

**The Ridgewood Public Schools  
Curriculum and Program Review  
For Computer Science Grades K-12  
*Five-Year Cycle 2016-2021***

**Department Study Findings &  
Recommendations June 5, 2017**

# Curriculum Study Timeline

- **Year One: 2016-2017: Program Review, Research, and Recommendation.**
  - *A committee of teachers and administrators research best practices in the content area, and review current program, students achievement, and perceptions of staff, parents, and students. A recommendation is made to reaffirm or revise curricula and/or program.*
- **Summer of Year One: 2017: Curriculum Writing, Revising, and/or Reaffirmation.**
  - *A committee of teachers and administrators develop new or revised curricula, research and recommend professional development and instructional materials to support implementation.*
- **Year Two: 2017-2018: Implementation of New or Revised Curriculum and Materials, with consistent professional development as needed.**
- **Year Three and Four 2018-2020: Monitoring and Revising as needed**
  - *Implementation continues. Achievement and feedback are monitored. Modifications are made if needed.*
- **Year Five 2020-2021: Begin to prepare for next study of department**

# Year-One Research Study Process

- Survey sent to Teachers
- Survey sent to HS Computer Science students
- Survey sent to community on all three educational levels
- Set of standards sent to Elementary Principals for evaluation
- Visited schools to see different programs in action
- Researched comparable districts Computer Science programs
- Video on Computational Thinking

<https://www.youtube.com/watch?v=VFcUgSYyRPg>

# Standards Guiding Study

## **K-12 Computer Science Framework**

<https://k12cs.org/wp-content/uploads/2016/09/K%E2%80%9312-Computer-Science-Framework.pdf>

## **Kodable Computer Science Standards Grades K-5**

[http://resources.kodable.com/public/cs\\_standards\\_2017.pdf](http://resources.kodable.com/public/cs_standards_2017.pdf)

## **International Society for Technology in Education Standards for Computer Science Educators**

<https://www.iste.org/standards/standards/standards-for-computer-science-educators>

## **Computer Science Teachers Association (Interim Draft)**

[https://c.ymcdn.com/sites/www.csteachers.org/resource/resmgr/Docs/Standards/2016StandardsRevision/INTERIM\\_StandardsFINAL\\_07222.pdf](https://c.ymcdn.com/sites/www.csteachers.org/resource/resmgr/Docs/Standards/2016StandardsRevision/INTERIM_StandardsFINAL_07222.pdf)

# Best Practices

## As Defined by National Groups and Research Institutes

- **International Society for Technology in Education Standards for Computer Science Educators**

<https://www.iste.org/standards/standards/standards-for-computer-science-educators>

- **Code Studio**

<https://studio.code.org/s/K5-OnlinePD/stage/9/puzzle/2>

# Benchmark Districts and Their Practices

With this being a relatively new area of interest and focus, there are very few lighthouse public school districts whose programs we could emulate.

Each district is in the process of finding and evaluating curricula and programs that are available to meet the standards that are in the process of being finalized.

# Our Current Program

## Grades K-5

Media Literacy K

Media Literacy 1

Media Literacy 2

Media Literacy 3

Media Literacy 4

## Grades 6-8

BF TV

GW TV

Technology Literacy 7

Technology Multimedia 8

## Grades 9-12

Web Design

Mobile App Development

Programming in Python

Programming in Java

Computer Science A AP

Advanced Topics in Computer Science

Principles of Computer Science AP\*

\* new course for 2017-2018

# How are we doing? - Student Data

## AP Test Results for Computer Science A

Year	Total	% 3 or higher	Average
2012	15	80	3.47
2013	17	88	4.19
2014	22	95	4.27
2015	16	100	4.56
2016	25	84	4.0

## Enrollment Numbers

	2014	2015	2016	2017
Web Design	19	45	29	39
Flash Animation/Mobile App	10	12	20	22
Visual Basic/Python	20	37	22	22
Java	18	30	15	20
AP Computer Science	27	15	23	11
Advanced Topics	0	0	15	8

# Program Perceptions

## K-5 Parental Survey (414 responses)

My child has an interest in computer science

67.1% of responses either agree or strongly agree

I feel computer science should be an essential aspect of my child's elementary school experience

80% of responses either agree or strongly agree

I feel satisfied with my child's experience in computer science in the elementary grades

45.4% were neutral on this question

# K-5 Summary of Comments

- 1) I think it would be beneficial for our children to learn the basics of how a computer operates. Also, writing code, in any form, will teach them analytical thinking and could build their confidence with each accomplishment.
- 2) Our kids use computers and other electronic devices such as smart phones and tablets in their daily life for, mostly, entertainment. Some of their homeworks now requires the use of computers, which is very good. The use of computers at school at early ages should be limited to supplement their learning. It should not be the core subject. For instance, they should learn to use computer as a tool to search for information.
- 3) My child is a kindergartner, and I try to limit screen time as much as possible. I would prefer that she have no computer classes prior to third grade.
- 4) Coding. Would like to see coding on the curriculum.

# Program Perceptions

## Middle School Parental Survey (239 responses)

My child has an interest in computer science

52.7% of responses were either agree or strongly agree

I feel computer science should be an essential aspect of my child's middle school experience

77.4% of the responses were either agree or strongly agree

I feel satisfied with my child's experience in computer science in the middle schools

43.1% of the responses were neutral

# Middle School Summary of Comments

- 1) Computer science is a part of curriculum in other top rated schools. It's a must.
- 2) Children should be exposed to computational thinking early in their lives just as they are to mathematical thinking. Given the fact that most of them will have to closely interact with technology, the sooner they are exposed to programming (say, in Python) the more prepared they will be for the future. Additionally, it will serve to motivate them to learn mathematics.
- 3) I would like to see more computer science classes offered like into to Java, web design and development
- 4) I don't know enough about it to say how good it is. In general, I support the concept of a strong CS department, given how technology is such an important component of the world today and beyond.
- 5) There needs to be better communication since I'm unaware of any computer science instruction, at least in 6th grade.
- 6) As computer science plays a key role in almost all fields today - starting from shopping, technology, medicine, entertainment , etc. The students will really benefit if they are comfortable with computer skills. Also those skills helps them to advance or do the job better and efficiently.

