Creative Computing with Scratch

UON Computer Science 4 Schools

Primary School Workshop

Presented by Daniel Hickmott

What is Creative Computing?

- Yesterday's Scratch activity mostly involved step-by-step exercises
- You may want to allow students to be more self-directed when teaching them to code
- *Creative Computing* emphasises students' personal connections to computing
- Encourages students to use code to implement their own ideas and invent

The Creative Computing Curriculum

- Developed by researchers and educators from the *Harvard Graduate School of Education*
- Is focused on using Scratch to teach computing
- Covers key *computational thinking concepts* and *computational thinking practices*
- Split into 7 themed units, e.g. *Stories* and *Games*
- The link to the material is on the CS4PS website, on the *Creative Computing with Scratch* session page

WHAT IS CREATIVE COMPUTING?

Creative computing is... creativity.

Computer science and computing-related fields have long been introduced to young people in a way that is disconnected from their interests and values – emphasizing technical detail over creative potential. Creative computing supports the development of personal connections to computing, by drawing upon creativity, imagination, and interests.

Creative computing is... empowerment.

Many young people with access to computers participate as consumers, rather than designers or creators. Creative computing emphasizes the knowledge, practices, and fundamental literacies that young people need to create the types of dynamic and interactive computational media that they enjoy in their daily lives.

Creative computing is... computing.

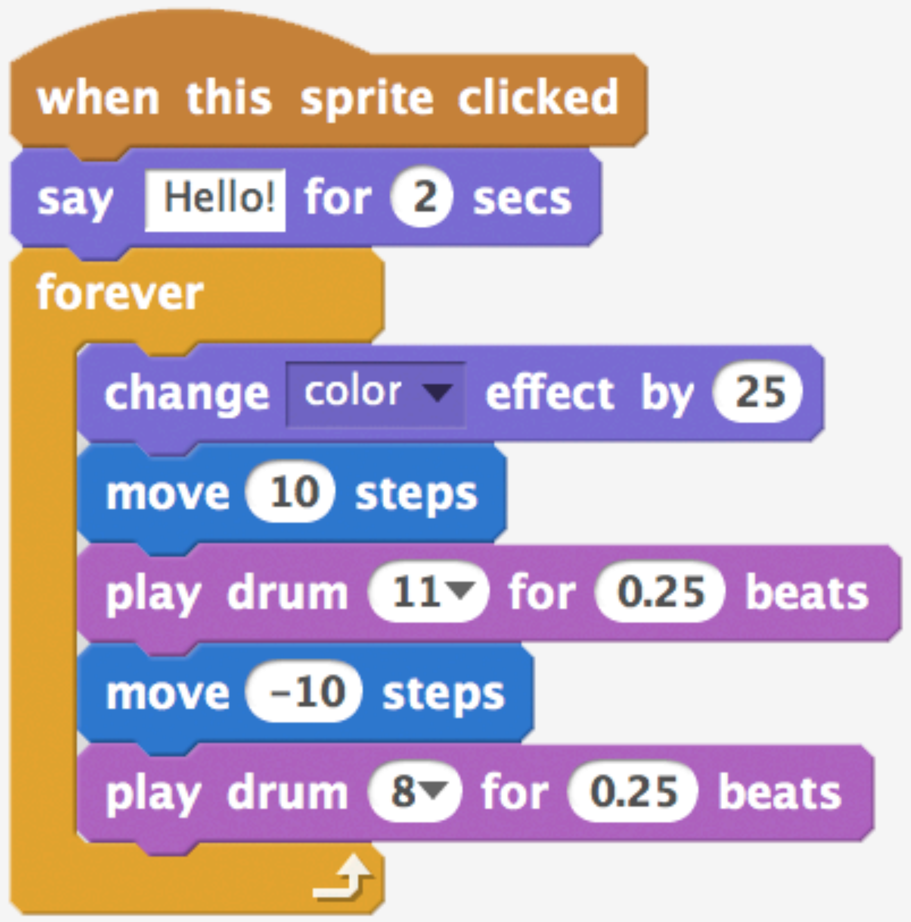
Engaging in the creation of computational artifacts prepares young people for more than careers as computer scientists or programmers. It supports young people's development as computational thinkers – individuals who can draw on computational concepts, practices, and perspectives in all aspects of their lives, across disciplines and contexts.

