



## Implementation and Technology Integration Ideas

TechnoCode introduces coding with Scratch to elementary and middle school students. It is an ideal project for Grades 4 and up. Jam-packed with programming activities, TechnoCode sparks an interest in computer science. Step by step instructions explain how to build animations, stories, games, art, music, and simulations.

Empower students with real-world skills they can use in the workplace. The instructional materials in TechnoCode encourage students to think like programmers. Resources include sample videos to inspire imaginations, planning sheets with guiding questions to help design scripts, assessment tools to evaluate student work, and coding journal logs to reflect upon learning.

### Ideas for Implementation

The TechnoCode project has students create animated scenes, construct mazes, broadcast stories, engineer games, design artwork, compose music, build a diorama, and more! The activities are suitable for any teaching situation. Select the option that works best for you and your students:

- *Coding Unit with Elementary Students:* Assignments in Sessions 1-3 in TechnoCode are ideal for students new to Scratch. The activities are perfect for Grades 4 and up. Students design animations, create art, develop games, and compose music. The emphasis is on coding basics including how to build scripts, sequence commands, control action with *if then* conditions, and create simple loops. The activities focus upon directing movement, synchronizing sound, and understanding **x** and **y** coordinates.
- *Coding Unit with Middle School Students:* Once students understand the basics of coding in Sessions 1-3, they extend their learning in Sessions 4-6. The activities are ideal for students that understand the fundamentals and are ready for a challenge. The critical and computational thinking required is ideal for students in Grades 6-8. They produce a story, engineer a game, develop a treasure hunt, build a diorama, and remix a project. The emphasis is on having students manipulate the appearance of sprites, direct the timing of events with broadcasting, and create original artifacts using conditions, variables, and operators.
- *Computer Science Course:* TechnoCode has 32 assignments designed to ignite an interest in computer science. The focus is on thinking like a programmer. Each coding activity is divided into four parts – exploration, practice, freestyle, and reflection. Using a question and answer format, students discover the function of command blocks. Next, they follow guided instructions to build scripts. Afterwards, they apply their skills to complete open-ended challenges. Once a Scratch project is finished, students write a coding journal entry to reflect upon the experience.
- *Hour of Code:* If you only have one class to teach coding there are many assignments in TechnoCode that can be used for this purpose. If your students are beginners, they can develop simple animations. Assignment 5 targets how to build a script, Assignment 6 explores directing movement, and Assignment 17 focuses upon changing the appearance of a sprite. If your students have existing knowledge of Scratch, the skill reviews in Sessions 2-5 are excellent challenges.
- *Coding Workshop Series:* If you are running a workshop series as part of an after-school program or community event, then you will need to select assignments that fit the number of classes offered. As well, consider the age range and coding abilities of students.

## Technology Integration Suggestions

The TechnoCode project is primarily a STEM project that teaches coding. However, the activities also integrate into other areas of curriculum including language arts, mathematics, social studies or science, visual arts, and music.

- *Computer Science:* TechnoCode is an introduction to programming. The activities have students build algorithms that sequence commands, events, loops, and conditions. Use the project to target computer science learning outcomes. The project includes a detailed list of skills achieved in each Session, ideal as a teacher checklist for assessment.
- *Language Arts:* The assignments in Session 1 and Session 4 can be integrated into curriculum as a language arts unit. In these assignments, students engage in visual storytelling. They create animated scenes and stories. To extend language arts learning outcomes, the concept of plot, setting, and characters is also applied when engineering games in Session 3 and 5.
- *Mathematics:* Integrate TechnoCode into an existing problem-solving unit in Math class. The assignments are an ideal fit because coding requires mathematical and logical thinking. For example, placing sprites on the stage requires plotting ordered pairs, rotating objects involves knowledge of angles, and setting the size of sprites uses percentages. As well, logic is used to control when or if an action happens.
- *Social Studies or Science:* Include the Session 4 Skill Review in TechnoCode as a creative way to showcase learning from another subject area. In this activity, students build an interactive diorama. It shows a scene from nature or a historical event that engages the viewer to click on objects to learn more. Complete the activity to have students share facts or create a simulation about a topic currently being studied. Samples provided include space exploration, tornado, and farming.
- *Visual Arts:* Target visual arts learning outcomes with TechnoCode. Graphic design is interwoven throughout the activities. Students apply their creativity to paint or edit unique sprites and backdrops. They also apply their skills to engage the audience using visual elements. In addition, the Session 2 Extension Activity specifically has students draw artwork with a pen using code.
- *Music:* Integrate TechnoCode into a music class. In the Session 3 Extension Activity, students invent an instrument. This activity is a fun way for students to express their musical talent.