



LEVEL 1 – FOUNDATIONS > OVERVIEW

OVERVIEW

This foundational programming course provides an introduction to creative computing with Tynker. Tynker is a creative computing platform that helps children develop computational thinking and programming skills in a fun, intuitive and imaginative way. Innovative visual programming language, interactive self-paced courses, and game-based programming activities provide an easy introduction to programming, and empower children to innovate and create. Tynker is available on the Web and on iPad and Android-based tablets, so that kids can make fun and useful applications for their favorite devices.

INTRODUCTION

Students are introduced to creative computing, through sample projects and hands-on experiences.

ARTS

Students explore the arts by creating projects that include elements of loops, motion, costume handling.

STORIES

Students explore storytelling by creating projects that include characters, scenes, and narrative; computational concepts of parallelism and events and the computational practices of reusing and remixing.

GAMES

Students explore games by creating projects that define goals and rules; computational concepts of conditionals, operators, and data, and the computational practices of testing and debugging.

STORY BASED GAME

Students develop combine Tynker programming competencies to develop a story based game, collaborating with others to improve the project, and presenting the project and its development process; computational practices of abstracting and modularizing are highlighted.

The pedagogy is inspired by constructionist approaches to learning based on four principles.

CREATING

Offer opportunities for learners to engage in designing and making, not just listening, observing, and using.

KidsCode

PERSONALIZING

Offer opportunities for learners to engage in activities that are personally meaningful and relevant.

SHARING

Offer opportunities for learners to engage in interactions with others as audience, coaches, and co-creators.

REFLECTING

Offer opportunities for learners to review and rethink their creative practices.

Each session is composed of four instructional components to enforce consistency leading to efficacy and ensure scaffold support for learning outcomes.

DESIGN TIME

Sessions begin with a prompt for students to transition from their last activity into design mode and introduce them to new concepts.

EXAMPLE

Instructor demonstrate specific examples to identify expectations and outcomes.

INSTRUCTION

Instructors identify session goals and objectives, as well as any explanation and resources the session may require.

REFLECTION

Students are prompted again to share their work and experience with their peers, and self-evaluate their performance.



CONTENT AND STANDARDS

This curriculum is both S.T.E.M. rich and tied to Common Core Standards to ensure the best educational experience possible for the students, and meet the needs and requirements of teachers and administrators. These bridges from the concepts to Common Core Standards (CCS) are examples, because any CCS that is identified as a gap in the class can be included in the lessons. For example, a “loop” could be used to generate flash cards (CCS NBT, CCS NF) and “questioning” could be used to stimulate more research (CCS WHST). This allows for customization of the curriculum to meet the needs of the individual school and teachers. Although the primary focus of this program is STEM, there are numerous ELA learning outcomes that can come from the humanities approach of this curriculum.

Here is an example matrix of KidsCode Level I – Foundation computational competencies to Common Core Standards.

COMPUTATIONAL CONCEPTS

Concept	Description	Common Core Standards
Sequence	Identifying a series of steps for a task	4.OA S3 Operations and Algebraic Thinking 4.MD S2 Measurement and Data 7.RP S2 Ratios and Proportional Relationships RH, RST.6-8.3 Key Ideas and Details WHST.6-8.1,2 Text Types and Purposes
Loops	Running the same sequence multiple times	4.OA S5 Operations and Algebraic Thinking 6.NS S4 The Number System
Parallelism	Making things happen at the same time	4.OA S2 Operations and Algebraic Thinking 4.MD S1, S5 Measurement and Data 6.RP S1 Ratios and Proportional Relationships 6.NS S5 The Number System 8.EE S8 Expressions and Equations

Events	One thing causing another thing to happen	4.0A S3, S5 Operations and Algebraic Thinking 4.MD S5 Measurement and Data 8.F S1-3 Functions WHST.6-8.1 Text Types and Purposes
Conditionals	Making decisions based on conditions	4.0A S2, S3 Operations and Algebraic Thinking 4.NBT S4, S5 Numbers and Operations in Base Ten ² 4.G S2 Geometry 7.EE S4 Expressions and Equations RI.6-8.4,5 Craft and Structure
Operators	Support for mathematical and logical expressions	4.0A S1-S5 Operations and Algebraic Thinking 4.MD S3 Measurement and Data 6.EE S5-8 Expressions and Equations 8.EE S7 Expressions and Equations
Data	Storing, retrieving, and updating values	4.MD S1-S4 Measurement and Data 6.SP S2, S5 Statistics and Probability 7.SP S1-4 Statistics and Probability

COMPUTATIONAL PRACTICES

Practice	Description	Common Core Standards
Being iterative and incremental	Developing a little bit, then trying it out, then developing some more	4.0A S3 Operations and Algebraic Thinking 4.MD S2 Measurement and
Testing and debugging	Making sure that things work – and finding and fixing mistakes	4.0A S3, S5 Operations and Algebraic Thinking 7.RP S2 Ratios and Proportional Relationships

Reusing and remixing	Making something by building on what others – or you – have done	4.G Geometry S3 7.EE S2 Expressions and Equations WHST.6-8.5 Production and Distribution of Writing SL.6-8.6 Presentation of Knowledge and Ideas
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COMPUTATIONAL PERSPECTIVES

Perspective	Description	Common Core Standards
Expressing	Realizing that computation is a medium of creation "I can create."	L.4-5.1 Conventions of Standard English (applying new language to primary language conventions) 5.OA S1 Operations and Algebraic Thinking L.6-8.5 Vocabulary Acquisition and Use WHST.6-8.10 Range of Writing (journal) 6.EE S2 Expressions and Equations
Connecting	Recognizing the power of creating with and for others "I can do different things when I have access to others."	WHST.6-8.4-6 Production and Distribution of Writing SL.6-8.1 Comprehension and Collaboration
Questioning	Feeling empowered to ask questions about the world "I can (use computation to) ask questions to make sense of (computational things in) the world."	W.6-8.7 Research to Build and Present Knowledge WHST.6-8.7-9 Research to Build Present Knowledge