Get Started!

Begin your creative computing experience by downloading the guide

The guide can be used in a variety of settings (classrooms, clubs, museums, libraries, and more) with a variety of learners (K-12, college, and beyond). No prior experience with computer programming is required, only a sense of adventure!

Download



```
when this sprite clicked
say Hello! for 2 secs
forever
    change color effect by 25
    move 10 steps
    play drum 11 for 0.25 beats
    move -10 steps
    play drum 8 for 0.25 beats
```

CREATIVE COMPUTING

DOWNLOAD

This guide was developed by members of the ScratchEd research team at the Harvard Graduate School of Education: Christan Balch, Michelle Chung, and Karen Brennan.

We encourage you to use as much or as little of the guide as you like, to design new activities, and to remix the included activities. No matter your prior experience or expertise, we think of every educator as a co-designer of the Creative Computing experience. We would love to learn about what you're doing, so we encourage you to document and share your experiences with us and with other educators via the ScratchEd community at http://scratched.gse.harvard.edu

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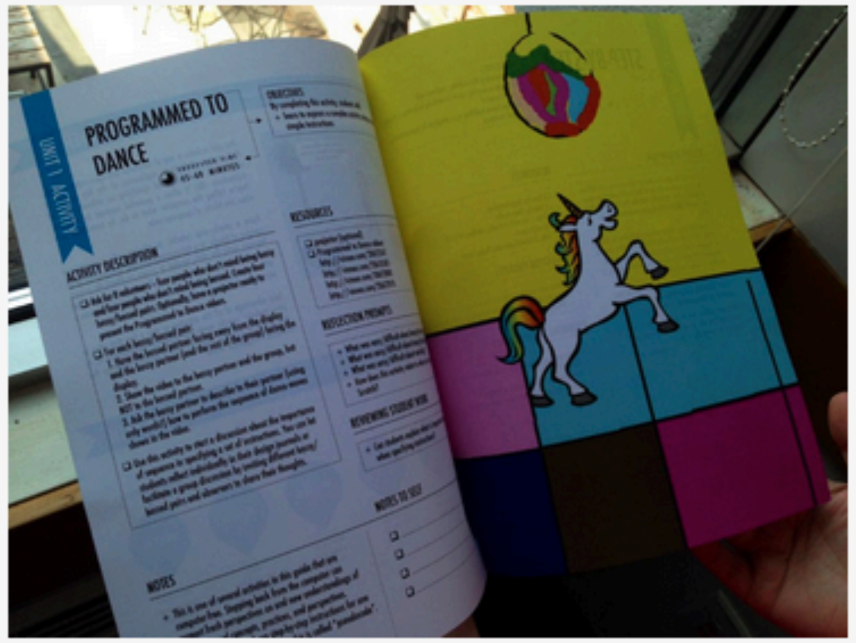
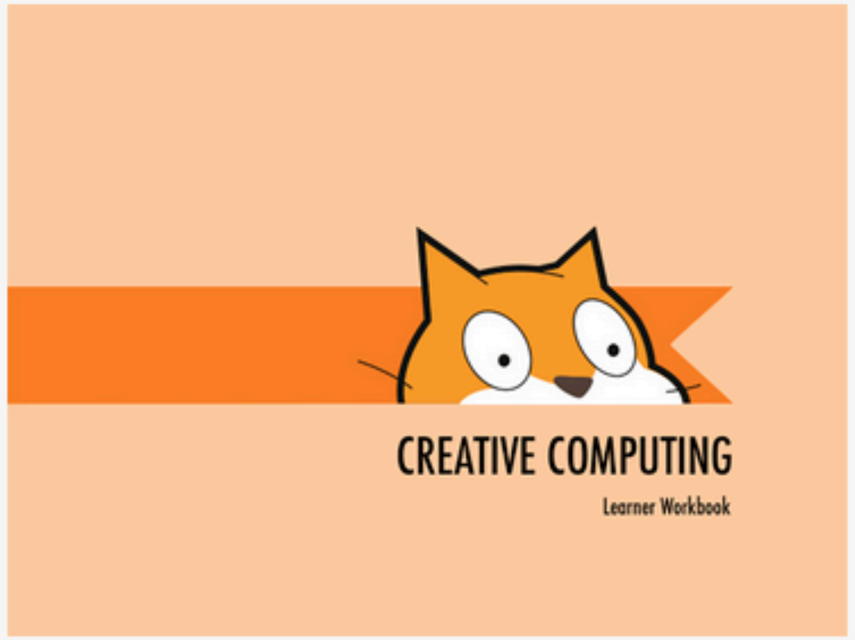


