

Chino Valley Unified School District Jr. High School Course Description

A. CONTACTS	
1. School/District Information:	School/District: Chino Valley Unified School District Street Address: 5130 Riverside Dr., Chino, CA 91710 Phone: (909) 628-1201 Web Site: chino.k12.ca.us
2. Course Contact:	Teacher Contact: Office of Secondary Curriculum Position/Title: Director of Secondary Curriculum Site: District Office Phone: (909) 628-1201 X1630
B. COVER PAGE - COURSE ID	
1. Course Title:	Computer Science Discoveries
2. Transcript Title/Abbreviation:	CS Discoveries
3. Transcript Course Code/Number:	3114
4. Subject Area/Category:	Elective
5. Grade Level(s):	7-8
6. Length of Course:	1 year
7. Classified as a Career Technical Education Course:	No
8. Date of Board Approval:	May 19, 2022
9. Brief Course Description:	An introductory computer science course that enables students to explore technology and how it can be utilized to solve real world problems while using communication, collaboration, creativity, and critical thinking. Students will also learn about computing systems, data, web development and coding. Computer ethics will also be stressed.
10. Prerequisites:	None
11. Context for Course:	This course is designed to introduce students to programming, how computers are used to help solve problems, interactive art, game creation, design, building prototypes, data collection and computer automation. The course will provide opportunities for students to problem solve through puzzles, challenges, and real-world scenarios.
12. History of Course Development:	This course was developed to prepare students for the rigor of the high school computer science courses that will be a part of the Biomedical Science and Technology Academy at Chino High School. This course is designed to introduce students to programming, how computers are used to help solve problems, interactive art, game creation, design, building prototypes, data collection and computer automation. The course will provide opportunities for students to problem solve through puzzles, challenges, and real-world scenarios.
13. Textbooks:	None
14. Supplemental Instructional Materials:	Code.org
C. COURSE CONTENT	
1. Course Purpose:	As an introductory computer science course. This course enables students to explore technology and how it can be utilized to solve real world problems while using communication, collaboration, creativity, and critical thinking. Students will also learn about computing systems, data, web development and coding. This course was developed to prepare students for the rigor of the high school computer science courses. This course is designed to introduce students to skills in computer programming, how computers are used to help solve problems, interactive art, game creation, design, building prototypes, data collection and computer automation.
2. Course Outline:	Unit 1: Problem Solving and Computing Unit 1 is an interactive and collaborative introduction to the field of computer science, as framed within the broader pursuit of solving problems. Students will practice using a problem-solving process to address a series of puzzles,

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challenges, and real-world scenarios. Next, students learn how computers input, output, store, and process information to help humans solve problems. The unit concludes with a project in which students design an application that helps solve a problem of their choosing.

Unit 2: Web Development

In Unit 2, students will learn how to create and share the content on their own web pages. After deciding what content, they want to share with the world, they'll learn how to structure and style their pages using HTML and CSS. Students will also practice valuable programming skills such as debugging, using resources, and teamwork.

Unit 3: Interactive Animations and Games

In Unit 3, students will build on their coding experience as they program animations, interactive art, and games in Game Lab. The unit starts off with simple shapes and builds up to more sophisticated sprite-based games, using the same programming concepts and the design process computer scientists use daily. In the final project, students will develop a personalized, interactive program.

Unit 4: The Design Process

Unit 4 introduces the broader social impacts of computing. Through a series of design challenges, students will learn how to better understand the needs of others while developing a solution to a problem. The second half of the unit consists of an iterative team project, during which teams can identify a need that they care about, prototype solutions both on paper and in App Lab, and test solutions with real users to get feedback and drive further iteration.

Unit 5: Data and Society

Unit 5 is about the importance of data in solving problems and highlights how computers can help in this process. The first chapter explores different systems used to represent information in a computer and the challenges and tradeoffs posed by using them. In the second chapter students will learn how collections of data are used to solve problems, and how computers help to automate the steps of this process. The chapter concludes by considering how the data problem solving process can be applied to an area of their choosing.

Unit 6: Physical Computing

Unit 6 explores the role of hardware platforms in computing and how different sensors can provide more effective input and output than the traditional keyboard, mouse, and monitor. Using App Lab and Adafruit's Circuit Playground, students will develop programs that utilize the same hardware inputs and outputs that you see in the smart devices, looking at how a simple rough prototype can lead to a finished product. The unit concludes with a design challenge to use the Circuit Playground as the basis for an innovation of their own design.

