APCS Principles Overview

Content Area: **Math**
Course(s): **Math**
Time Period:
Length: **4 weeks**
Status: **Published**

Cover

EAST BRUNSWICK PUBLIC SCHOOLS

East Brunswick New Jersey

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Course Adoption: 10/24/2013

Curriculum Adoption: 10/24/2013

Date of Last Revision Adoption: 9/1/2017

Course Overview

COURSE DESCRIPTION

Advanced Computer Science Honors is an honors course that will introduce students to the big ideas of computer science, and how computers will change our lives. Instead of teaching specific applications, students will have to use all aspects of computer science to solve large-scale problems affecting society. The course focuses on three important ideas: 1) Creativity in solving problems, 2) A means to solve technological problems using large amounts of data, and 3) Internet and societal citizenry. While programming skills is expected, knowledge of programming is only required for solving the task at hand. Grading will be based on collaborative as well as individual portfolio assessments.

SCED

10152 Computer Programming

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CONTENT FOCUS AREA AND COURSE NAME

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Course Name: Advanced Computer Science Honors

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Course Number	School Numbers	Course Level	Grads(s)	Credits	Min. Per Week	Elective/Required	Initial Course Adopted
1457	050	H	10-12	2.50	210	E	9/1/2014

PRIMARY CONTENT AREA AND SECONDARY AREAS OF FOCUS

NJCCC Standard		NJCCC Standard		NJCCCS Standard	
1. Visual and Performing		5. Science	S	9. 21st Century Life and	P

Arts				Careers	
2. Health and Physical Education		6. Social Studies			
3. Language Arts Literacy	S	7. World Languages			
4. Mathematics	S	8. Technology	P		

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COURSE SCOPE AND SEQUENCE

Sequential Unit Description	Associated CPI's to be Achieved		Marking Period Guide	Other Pacing Guide References	Proficiency (Summative) Assessments
Big Idea 1: Creativity • How can a creative development affect the creation of computational artifacts • How can computing and the use of computational tools foster creative expression? • How can computing extend traditional forms of human expression and experiences?	8.1.8.A.3 9.4.12.K.(3).6 9.4.12.K.5 9.4.12.K.9 9.4.12.K.28	RST.8.3 WHST.8.1.C WHST.8.1.D WHST.8.2.A WHST.8.5	1/2	Ongoing 3 weeks	**Formative:** Teacher observation, answers/comments during discussions, surveys, do-now, closure activities **Summative:** - Completed projects, Completed class activities, Homework
Big Idea 2: Abstraction	9.4.12.K.(3).10		1	2 weeks	**Formative:**

• How are vastly different kinds of data, physical phenomena, and mathematical concepts represented on a computer? • How does abstraction help us in writing programs, creating computational artifacts, and solving problems? • How can computational models and simulations help generate new understanding and knowledge?	9.4.12.K.(4).4 9.4.12.K.70 9.4.12.K.72				Teacher observation, answers/comments during discussions, surveys, do-now, closure activities **Summative:** Completed projects, Completed class activities, Homework
Big Idea 3: Data and Information • How can computation be employed to help people process data and information to gain insight and knowledge? • How can computation be employed to facilitate exploration and discovery when working with data? • What consideration and trade-offs arise in the computational manipulation of data? • What opportunities do large data sets provide for solving problems and creating knowledge?	8.1.12.D.1 9.4.12.K.5 9.4.12.K.(3).10 9.4.12.K.9 9.4.12.K.70 9.4.12.K.28	RST.8.2 WHST.8.1.C WHST.8.2 5.1.4.B.4	1	4 weeks	Formative: - Class Discussion -Hands on Activities Summative: -Projects -Presentations
Big Idea 4: Algorithms • How are algorithms implemented and executed on computers and computational devices? • Why are some languages better than others when used to implement algorithms? • What kinds of problems are easy, what kinds are difficult, and what kinds are impossible	9.4.12.K.(3).10 9.4.12.K.(4).2 9.4.12.K.17	RST.8.3 RST.8.4	1	4 weeks	**Formative:** Teacher observation, answers/comments during discussions, surveys, do-now, closure activities **Summative:** Completed projects,