The original guide, for educators

154 pages of plans, activities, and strategies for introducing Creative Computing in your learning environment.

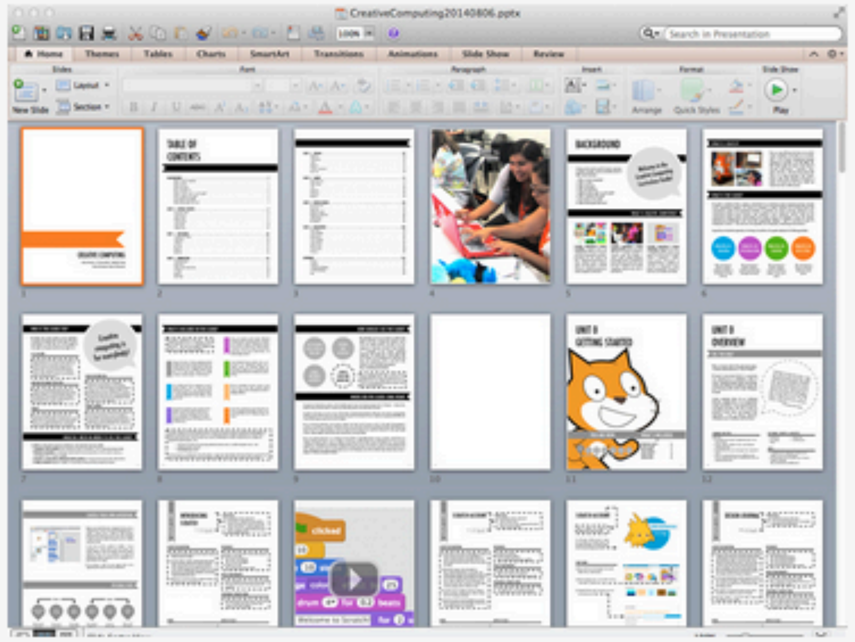
Guide as PDF



A workbook version, for learners

A learner-focused version of the guide, including all of the student activity pages and reflection question templates.

Workbook as PDF



Editable versions, for teachers and translators

The guide and workbook are available as PowerPoint files. Remixing and translating encouraged!