# Program Perceptions

## High School Parental Survey (95 Responses)

**This section was completed by parents whose child was not enrolled in a computer science course**

My child has an interest in computer science

39.4% of responses were either agree or strongly agree

I feel computer science should be an essential aspect of my child's high school experience

75.8% of the responses were either agree or strongly agree

I feel satisfied with my child's experience in computer science in the high schools

51.7% of the responses were neutral

# Program Perceptions

## High School Parental Survey

**This section was completed by parents whose child was enrolled in a computer science course**

How would you describe your child's interest in studying computer science

Very strong	21	22.1%
Strong	29	30.5%
On par with other courses	19	20%
Lower than other courses	26	27.4%

My child enjoys the computer science program at RHS: 50.5% of the responses were neutral

My child has been successful in CS classes: 55.8% of the responses were neutral

My child is appropriately challenged in CS classes: 49.5% of the responses were neutral

I am satisfied with the CS choices at RHS: 48.4% of the responses were neutral

# High School Summary of Comments

- 1) I have been encouraging taking courses, but are having problems fitting it in. Perhaps try to do more in applying technology in standard course work to maximize the opportunity for exposure. I realize this may be challenging depending on the teacher's' background, but my kids seem to know very little about Excel for example. This is a standard business tool every H.S. student should be comfortable with. Not just Word and PowerPoint. Excel macros and things like that can be a good intro to programming as a place to start. Making Comp SCI class required would be good too.
- 2) Because of the way the prerequisites are set up unless you start freshman year, sophomore year at the very latest, you won't be able to get to the more interesting courses.
- 3) My son has a very strong interest in taking computer science courses. However, my understanding is that because he takes Band, he will not be able to take any courses until at least his junior year. That fact influenced my answer to the previous question.
- 4) My son took 2 semesters of Computer Programming this year and is enrolled in AP computer science class for next year. He considers CS as his future profession so these classes allow him to take steps towards his future college degree

# Results of Student Survey

The survey sent out to the students in Computer Science mainly dealt with how the individual class could be improved. The students provided valuable feedback in this regards.

The students were asked why they chose to take a computer science course and 92.7% included interest as one of their responses. The second most selected response was the fact that they would receive honors credit, 34.1%

Among the suggested course additions made by the students were additional programming courses (C++, Swift), Game design, Building a computer, and Robotics

# Use of Technology Standards

## **Each response was graded from Few Opportunities(1) to Many Opportunities (5)**

Students are provided with opportunities to use technology systems and operations

60.5% of the responses rated this at either a 4 or a 5

Students are provided with opportunities to demonstrate creative thinking, construct knowledge and develop innovative products and process using technology

40% of the responses rated this at either a 4 or a 5

Students are provided with opportunities to use digital media and environments to communicate and work collaboratively

41.4% of the responses rated this at either a 4 or a 5

# Use of Technology Standards

Students are provided with opportunities to understand human, cultural, and societal issues related to technology and practice legal and ethical behavior

23.3% of the responses rated this at either a 4 or a 5

Students are provided with the opportunities to utilize technology in design process as it applies to creative thinking and problem solving

29.8% of the responses rated this at either a 4 or a 5

Students are provided with opportunities to engage in computational thinking

8.8% of the responses rated this at either a 4 or a 5

# Use of Technology

The elementary schools effectively use technology in a variety of ways to advance student learning

32.1% of the responses rated this at either a 4 or a 5

The middle schools effectively use technology in a variety of ways to advance student learning

41.9% of the responses rated this at either a 4 or a 5

The high school effectively use technology in a variety of ways to advance student learning

41.9% of the responses rated this at either a 4 or a 5

# Use of Technology Suggestions

- 1) Develop a baseline list of what every teacher needs to know - if teachers aren't informed, they will not utilize it in their classroom and push their students to learn the technology.
- 2) Train staff
- 3) Limit ways the students can use the Chromebook as a distraction. Go Guardian has helped this. Adapt more software that can be used in math classes.
- 4) Know that it does not make every lesson better.
- 5) Teacher instruction and time to implement
- 6) More suggestions throughout the year and different websites and apps that students & teachers can use.
- 7) It would be great to be able to teach coding to students. I have old school knowledge of codes, but am a lot less familiar with the newer codes. It would be great to hire a teacher to teach the students coding.

# Summary of our Findings

- There is a strong parental interest in having students exposed to computer science at an earlier age that is currently happening
- Students feel the need for additional opportunities in the form of course offerings to expand their exposure to computer science
- Teachers will need professional development to help them with utilizing technology and any coding/computer science that might be instituted
- The response to the new AP Principles of Computer Science was incredible: 212 students requested it

# Recommendations for 2017-2018

- Research what programs are available for our K-5 students.
- STEAM pilot in grade 3-5 will afford us the opportunity to explore Computer Science experiences for students
- Research what programs are available for our 6-8 students and look to create selective quarter or semester courses for these students
- Year one of the new Principles of Computer Science AP
- Combine semester courses at the High School to create full year courses
- Investigate the viability of offering a Discrete Math course under the Computer Science heading
- Consider other possible programming courses that may be needed in the future

# Work Planned for Summer 2017

- Curriculum writing for the new Principles of Computer Science AP course.
- Developing pilot lessons for grades 3-5 in STEAM