

Welcome! We'll start at half-past the hour.

PASCO

Coding in Science:
Activities for Hour of Code

Housekeeping



Your mic is muted.

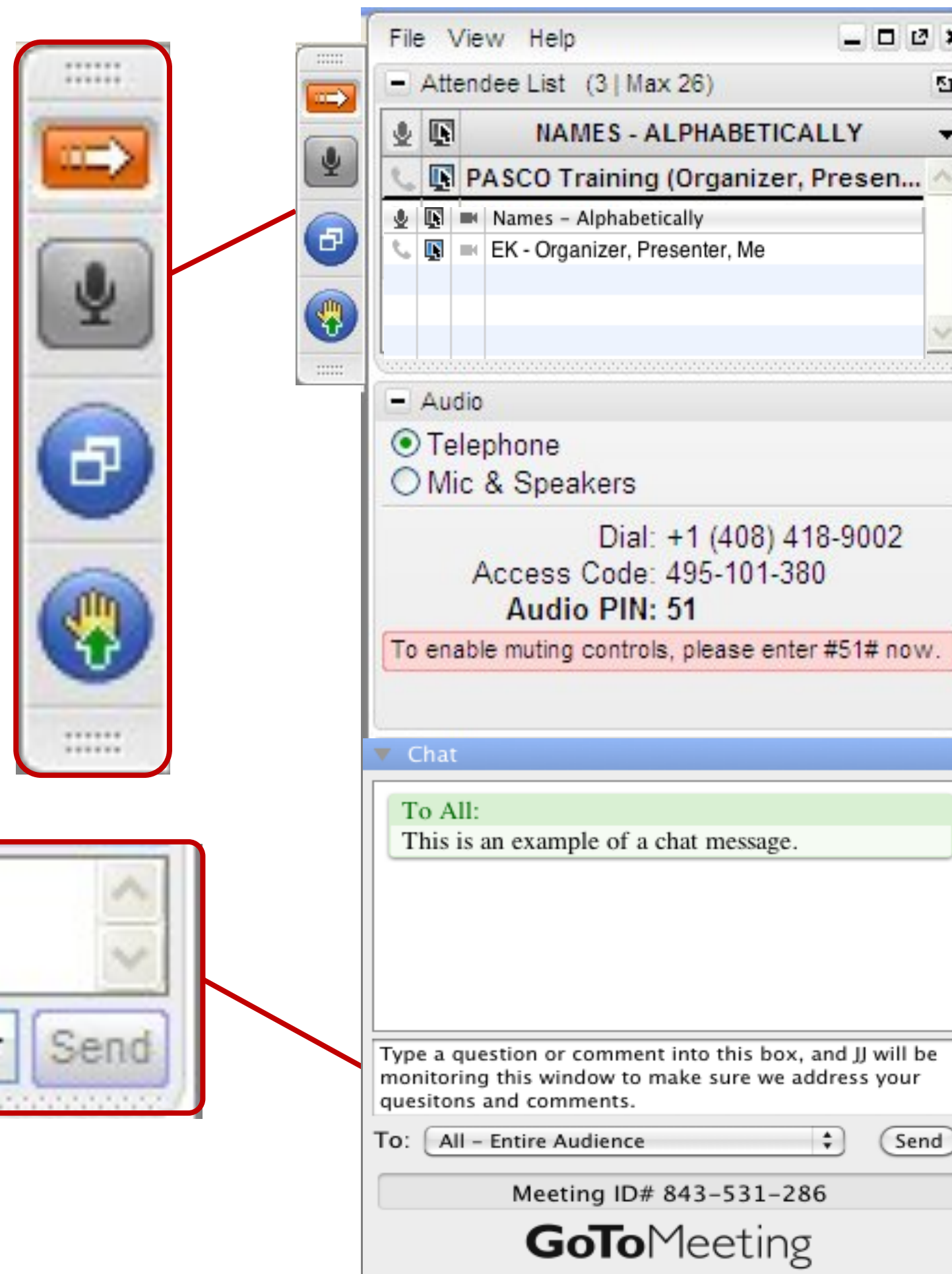
GoToTraining Chat

Try It Now:
Send a chat to All
letting us know where
you're joining from.

