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Light Show Lab: Sequence a Show

Grades 4-6 · 45 minutes

Computer science · Music



Slides, rubric and answer key | Print and go | No student accounts | Chromebook friendly

What's included

- A one-page overview: objectives, essential question, vocabulary, standards and assessment
- A 45-minute lesson sequence: warm-up, direct instruction, guided practice, independent practice, closure
- Slides for the board: a PowerPoint file that also opens in Google Slides
- A student worksheet with a QR code and a show plan table
- A 3-question exit ticket, two to a page, with an answer key
- A rubric: 3 criteria, 4 levels, scored out of 12
- Differentiation for English learners, students with IEPs or 504 plans, and students who need more support or more challenge
- Cross-curricular extensions, and notes for teaching it in grade 3 and in grades 7 and 8
- Standards: CSTA 2017

Light Show Lab: Sequence a Show

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Students open a house whose lights are up and whose show is empty: press Play and everything only twinkles. They add one block on the timeline, read it as a sentence ("at bar 2 for 2 bars: the roofline, chase"), then type a loop, "every 2 bars from bar 9 to bar 16: the bushes, pop", and watch one line become four blocks. Then they plan and build a show for Jingle Bells in which the chorus, from bar 19, is busier than the verse, and fix the lines the app cannot read.

At a glance

ESSENTIAL QUESTION

How do you tell a house full of lights what to do, and when?

OBJECTIVES

Students will be able to:

- put instructions in order on a timeline so that each one starts on the bar they chose
- explain that the bar a block starts on is the event that sets it off
- write a loop in one line and predict how many blocks it will make
- find and fix a line the app cannot read, using the message it gives

VOCABULARY

Sequence, Event, Loop, Bar, Debug

STANDARDS

1B-AP-10, 1B-AP-11, 1B-AP-15

TIME AND MATERIALS

45 minutes, grades 4-6.

- One computer or Chromebook per student
- A projector
- The worksheet and exit ticket, one copy each per student
- The rubric, one copy per student if you grade the work
- Optional: headphones

PREP

Make copies of the worksheet and exit ticket. Before class, open mytekdev.com/try/lightshowlab?lesson=sequence-a-show&ref=tpt-lightshowlab-1 once on a student computer: it opens on a lit house with an empty show, and checks that your school's filter allows the app. Follow the short guide yourself, about five minutes. Decide whether students use headphones or play with the sound off.

ASSESSMENT

- Formative: the questions under What to look for, asked while students work, and the exit ticket (answer key included).
- Summative: the worksheet, scored with the rubric.

TECHNOLOGY AND PRIVACY

Runs in any browser, Chromebooks included, with nothing to install. Students need no account and no email: the link works signed out, and nothing they do is stored on our server unless they choose to save. The music is played by the page, so headphones help, and the Sound button turns it off.

Lesson sequence

MINUTES	STAGE	WHAT YOU DO	WHAT STUDENTS DO
0 to 5	**Warm-up** Hook	Show the title, essential question and Today I can slides (about 1 minute). Then the warm-up: who or what tells each light when to turn on? List the ideas on the board.	Answer the warm-up on the worksheet.
5 to 12	**Direct instruction (I do)** Model it	Project the app with the starter open and press Play the show: every light only twinkles. Stop, open Show, and click the Roofline row to make one block. Press Sentences and read the line aloud, pointing at its three parts: when, which lights, what they do. Show One block is one instruction, then One line, four blocks. **It's working when:** Read the sentence aloud every time you add a block. Students who can say the line can type it.	Watch, and fill in the vocabulary on the worksheet.
12 to 20	**Guided practice (We do)** The first blocks	Students open the link or scan the QR code. A short guide walks them through: play the empty show, add one block, read it as a sentence, type the loop for the bushes, and play it. Check that every screen shows four blocks in the Bushes row. **Watch for:** A typed line with a red message under it. The message names the line and what it could not read; have the student read it aloud before you help.	Follow the guide, and write on the worksheet how many blocks the loop made.
20 to 38	**Independent practice (You do)** Build the song	Students plan a show in the table on the worksheet, then build it, in Blocks or in Sentences. Three rules: four rows in use, one loop, and a chorus busier than the verse. Walk the room with the What to look for questions. **If they ask:** "How many blocks will that line make? Count them in the row and check." The loop **Watch for:** Students who put every block at bar 1. Ask what the roofline does at bar 19, and scrub the strip under the house to that bar.	Plan, build, play, and fix. Copy one loop line onto the worksheet.
38 to 45	**Closure** Showcase and exit ticket	Show the Showcase slide. Two students play their show on the board and point out their loop. Go back to the warm-up list: the answer is a program, written ahead of time. Hand out the exit ticket.	Answer the exit ticket.

