START
TEACHER'S GUIDE

A complete summary of the GAME:IT Junior curriculum.

Introduction

Welcome to STEM Fuse's GAME:IT Junior Course

Whether GAME:IT Junior is being taught as an introductory technology course, multimedia course, or a supplement to a computer science course, we at STEM Fuse are confident that you and your students will find GAME:IT Junior to be flexible, inventive, inspiring, and most importantly fun!

GAME:IT Junior was created due to popular demand for a middle school focused version of our popular GAME:IT course. Now, we are very excited to bring you the next edition of our GAME:IT Junior course, GAME:IT Junior 2.0! While we still worked closely with educators, we also have worked with leading technology companies and professionals. This reinvention of GAME:IT Junior brings the most up to date technologies directly into the hands of you and your students. You will find a theme throughout the course...we want your students to have fun, learn a lot, and get excited about technology!

GAME:IT Junior is a game design course...and much more. Your students will learn:

- Technical skills like programming, graphic design and animation, testing / debugging and other skills that are needed for game development, but are also transferable to all types of industries.
- How the same engineering cycle used to design bridges and buildings is used to design games and solve ALL types of problems.
- How physics plays such a large role in making games playable (those science and math courses DO HAVE meaning after all) and how to think like a programmer.

Most of all GAME:IT Junior hopes to create a love of computer science and game design in students. STEM Fuse has a mission to inspire students to want to learn more about the world of technology.

This is an introductory programming and design course:

You (the teacher) and your students DO NOT need to have experience in programming. We have written our game projects using Construct 2 - a free, HTML5 game creator. Construct 2 is a powerful game creator which uses "drag-n-drop" programming, so anybody familiar with Windows and using a mouse will be able to start creating games.

As the game projects get more complex, students will begin to be introduced to more advance features, these include (functions, arrays, loops). We purposely chose Construct 2 because it is a terrific tool for beginners, but with features rich enough to allow for advanced users to build out full featured games.

Learning Objectives

The main goal of GAME:IT Junior is to attract students into STEM related courses and eventually fields. Game design is used as a hook to attract students to those courses and fields. As STEM becomes a national educational focus, there have been several studies that show the true value of teaching with games and teaching students the skills needed to develop & design working digital games.

MIT & the U.S. Department of Education have encouraged high schools to unlock the teaching potential of games and game design. This course was created to align with national & state core technology standards as well as 21st Century Skills.

GAME:IT Junior exposes your students to a wide range of concepts and technical skills in six separate areas that will greatly help them succeed in the future.

1. Technical skills related to software development, computer programming & graphic design
2. Creative, innovative & critical thinking
3. Communication and collaboration as an individual and part of a team
4. Using appropriate and accessible digital tools for research and learning
5. Using engineering, physics & mathematical concepts critical to game development
6. Post-secondary and career options & resources related to STEM
1. Technical Skills
   a. Programming through a drag-n-drop method
   b. Programming by using advance coding methodologies (functions, arrays, loops)

c. Follow technical and increasingly complex programming instructions in order and detail

d. Become familiar and competent in using game engines (Construct 2); open files, save files, create and program original games, integrate separate files into a final game project, create and edit audio sound effects & music.

2. Creative, Innovative & Critical Thinking

a. Learn steps of the engineering design cycle (discover- evaluate, design-evaluate, develop- evaluate, deliver- evaluate) and how it works as a practical problem solving method

b. Troubleshoot existing game programs to fix bugs and ensure performance

3. Communication & Collaboration

a. Work as an individual or form game development groups to achieve directive of designing an original game

b. Use the engineering design cycle within the development team to design a game

c. Conduct an in-class presentation to show off their game design

4. Using Digital Research Tools

a. Use appropriate internet websites to gather and analyze research on post-secondary education options and careers in game development & technology

5. Engineering, Physics, & Math

a. Learn how the process used in designing and developing software can be applied to other design and development projects like bridges, buildings and machines

b. Learn how basic physics concepts like gravity, acceleration, velocity, speed, Newton's Laws of Motion, and force are used in game development

c. Use required mathematical techniques to perform physics calculations in determining how physics is used in gaming compared to the real world

d. Use knowledge of math & physics to evaluate behavior in games in the "virtual world" as compared to the "real world"

6. Further Career, STEM, & Post-secondary Education Options

a. Research how technical & communication skills used in game design translate to other technology industries and businesses

b. Learn about the personality traits and behaviors that are most prevalent in STEM careers.

Technology Requirements

Computer Lab & Internet Access

When using Construct internet access is NOT required, but it's important to note that having internet access available is highly recommended. Throughout the course students are frequently asked to visit various sites to find out more information or to find an answer. In addition, internet access is required to download Construct 2 onto the computer.

