raspberry Pi 3, as they're much cheaper than other computers, and are easy to experiment with. In addition to the computer they'll also need a monitor, keyboard, and mouse.

Payment Options:

1. Full tuition of \$702.00 due at time of registration.
2. Semester tuition of \$351 due at time of registration and second semester payment of \$351 due by January 15th
3. Monthly payments of \$78. First month is due at time of registration. Subsequent monthly payments of \$78 on 9/1, 10/1, 11/1, 12/1, 1/1, 2/1, 3/1, 4/1. No tuition is due in May.

Robotics

Teacher: Laura Woolley

Grades: 9,10,11,12

Class Schedule: Thursdays Only

Class Time: 9:30 – 12:15 pm

Duration: 2.75 hours per week, 32 wks

Fee(s):

Full Tuition

Supply Fee

\$1152.00

\$0 – class supply fee is included in tuition

Description:

Robotics is a hands-on, lab-based course that introduces the basic concepts of robotics. Students focus on the construction and programming of robots. Course information is tied to lab experiments. Students work in groups to build and test increasingly more complex robots. At the end of each semester, students participate in a robot contest to see which design is the most robust and demonstrates good design. We are using a robotic design system as our platform; this eliminates the need to build parts from raw materials or the need to have access to a machine shop. Students are divided into groups to complete a variety of robot construction and programming activities.

In this course, students will:

- Explore different robotic applications
- Learn the basic components and building blocks of robots
- Develop robot design and fabrication skills
- Learn how to program robots

Prerequisites: None

Homework: None

Class Materials: None. All supplies and materials are provided by the teacher.

Payment Options:

1. Full tuition of \$1152.00 due at time of registration.
2. Semester tuition of \$576 due at time of registration and second semester payment of \$576 due by January 15th
3. Monthly payments of \$128. First month is due at time of registration. Subsequent monthly payments of \$128 on 9/1, 10/1, 11/1, 12/1, 1/1, 2/1, 3/1, 4/1. No tuition is due in May.

Speech and Debate

Teacher: Ian Seamans

Grades: 9,10,11,12

Class Schedule: Thursdays Only

Class Time: 1:00 - 2:30 pm

Duration: 1.5 hours per week, 32 wks

Fee(s):

Full Tuition

Supply Fee

\$450.00

\$30

Description: This class fulfills the speech credit required for high school. Equally important, it prepares students for those many situations in careers, community service, college courses, and even high school classes where they will be expected to speak in front of people.

This class will focus equally on debate and public speaking. In-class debates will be held, and we will learn both the informal and formal rules of debate. We will also learn some of the principles of effective public speaking, analyze some great speeches, gain some tools to deal with anxiety, and have frequent opportunities for impromptu speaking.

Prerequisites: None

Homework: Students can expect to spend 1 hour per week.

Class Materials: Internet access
A three-ring binder
Notebook paper
Writing utensils

No textbook required
The supply fee of \$30 allows the instructor to provide resources and materials.

Payment Options:

1. Full tuition of \$450.00 due at time of registration.
2. Semester tuition of \$225 due at time of registration and second semester payment of \$225 due by January 15th
3. Monthly payments of \$50. First month is due at time of registration. Subsequent monthly payments of \$50 on 9/1, 10/1, 11/1, 12/1, 1/1, 2/1, 3/1, 4/1. No tuition is due in May.