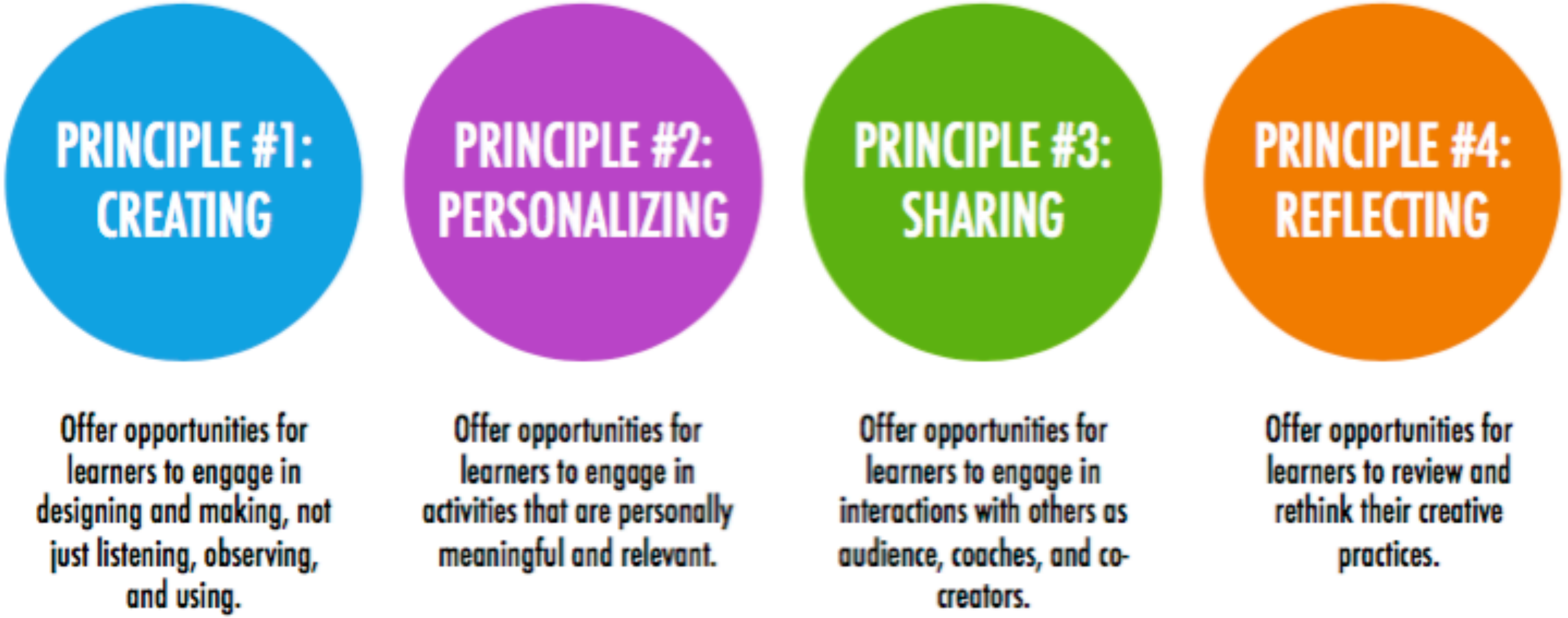
Guide as PPT | Workbook as PPT

Balancing Structure & Agency

- Research by Dr Karen Brennan (from Harvard) influenced the design of the curriculum materials
- Brennan[1] investigated the balancing learners' *agency* and *structure* when teaching computing, both inside and outside of schools
- Argued that "we should begin to think about agency and structure not as separate, but as mutually-reinforcing concepts" (p. 194)
- Proposed strategies for teaching computing that became part of the *Creative Computing Curriculum*

[1] Brennan, K. Best of both worlds: Issues of structure and agency in computational creation, in and out of school. Dissertation. Massachusetts Institute of Technology, 2013.