Unit 7: AI and Machine Learning

Unit 7 is a hands-on introduction to developing a machine learning model with tabular data. Students explore how computers learn from data to make decisions, then develop machine learning projects around real-world data. The unit culminates in designing a machine learning app to solve a personally relevant problem.

3. Key Assignments:

Unit 1: Problem Solving and Computing

Create an app that solves a real-world problem using input, output, storage, and processing.

- Work with a partner
- Define a real-world problem
- Brainstorm ways an app could be used to help solve that problem
- Identify the inputs / outputs / storage / processing used by your app
- Share your ideas with another group for peer feedback
- Incorporate feedback to create a final version of the app
- Create a poster of your app to share with the class

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Students will submit:

- Completed Project Guide
- Completed Peer Review
- A poster of your app
- Computer Science Practice Reflection

Unit 2: Web Development

Students use computing as a form of self-expression as they design and develop basic web pages. Focusing on the tags, keywords, and syntax used to communicate instructions to the computer, students use HTML to structure the content of a web page. They also explore the privacy and intellectual property implications of publishing their work online.

Webpage will show students can:

- Use HTML to structure a site
- Use CSS to style text and layout
- Respect copyright when using images
- Keep your personal information safe
- Write readable code and use good file names
- Computer Science Practice Reflection

Unit 3: Interactive Animations and Games

Create an interactive greeting card using programming concepts and techniques learned so far.

- Multiple sprites with multiple properties updated in the draw loop
- Program responds to multiple types of user input and uses at least one random number
- Well sequenced and properly separates code in and out of the draw loop
- Multiple conditionals inside the draw loop, at least one of which is triggered by a variable or sprite properly
- Multiple elements are placed on the screen using the coordinate system, and move in different ways
- Multiple variables are used, and their values are updated during the program. At least one variable or property uses the counter pattern
- Computer Science Practice Reflection

Unit 4: The Design Process

Introduction to the design process as a specific version of the problem-solving process in which empathy for a user's needs is consistently integrated. Students learn strategies for identifying user needs and assessing how well different designs address them. They learn how to develop a paper prototype, how to gather and respond to feedback about a prototype and consider ways different user interfaces do or do not affect the usability of their apps.

Working in teams, students identify a social issue that they care about and design and prototype an app to address that issue. Students explore other roles in software development, such as product management, marketing, design, and testing.

Students submit:

- The project guides
- The screens of your app, which are drawn on notecards and at most you can have 6 screens
- A navigation diagram of your app, showing how your user moves between screens
- A poster showing off your prototype and describing how it works

Unit 5: Data and Society

Students learn what a representation system needs to be useful, and how computers can represent different types of information using binary systems. For the chapter project, students represent their perfect day in a binary punch card and trade with classmates to decipher. Students explore how data can be used to answer interesting questions and solve problems. Using a modified version of the general Problem-Solving Process, students look at how computers and

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humans use data differently and the pros and cons of automating problem solving. After learning ways that computers use data in the real world, students choose their own problem and use data to address it.

Students will...

- Work with a partner
- Define a problem that could be addressed by a recommendation
- Identify the data you need and create a survey to collect it
- Interpret the data to find relationships between survey answers
- Create an algorithm to make a prediction based on data
- Test your algorithm
- Present your work to your classmates
- Completed Project Guide
- Completed Peer Review
- Any materials used to present your work
- Computer Science Practice Reflection

Unit 6: Physical Computing

Designing a computing device that combines hardware and software requires a good deal of preparation. Starting with a clear plan can help you stay organized and identify issues ahead of time. A lot of the work you do here will make it much easier to keep track of what you need to do once you begin creating your device, both the physical and software components.

- Computer Science Practice Reflection

Unit 7: AI and Machine Learning

In this project you will design an app that uses machine learning to help decide, offer a recommendation, or make a prediction. You will have a choice of real-world datasets to use to help your app make its decision.

Your app will show that you can...

- Train a model to make a prediction
- Create a model card
- Create an app that uses machine learning
- Computer Science Practice Reflection

4. Instructional Methods and/or Strategies:

Other strategies would include:

- Direct instruction
- Small group work
- Activity-based instruction
- Collaborative groups
- Modeling
- Group discussions

5. Assessment Including Methods and/or Tools:

The evaluation of student progress and evaluation will be based on the following criteria outlined in Board policy:

- Assessments: 60-75% of the final grade
- Assignments and class discussions: 25-40% of the final grade