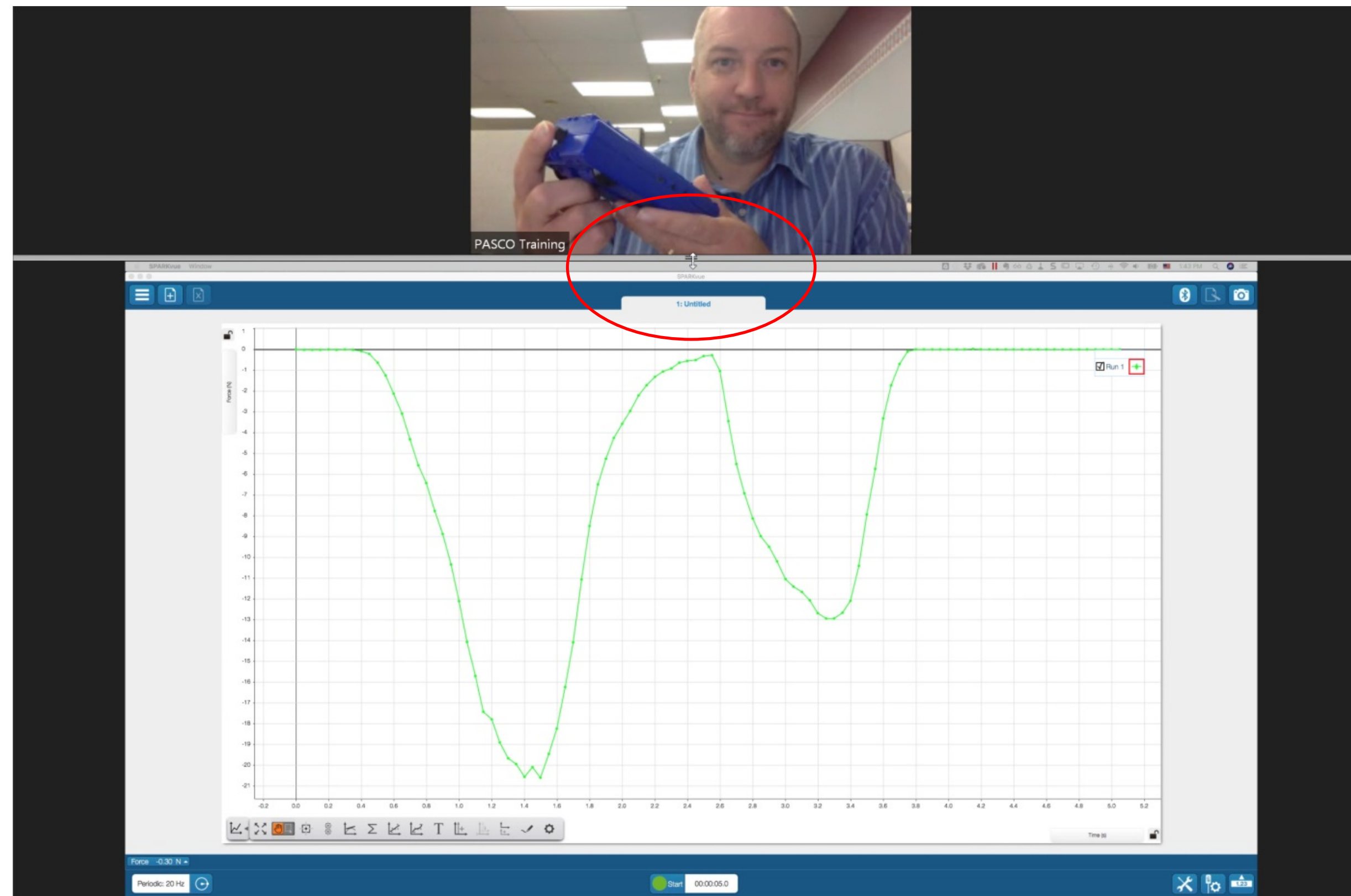
[Type message here]