Before you teach: a ten-minute walkthrough

Open mytekdev.com/try/lightshowlab?lesson=sequence-a-show&ref=tpt-lightshowlab-1. A short guide opens over the app. A two-story house stands in the snow at night with lights on the roofline, the windows, the porch, a tree and

three bushes. The show is empty.

1. **Play nothing.** Press `Play the show`. Jingle Bells plays, 34 bars in 49 seconds, and the lights only twinkle. A row with no block twinkles.
2. **One block.** Open `Show`. Each row is one run of lights: Everything, Roofline, Upstairs, Downstairs, Porch, Tree, Bushes. Click an empty spot in a row and a block appears, two bars long. Click the block to pick one of eleven looks (On, Twinkle, Chase, Wave, Swap, Pulse, Pop, Sparkle, Rainbow, Fade in, Fade out) and a color set. Drag it to move it; pull its right edge to stretch it.
3. **The same show as words.** `Sentences` shows every block as a line: "at bar 2 for 2 bars: the roofline, chase". Typing changes the blocks about a third of a second after the last key. A line the app cannot read gets a message with its line number, such as: there are no lights called "the chimney".
4. **The loop.** "every 2 bars from bar 9 to bar 16: the bushes, pop" makes four blocks, one bar long, at bars 9, 11, 13 and 15. "every 1 bar from bar 1 to bar 8: the roofline, pop" makes eight, each two beats long.
5. **Ways back.** `Undo` steps back one change. In `Show`, `Empty the show` clears every block and `Bring back the first show` loads a finished twenty-block show to read.

> A block in a run's own row wins over a block in the Everything row at the same time. Two blocks cannot overlap in one row: the newer one trims the older.

Background for the teacher

A light show is a program. Hobbyists who run real ones build them in sequencing software, on a timeline much like this one: rows for groups of lights, bars and beats across the top, and effects placed where the music calls for them. The song is fixed, so time itself is the trigger: "at bar 19" is an event the same way "when the green flag is clicked" is.

Three ideas are in play. Sequence: the blocks in one row run in order, left to right. Events: each block waits for its bar. Loops: "every 2 bars from bar 9 to bar 16" repeats one instruction. The rows also run at the same time, which is worth saying aloud, though no elementary standard names it.

What the app does not have is a conditional. No line can say "if". Every show plays the same way every time, which is why scrubbing to a bar always shows what playing to that bar shows.

Common mistakes: putting every block at bar 1; expecting a loop's "to bar 16" to mean a block starts on bar 16 (the last one starts on bar 15 and ends as bar 16 ends); typing a name the house does not have. The app answers the last one in words.

What to look for

Ask these while students work. A student who has understood the lesson can answer them without help:

- What will the roofline be doing at bar 10? How do you know without playing it?

- Which part of this line says when? Which part says which lights?
- How many blocks will "every 4 bars from bar 1 to bar 16" make?
- The app says it cannot read line 3. What does the message tell you to try?
- What is different in your show when the chorus starts?

> The third question is the test for loops: four blocks, at bars 1, 5, 9 and 13. A student who counts them before pressing anything has the idea.

Cross-curricular extensions

- Music: clap the beat of Jingle Bells and count the bars aloud. Where does the chorus start?
- Math: a loop runs every 2 bars from bar 1 to bar 34. How many blocks is that? What about every 3 bars?
- Writing: write instructions for a friend that explain what one of your lines does, word by word.
- Art: pick one color set for the verse and another for the chorus, and say why.

Vocabulary

Sequence	Instructions in order. On the timeline, the blocks in one row happen left to right.
Event	The thing that sets an instruction off. Here it is the song reaching a bar: "at bar 19".
Loop	An instruction that repeats. "every 2 bars from bar 9 to bar 16" does the same thing four times.
Bar	A short count of beats in music. In this song a bar is four beats, and the song is 34 bars long.
Debug	To find what is wrong with a program and fix it.

Differentiation

ENGLISH LEARNERS

- Keep the vocabulary slide up, and point at the house on the board as you say each word: the lights carry the meaning.
- Give the sentence frame on a card: at bar __ for __ bars: the _____, _____.
- Let students build in Blocks first and read the sentences the app writes, before typing their own.

STUDENTS WHO NEED MORE SUPPORT

- Stay in Blocks: click a row to add a block, click the block to pick its look.

STUDENTS WITH IEPS OR 504 PLANS

- Pair students, one typing and one reading the message under the box aloud.
- Turn on Big screen for the showcase, or zoom the browser to 150%.
- Allow two rows and no loop where the IEP allows a modified assignment; play with the sound off for students sensitive to noise.

STUDENTS READY FOR MORE

- Write "every 1 bar from bar 1 to bar 8: the roofline, pop". How many blocks, and how long is each one?