Installing Construct 2

Construct 2 is very flexible in regards to downloading the program. Scirra, the company behind Construct 2, has provided full documentation on the variety of ways Construct 2 can be installed. For more information on this, visit https://www.scirra.com/manual/4/installing-construct-2 (https://www.scirra.com/manual/4/installing-construct-2). Below is a summary of the download methods.

Since Construct 2 is portable, it DOESN'T have to be installed directly on each individual computer. Instead Construct 2 can be installed over the network (exactly how other software is installed and distributed to each individual computer) or via an external memory stick (USB).

Depending on the your district administrative level, Construct 2 can also be installed by users with limited administrative rights. For more information, see the Limited User Accounts section.

If you need to install Construct 2 to multiple machines remember that the program is portable and carries no dependencies. Installing this way can be done either via a the GUI interface or via the command line. Both methods are explained in more detail under the Site-wide Installations section.

STEM Fuse has also provided a presentation walking you step by step through the installation process visit the Getting Started Guide under the Start folder of your curriculum.

System Requirements for Construct 2

Below is a list of the minimum to optimal system requirements to run Construct 2 on your system. It's important to note that as long as the minimum requirements are meant Construct 2 will be able to run on your machine. The advance requirements are just recommendations.

Minimum System Requirements

- Windows XP Service Pack 3 or newer
- 512 MB RAM
- 1 GHz Processor
- A HTML5 compatible browser (see below) (#browsers)
- Updated graphics card (Graphic Card Version) (https://www.scirra.com/tutorials/38/update-your-graphics-card-driver)

Recommended System Requirements

- Windows 7 or newer
- 2 GB RAM
- 2 GHz dual-core processor
- A HTML5 compatible browser (see below) (#browsers)
- Updated graphics card (Graphic Card Version) (https://www.scirra.com/tutorials/38/update-your-graphics-card-driver)

Optimal System Requirements

- Solid state drive (SSD) for OS and software
- 64-bit edition of Windows 7 or newer
- 4 GB of RAM or more
- A large display or dual monitor setup
- A nVidia or AMD graphics card with latest drivers, at least 512 MB of dedicated video memory and support for OpenGL 2.0+
- A hi-speed broadband internet connection

HTML5 Compatible Browsers

Since Construct 2 games are able to be previewed in HTML5 it is recommended to have a browser that supports HTML5. It's most likely you currently have a browser that does, you might just need to check the version and see if an update is needed. The HTML5 compatible browsers include:

- Internet Explorer 9+
- Mozilla Firefox (latest version)
- Google Chrome (latest version)
- Opera (latest version)

For "best" results use Google Chrome or Mozilla Firefox.

Additional Download and Setup Instructions

Construct uses an agile release schedule and frequently will update their software with bug fixes and additional features. Frequency of release will vary, but on average there will be a release about once a week. If you choose to update Construct 2, the setup process will automatically ask you to delete the older version of Construct. This is recommended as there is no need for the older version.

NOTE: The software DOESN'T have to be updated during the course of the class. The version of Construct 2 that you originally download will work throughout. STEM Fuse will alert you of any updates that are required.

The Curriculum Materials

All course material is available digitally on STEM Fuse Educate. Educate is an online curriculum delivery platform that allows both teachers and students to access curriculum via any device or operating system. With purchase of GAME:IT Junior the teachers within the school will instantly be granted access to the materials. STEM Fuse will work with the school in setting up the student accounts, which will also be accessible via the STEM Fuse Educate platform.

If educators prefer to have materials in PDF form, they can easily use the Educate platform and download the full course in PDF. For more information on the Educate system see the Getting Started presentation.

If your school provides devices to your students, it is recommended to download the STEM Fuse Educate app. This app can be used to navigate and consume all the curriculum in the GAME:IT Junior course. Currently, STEM Fuse educate is available for download on Android, Google Chrome Web Store and Windows Market Place. For more information on the app and best practices contact customerservice@stemfuse.com (mailto:customerservice@stemfuse.com).

The Curriculum Layout

GAME:IT Junior is broken out over the course of 18 weeks, but can easily be split apart to accommodate other timelines. The course is composed of 3 units (with instructions and assignments further broken down day-by-day when needed). Each unit comes with a teaching guide that will walk you through the progression of that unit's activities and ALL needed materials - presentations, handouts, game code (solutions) & resources, and quizzes/assessments.

All teaching resources & materials are organized, by order in which to teach, within their respective "Unit Folders" on the website. You can simply follow along with the curriculum digitally or you print the PDF versions out and share them with your students.

Timelines:

- Unit 1 = 3 weeks (approx. 15 hours)
- Unit 2 = 3 weeks (approx. 15 hours)
- *Unit 3 = 12 weeks (approx. 60 hours)

* Unit 3 is broken out into an Intro and 5 games. We anticipate each game taking approximately 2 weeks (10 hours) to complete. Each game is independent of each other, but conceptually do build upon each other. If you find that you're running short of time, cutting out a game will NOT affect the course in any way. However, we provided you with enough projects with increasing complexity to teach this as an 18 week course. Obviously, the longer you spend in Unit 3, the more students will be involved in actual programming and the better their games will be.

