SCRATCH Lesson Plan

What is SCRATCH? SCRATCH is a programming language that makes it easy to create interactive stories, animations, games, music, and art that can then easily be shared on the web. Scratch is designed specifically for young people (ages 8 and up) to help them develop 21st century learning skills: thinking creatively, communicating clearly, analyzing systematically, using technologies fluently, collaborating effectively, designing iteratively, and learning continuously. As students create Scratch projects, they learn important mathematical and computational ideas, while also gaining a deeper understanding of the process of design.

Why SCRATCH? SCRATCH turns kids from media consumers into media producers, enabling them to create their own interactive stories, games, music, and animation for the Web.

With this new software kids can program interactive creations by simply snapping together graphical blocks, much like LEGO® bricks, without any of the obscure punctuation and syntax of traditional programming languages. Children can then share their interactive stories and games on the Web, the same way they share videos on YouTube, engaging with other kids in an online community that provides inspiration and feedback.

"Until now, only expert programmers could make interactive creations for the Web. Scratch opens the gates for everyone," said Mitchel Resnick, Professor of Learning Research at the MIT Media Lab and head of the Scratch development team.

Resnick's Lifelong Kindergarten research group previously developed the "programmable bricks" that inspired the award-winning LEGO® MINDSTORMS® robotics kits. Just as MINDSTORMS allows kids to control LEGO creations in the physical world, Scratch allows them to control media-rich creations on the Web.

"As kids work on Scratch projects, they learn to think creatively and solve problems systematically -- skills that are critical to success in the 21st century," said Resnick.

NETS
Creativity and Innovation
Students…
- ☐ create original works as a means of personal or group expression.

Communication and Collaboration
Students…
- ☐ interact, collaborate, and publish with peers, experts or others employing a variety of digital environments and media.
- ☐ develop cultural understanding and global awareness by engaging with learners of other cultures.

Critical Thinking, Problem-Solving & Decision-Making
Students…
- ☐ use multiple processes and diverse perspectives to explore alternative solutions.

Digital Citizenship
Students…
- ☐ exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity.

INTEGRATED MATHEMATICS TOPICS
- ☐ x-y coordinates
- ☐ Negative numbers
- ☐ Estimation
- ☐ Direction and distance
- ☐ Angles
- ☐ Percentages
- ☐ Comparison (Greater than/smaller than, equal)
- ☐ Integers
- ☐ Rounding
- ☐ Division with remainders
- ☐ Random numbers
- ☐ Probability
- ☐ Geometry concepts with pen drawing
- ☐ Properties of 2d shapes
- ☐ Congruence
- ☐ Similarity variables
- ☐ Equations
- ☐ Absolute value
- ☐ Visualization and reasoning

Goal/Objective: The goal of the project is to engage students in high- level critical and creative thinking skills with an emphasis on math concepts.

Procedures:
Download SCRATCH

Access www.scratch.mit.edu and secure an account – do not put any personal info on the account and do not use important information as your username or password

Using the project evaluation chart, choose 4 – 5 projects located on the SCRATCH website and evaluate them using the project rubric.

Choose the one you think is the best as defined by the rubric and be prepared to show it to your group.

In small groups, share your opinions of the projects and as a small group choose one to show to the whole class.

Whole class, review the group chosen projects.

Complete the "Challenge Cards" to learn the basic programming codes in SCRATCH

Now you are ready to really get into your project…
SCRATCH Project Directions: You are going to create a video game or animation using SCRATCH. Now that you have had a chance to work through the Challenge cards and are more knowledgeable about SCRATCH programming language, you are going to create either a video game or a complex animation.

1a) If you choose to complete a video game… think about the following… (If you are, instead, creating an animation…. Go to Number #2…. See, that was an "If…Then" statement… not bad, huh?)
How many sprites will you need?
How many backgrounds will you need? If you want various levels to your game, you need to think about backgrounds…
How will the audience play the game? How do they win? You will most likely need to include language from the Motion blocks, Looks blocks, Control blocks, and maybe Sensing blocks... You can certainly use other language, but most of the games we evaluated, remember, included language from those blocks…
Will the game keep score? How?

1b) Now that you have had a chance to think about the questions, you are ready to write a description of what you want your game to be like…

Name of Your Game:

Purpose of the Game:

How you play the Game:

How you win the Game:

Scoring:
1c) Once you have made these decisions, you are ready to get to work programming your game… Good Luck! Remember, the goal is to work on problem solving skills… you won't get it right the first time, so don't worry… keep trying. You can get your game to do anything you want it do … you have the power!

2a) Now… if you want to instead create an animation… think about the following…

What is the purpose of the animation? Is it just for fun or is there a message?

What characters will you use? Will you need costumes?

What do you want the characters to do? How will they move on the stage?

What backgrounds will you need to stage the animation?

How will you use sound or words to enhance your animation?

2b) Now that you have had a chance to think about the questions, you are ready to write a description of what you want your game to be like…
Name of Your Animation:

Purpose of the Animation:

How you play the Animation:

2c) Now that you have had a chance to make some decisions, you are ready to get to work programming your animation… Good Luck! Remember, the goal is to work on problem solving skills… you won't get it right the first time, so don't

worry… keep trying. You can get your game to do anything you want it do … you have the power!

Project Checklist
Originality
Is your project original or a remake of another project?

Creativity
Is your project creative and is it different and unique?

Backgrounds
Do the backgrounds/stage add to and enhance the product?

Sprites
Do the sprites/costumes you chose add to and enhance the product?

Scripts
Do the Scripts make the sprites effectively do what you want them to do? Do you have correct x y coordinates? Do you include "forevers" where needed, etc.

Purpose
Is the purpose of the product evident to the audience?

User-Friendly
Is the product user friendly? Did you include notes to help the user know how to manipulate the product?

Other….

RUBRIC
Originality
4 = Completely original idea
3 = Some ideas/scripts taken from other projects
2 = many ideas/scripts taken from other projects
1 = most ideas/scripts taken from other projects
0 =Did not complete project

Creativity
4 = Very creative and unique idea
3 = creative and unique idea
2 = somewhat creative and unique idea
1 = not creative and unique idea
0 =Did not complete project

Backgrounds
4 = Backgrounds are extremely well done and enhance the product
3 = Backgrounds are well done and enhance the product
2 = Backgrounds are OK and add to the product
1 = Backgrounds are weak and may distract from the product
0 =Did not complete project

Sprites
4 = Sprites are extremely well done and enhance the product
3 = Sprites are well done and enhance the product
2 = Sprites are OK and add to the product
1 = Sprites are weak and may distract from the product
0 =Did not complete project

Scripts
4 = Scripts are extremely well done and complex
3 = Scripts are well done
2 = Scripts may have errors and may not work
1 = Scripts do not work
0 =Did not complete project

Purpose
4 = Purpose is clearly evident to the audience
3 = Purpose is clear to the audience
2 = Purpose is somewhat clear to the audience
1 = Purpose is not evident
0 =Did not complete project

User-Friendly
4 = Product is extremely user friendly and appropriate for all levels of learners
3 = Product is user friendly and appropriate for all levels of learners
2 = Product is not so user friendly and appropriate for all levels of learners
0 =Did not complete project