Four Principles of the Curriculum



PRINCIPLE #1: CREATING

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

PRINCIPLE #2: PERSONALIZING

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

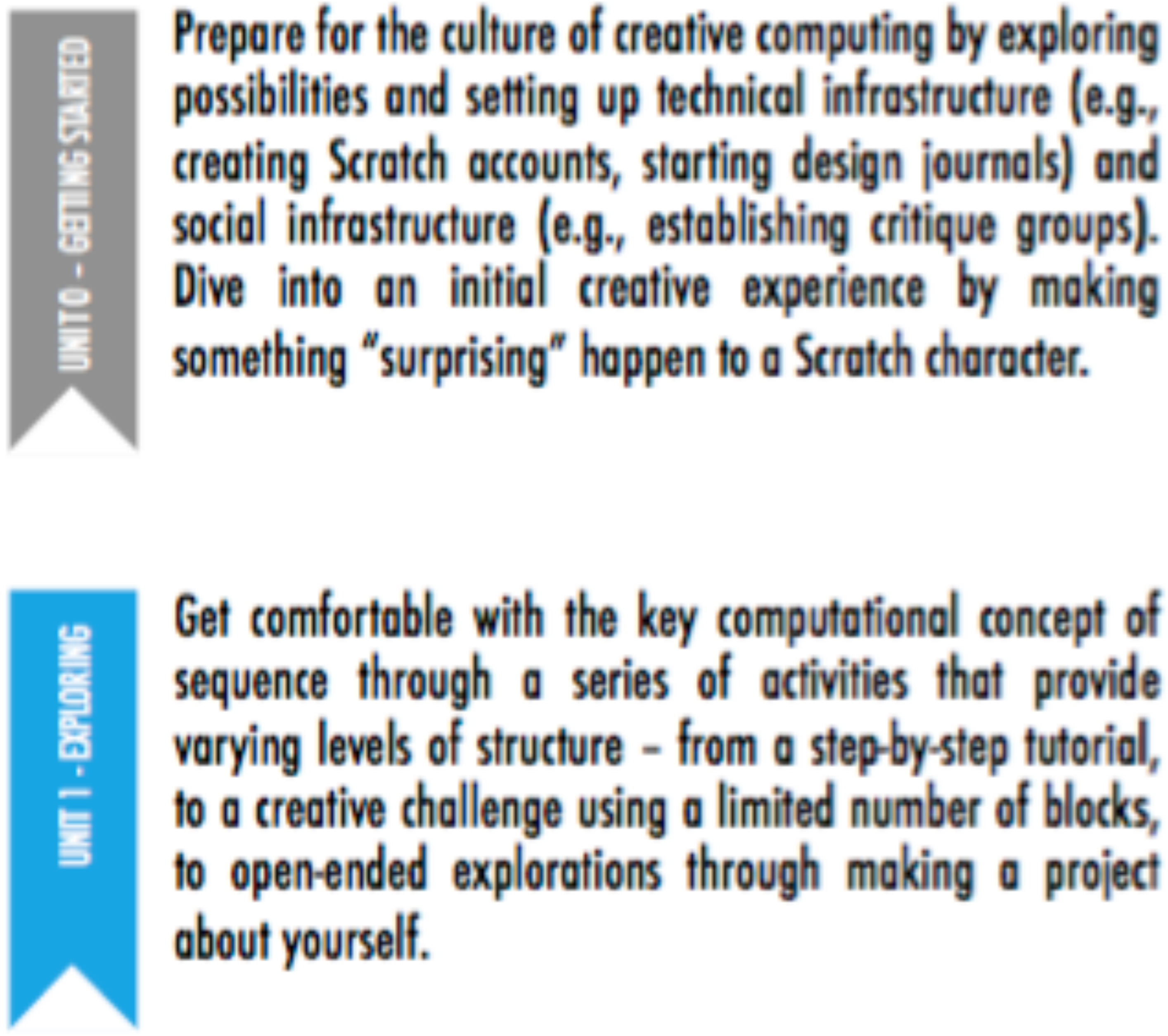
PRINCIPLE #3: SHARING

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

PRINCIPLE #4: REFLECTING

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

Today's Session: Units 0 and 1



UNIT 0 – GETTING STARTED

Prepare for the culture of creative computing by exploring possibilities and setting up technical infrastructure (e.g., creating Scratch accounts, starting design journals) and social infrastructure (e.g., establishing critique groups). Dive into an initial creative experience by making something "surprising" happen to a Scratch character.

UNIT 1 - EXPLORING

Get comfortable with the key computational concept of sequence through a series of activities that provide varying levels of structure – from a step-by-step tutorial, to a creative challenge using a limited number of blocks, to open-ended explorations through making a project about yourself.