to solve algorithmically? • How are algorithms evaluated?					Completed class activities, Homework
Big Idea 5: Programming • How are programs developed to help people, organizations, or society solve problems? • How are programs used for creative expression, to satisfy personal curiosity, or to create new knowledge? • How do computer programs implement algorithms? • How does abstraction make the development of computer programs possible? • How do people develop and test computer programs? • Which mathematical and logical concepts are fundamental to computer programming?	9.4.12.K.(3).10 9.4.12.K.(4).2 9.4.12.K.(4).4 9.4.12.K.(4).5 9.4.12.K.(4).6 9.4.12.K.(4).7 9.4.12.K.17	RST.8.3 RST.8.4	1/2	4 weeks	**Formative:** Teacher observation, answers/comments during discussions, surveys, do-now, closure activities **Summative:** Completed projects, Completed class activities, Homework
Big Idea 6: The Internet • What is the Internet? How is it built? How does it function? • What aspects of the internet's design and development have helped it scale and flourish? • How is cybersecurity impacting the ever-increasing number of internet users?	8.1.12.D.1 8.1.12.D.3 8.1.12.D.4 8.1.8.D.1 9.4.12.K.26 9.4.12.K.51 9.4.12.K.53 8.4.12.K.70	9.4.12.K.72 9.4.12.K.73 RST.8.4 WHST.8.1.C	2	4 weeks	**Formative:** answers/comments during discussions, surveys, do-now, closure activities **Summative:** Completed projects, Completed class activities, Homework
Big Idea 7: Global Impact • How does computing enhance human communications,	8.1.12.D.1 8.1.12.D.3 8.1.12.D.4	9.4.12.K.72 9.4.12.K.73	2	4 weeks	**Formative:** Teacher observation, answers/comments during

interaction, and cognition? • How does computing enable innovation? • What are some potential, beneficial, and harmful effects of computing? • How do economic, social, and cultural contexts influence innovation, and the use of computing?	8.1.8.D.1 9.4.12.K.26 9.4.12.K.51 9.4.12.K.53 8.4.12.K.70	RST.8.4 WHST.8.1.C			discussions, surveys, do-now, closure activities **Summative:** Completed projects, Completed class activities, Homework

Textbooks and Other Resources

Standards

CRP.K-12.CRP1.1	Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.

Grading and Evaluation Guidelines

COURSE RESOURCES

Blown to Bits (Hal Ableson) Pearson

Little Brother (Cory Doctorow) Tor Teen

Android App Inventor (appinventor.mit.edu)

Scratch programming environment (http://scratch.mit.edu) and associated materials

Teacher prepared samples and exercises

GRADING PROCEDURES

In terms of proficiency level the East Brunswick grades equate to:

A Excellent Advanced Proficient

B Good Above Average Proficient

C Fair Proficient

D Poor Minimally proficient

F Failing Partially Proficient

COURSE EVALUATION

Each quarter students will be evaluated with various assessments using a total point basis to determine the quarter average. The semester/course average will be a weighted average of the 2 quarter averages (40% each) and a final exam (20%)

Course achievement will be evaluated based on the percent of all pupils who achieve the minimum level of proficiency (final average grade) in the course. Student achievement levels above minimum proficiency will also be reported. Final grades, and where relevant mid-term and final exams, will be analyzed by staff for the total cohort and for sub-groups of students to determine course areas requiring greater support or modification.)

The goal of this course is for a minimum of 95% of the total number of enrolled students to attain at least the minimum proficiency level.

Other Details

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problems using large amounts of data, and 3) Internet and societal citizenry. While programming skills is expected, knowledge of programming is only required for solving the task at hand. Grading will be based on collaborative as well as individual portfolio assessments.

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