- A check-in after the guide: every student can point at the four bush blocks before starting their own show.
- Hand out three finished lines to copy and change one word at a time.
- Press Record in Show, then play the lights live with the number keys in time with the song. Read the blocks it kept as sentences.
- Open Song and pick Deck the Hall. The show is 18 bars now. What happened to your blocks past bar 18?

Adapting for other grades

Younger students: In grade 3, stay in Blocks for the whole lesson: students click rows to add blocks and pick looks, and you type one loop on the board for everyone to see. Score the first two rubric rows, total 8, and 6 meets the objectives.

Older students: In grades 7 and 8, have students write the whole show in Sentences from a blank box, then trade printed lines with a classmate and predict the show before playing it. Ask what the language cannot say yet: there is no "if", so no line can react to anything.

Student worksheet

Name: _____ Date: _____

Open the app: scan the QR code, or go to mytekdev.com/try/lightshowlab?lesson=sequence-a-show

Essential question: How do you tell a house full of lights what to do, and when?

Warm-up: Some houses have lights that dance to music. Who, or what, tells each light when to turn on?

_____

1. **Vocabulary.** Sequence, event, loop, bar, debug: write each in your own words.

2. **The loop.** I typed: every 2 bars from bar 9 to bar 16: the bushes, pop. It made _____ blocks, starting on bars _____, _____, _____ and _____.
3. **My show plan.** Verse (bars 3 to 18): the roofline will _____, the tree will _____, the _____ will _____. Chorus (bars 19 to 34): the roofline will _____, the tree will _____, the _____ will _____.

4. **My loop.** Copy one loop line from your show: every _____ bars from bar _____ to bar _____: _____, _____. I predict _____ blocks. It made _____.

1. A line of yours that the app could not read at first: what did the message say, and how did you fix it?

2. How is your chorus different from your verse?

Exit ticket

Name: _____

1. "at bar 19 for 8 bars: the roofline, chase". What sets this instruction off? (A) pressing a key (B) the song reaching bar 19 (C) the roofline

2. How many blocks does "every 2 bars from bar 9 to bar 16: the bushes, pop" make? (A) 2 (B) 4 (C) 8

3. Write one sentence about why a loop is useful.

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Exit ticket

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3. Write one sentence about why a loop is useful.

Answer key: exit ticket

QUESTION	ANSWER	WHY
1	B	The bar is the event. Nothing in this show waits for a key or a sensor: the song reaching a bar starts each block.
2	B	Bars 9, 11, 13 and 15: one block every 2 bars across 8 bars.
3	Open answer	A full answer says a loop repeats an instruction, so one line does the work of many and is easier to change.

Rubric

Score each row from 1 to 4.

Name: _____

CRITERIA	4 EXCEEDS	3 MEETS	2 APPROACHING	1 BEGINNING
The sequence	Four or more rows have blocks, placed on purpose on the bars in the plan, and the chorus is plainly busier than the verse.	Four rows have blocks and the chorus differs from the verse.	Two or three rows have blocks, or everything starts at bar 1.	One block or none.
The loop	Writes a loop line, predicts the number of blocks correctly, and explains what "every" and "from, to" each control.	Writes a loop line that works and says how many blocks it made.	Copies the loop from the guide without changing it.	No loop.
Debugging	Reads the message under a line that fails, fixes the line, and can say what was wrong.	Fixes a failing line with the message's help.	Deletes failing lines instead of fixing them.	Leaves lines the app cannot read.

Total: ____ / 12. A score of 9 or more meets the objectives.

Standards

The lesson is built for the sequence, events and loops in CSTA 1B-AP-10. It does not cover conditionals: the app has no "if" yet.

FRAMEWORK	CODE	GRADES	STANDARD	HOW THE LESSON MEETS IT
CSTA 2017	**1B-AP-10**	3-5	Create programs that include sequences, events, loops, and conditionals.	Students build a show from sequences (blocks in order in a row), events (the bar each block starts on) and loops (a line that begins "every"). Conditionals are not part of this lesson or this app.
CSTA 2017	**1B-AP-11**	3-5	Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.	The house is broken into named runs, the roofline, the tree, the bushes, and students plan and program one run at a time.
CSTA 2017	**1B-AP-15**	3-5	Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.	Students play the show, scrub to the bar that looks wrong, and fix lines the app reports it cannot read.

Checked November 2026 against: CSTA K-12 Computer Science Standards, Revised 2017.

Optional: save student work in a free class

The whole lesson runs at the link on the worksheet, with no accounts and no sign-up.

To keep students' work, and see it all in one place, make a free class. It takes about ten minutes, once, and covers every lesson in this series: mytekdev.com/tools/class-setup

Students in a class open mytekdev.com/tools/light-show-lab/lessons/sequence-a-show/start instead of the worksheet link. Each one gets their own copy of the starter, and the same link reopens it next time.

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