Some students will pick up Construct 2 faster than others. You have a few options in this case; some teachers will have the students who are ahead give help to others to catch up, or allow the student to add additional features to the game. The possibilities to all these games are only limited to the imagination. Let them explore.

Organizational Teaching Tips

We have designed GAME:IT Junior to give you terrific flexibility in how you teach the course. We have provided you with guidelines for time-frames, grading and progression of activities within each unit. However no class is the same and it seems no school operates exactly the same either, so we have given our teachers the ability to adapt the course to fit your specific needs.

Here are some tips for making GAME:IT Junior a successful experience for you & your students:

- Get familiar with Unit 3 ASAP! You will find Units 1 & 2 are pretty straight forward. Unit 3 is where the action is, where we start actual programming. Read our Unit 3 teachers guide and then download Construct 2 and start to play around with it - go through our game projects. If you are familiar with Construct 2 or programming you will pick things up quickly. If you aren't - no problem - just follow our step-by-step project guides along with the Construct 2 tutorials and it will start to make sense.

- We have several worksheets, handout assignments and quizzes that are straightforward to grade. It can get tricky when dealing with the game design projects in Unit 3 - while we have assessments for each game project, to some degree there is a certain amount of subjectivity required. For example: Certain students will pick things up faster than others, some will spend more time on designing an ultra-high quality game rather than just hit the standards and some students will work very hard, but not quite produce the same quality. To some extent game design and programming is like an art project. We have supplied some ideas for you within those units, but only you know your class and students.
- Manage the course to best fit your calendar (up to 18 weeks). You will need about 3 weeks for Units 1 & 2 and about 12 weeks for unit 3, but Unit 3 can be adapted to take up the rest of the time you have for course. Unit 3 is a series of game programming projects that start out pretty simple and build on each other to get fairly complicated. While each game will take about 2 weeks to complete the concepts within will challenge the student more and more. We have provided 5 game projects along with an intro to Construct 2 - potentially 12 weeks of material.
- This is an intro level course with many of your students having no programming background. Guard against student frustration with mistakes or with games that "don't run'. It is 100% normal (and expected) for students to have a few bugs in their games as they program them. We have gone through great lengths and years of trials to make sure our instructions are easy to follow and accurate, however there are thousands of possibilities and programming options in designing these games. When there is a problem, go back and meticulously review the code - the bug is in there somewhere. Troubleshooting and testing is a huge part of game development and is a GREAT opportunity to learn and find a creative alternative. Also, don't forget if you cannot figure out the issue you have all the completed games provided for you. Like real life though, we recommend letting the student attempt to figure out the answers on their own first.

Tips for Student Success

If possible, have your students:

- Bring headphones or earbuds if possible - it can get a little loud when we start adding music & sound effects to the games
- Bring a notebook with pen or pencil. It is always helpful to sketch out ideas.
- Bring their ideas and opinions
- Bring a fun, curious and creative attitude!

Support

We have designed GAME:IT Junior as an intro level course. We have taken extreme care to make our instructions, materials and game projects easy to follow. But have no fear, if you run into obstacles along the way we have several excellent resources to provide help.

- See the interactive help section within STEM Fuse educate.
- Check out Construct 2 FAQ's & tutorials here: https://www.scirra.com/forum/ (https://www.scirra.com/forum/)
- Email us and let us know how we can help: customerservice@stemfuse.com (mailto:customerservice@stemfuse.com)

We are here to ensure GAME:IT Junior provides an outstanding educational experience for our teachers and students.

GOT GAME? Competition

Twice a year, STEM Fuse runs a national GOT GAME? Competition to allow students to showcase their original games. Watch for information on this contest in early November and again in April. We offer great prizes to the students as well as their schools. To see the winning games from our latest competition, go to: http://arcade.stemfuse.com/got-game (http://arcade.stemfuse.com/got-game)

STEM Fuse Is A Resource For You...So Stay in Touch

We are here to promote STEM education, period! We have high school teachers on our board and we have high school teachers that serve as curriculum developers. We were created by teachers for teachers! That is the main reason we have kept the cost of GAME:IT Junior so affordable - it's our mission!

We have additional courses: GAME:IT (9th and 10th Grade), GAME:IT intermediate (11th and 12th Grade), GAME:IT Advanced, Mobile App:IT, Health:IT, Biomedicine with Lab for the high school level, and GAME:IT Elementary (2nd - 4th grades) completed and available for purchase. It is our very mission to bring our high schools the latest in STEM trends, information and resources.

Visit our website often and see what's new. Send us an email or give us a call if you have questions or ideas. WE want to hear from YOU!

Visit us at www.stemfuse.com (www.stemfuse.com) **- send your students too!**