Overview of the Instructional Materials

The pages that follow contain the core of the materials teachers will need in order to plan and deliver Exploring Computer Science. The materials begin with the unifying themes and practices that are woven throughout the course followed by a Scope and Sequence chart that details the various topics included in the course, along with the unit in the course where each is introduced and reinforced. Teachers should continue to refer back to previous units where appropriate. For example, Unit 3 builds on many of the Unit 1 concepts by taking students from discussing and viewing websites to actually using and developing them. The approximate time allotment noted in the chart includes all activities from introduction through application.

Following the Scope and Sequence is an overview of each unit that includes the unit description and overall objectives of the unit. There is also a table that indicates the topics for each instructional day of the course.

Finally, are the daily lesson plans with detailed student activities and teaching strategies for each day. Each lesson has been built on a 55 minute class period. In schools where class periods are shorter or longer (or on varying block schedules) adjustments will need to be made; such adjustments may include combining lessons (for longer class periods) or assigning parts of the lesson for homework (for shorter class periods).

An attempt was made to provide enough detail to the teaching strategies sections to give teachers clear guidance as to the activities involved and the types of questions that might need to be asked to prompt discussion. At the same time, an effort was made not to be prescriptive.

Each unit includes supplementary materials, a final project, and a sample rubric for the final project.
Unifying Themes and Practices

The individual lessons in this course were developed to reinforce the unifying themes and support the use of the computational practices that we expect students to employ.

The three themes are

- The creative nature of computing
- Technology as a tool for solving problems
- The relevance of computer science and its impact on society

There are many technological tools that enable people to explore concepts and create exciting and personally relevant artifacts that impact society. In this course, programming is used as one of the tools, but not the only tool. Students are asked to be creative in designing and implementing solutions as they translate ideas into tangible forms. As students actively create, they will also discuss the broader implications of computing technologies.

Throughout the course students will gain experience in employing the following computational practices.

- Analyze the effects of developments in computing.
- Design and implement creative solutions and artifacts.
- Apply abstractions and models.
- Analyze their computational work and the work of others.
- Connect computation with other disciplines.
- Communicate thought processes and results.
- Work effectively in teams.

As students design and implement solutions using abstractions and models, they will analyze the processes they and their peers use to arrive at solutions, study the effects of their creations and learn how computing concepts connect explicitly and implicitly to other disciplines. Students will learn about the collaborative nature of computer science by working in teams and communicate the results of their work in writing and orally supported by graphs, visualizations and computational analysis.