Unit 0: Getting Started

- *Unit 0 (Getting Started)* is a preparatory unit focused on getting students to set up Scratch accounts and other administrative tasks
- Assumes you are using the online version of Scratch and that your school has access to Scratch

Unit 0: Getting Started

- Teacher Accounts
- Design Journals
- Sharing your creations (Scratch Surprise)
- Scratch Studios
- Critique Groups

Teacher Accounts

- *Creative Computing Curriculum* guide was written before Teacher Accounts were made available
- Highly recommend getting a Teacher Account for managing your classes
- Can see students' activity in Scratch
- Can reset students' passwords when they lose or forget it
- Usually take about 24 hours to be approved
- Does anyone have use a Teacher Account already?

Teacher Accounts: Overview

- Please login with the account details I sent you through email
- Create a new Scratch program
- Let's look at the Activity tab
- Signing up Students
  - + New student
  - CSV Upload
  - Student Sign-up Link

Design Journals

— Refer to *Design Journal* activity in *Creative Computing Curriculum* Guide (p. 14)

— http://bit.ly/designjournal-blog has example of a journal in blog form

Sharing your Creations

— Refer to *Scratch Surprise* activity in *Creative Computing Curriculum* Guide (p. 16)

— Take 10 minutes to explore some Scratch blocks and sections that you haven't explored yet

— Try and make the Cat do something surprising!

— Share your creations

Scratch Studios

- Refer to *Scratch Studios* activity in *Creative Computing Curriculum* Guide (p. 18)
- I'll create a Scratch Studio for our *Scratch Surprises* and send the link to this through email
- Try and add your *Scratch Surprise* project to this new *Scratch Studio*

Critique Groups

- Refer to *Critique Groups* activity in *Creative Computing Curriculum* Guide (p. 20)
- I don't know how successful these would be - does anyone do Scratch critique groups already or use similar approaches in other subjects?

Unit 1: Exploring

- As mentioned earlier, the design of the *Creative Computing Curriculum* has been influenced by research about balancing learners' *structure* and *agency*
- *Unit 1 (Exploring)* is focused on activities that encourage students to explore the Scratch interface and different blocks
- One of the important points of this Unit's overview (p. 24) is that educators don't necessarily have to know every block and part of Scratch's interface

Unit 1: Exploring

- Programmed to Dance
- Step-By-Step
- 10 Blocks
- My Studio
- Debug It!
- About Me

Programmed to Dance

- Refer to *Programmed to Dance* activity in the *Creative Computing Curriculum* Guide (p. 26)
- This is another example of an *unplugged* activity
- Let's look at one of the videos and write instructions for someone to follow
- Could have students in groups create their own dances or choose one of the videos and swap with other groups

Step-By-Step

- Refer to *Step-By-Step* activity in the *Creative Computing Curriculum* Guide (p. 28)
- Take 10 minutes to complete this activity
- Try to incorporate some ideas from the *Things to Try* section of the activity
- Add to the *Step-By-Step* studio if you would like to share your program

10 Blocks

- Refer to *Step-By-Step* activity in the *Creative Computing Curriculum* Guide (p. 30)
- Take 10 minutes to complete this activity
- You have to use each of the blocks shown on p. 30 at least once - you can also use them multiple times
- Add to the *10 Blocks* studio if you'd like to share your program

My Studio (Remixing)

- In this activity, we will remix an existing Scratch program instead of the activity in the *Creative Computing Curriculum* Guide
- Take 10 minutes to find a program that you'd like to remix and make some change to it
- We'll also briefly look at remix trees and discuss potential issues with students remixing projects

Debug It!

- Refer to *Step-By-Step* activity in the *Creative Computing Curriculum* Guide (p. 34)
- Debug It! exercises involve fixing Scratch programs that have *bugs* (mistakes) in them
- These activities could be used for assessment of student's understanding of Scratch and coding concepts
- Fixing bugs (*debugging*) is a large part of a coder's job

About Me

— Refer to *About Me* activity in the *Creative Computing Curriculum* Guide (p. 36)