All - Entire Audience ▼ Send

Send Chats To:
→ All – Entire Audience or
→ Organizer(s) Only

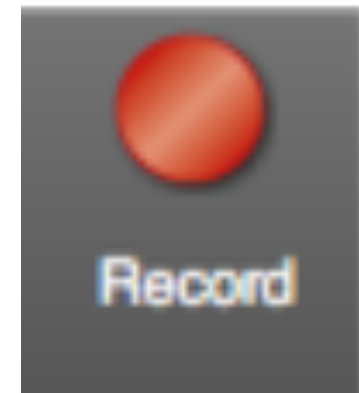


Live Video & Screen Sharing



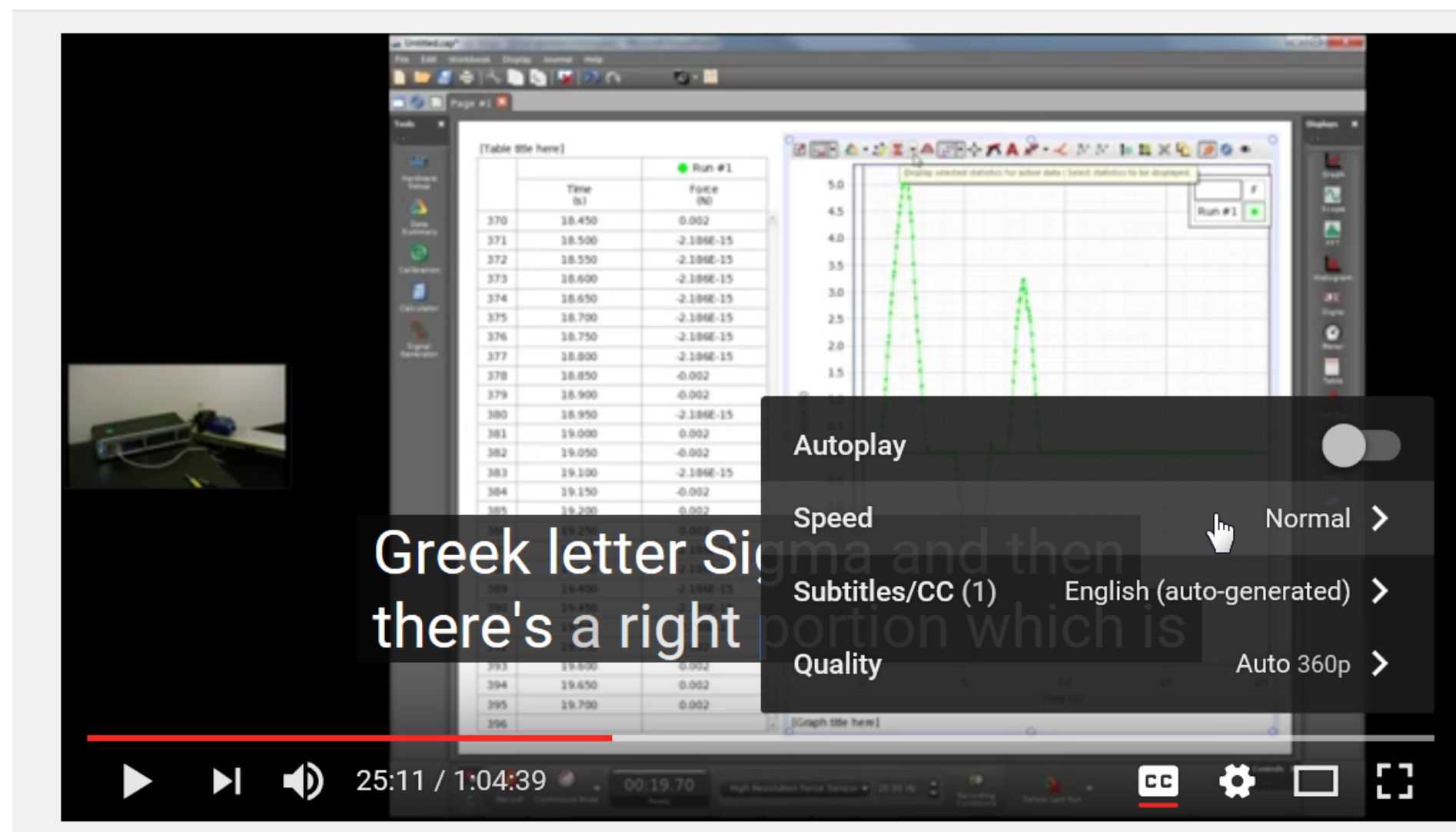
When live video is being shared, you have control of the relative size of the video and shared screen (live session only).

Session Recording



You'll receive a link to the session recording by email tomorrow.

YouTube



YouTube

- variable speed playback
- English captions (auto)
- translated captions (auto)
- Unlisted, but link is shareable
- *see YouTube description for links to start of each of today's four activities*

Session Files

<https://bit.ly/codinginscience>

Coding in Science webinar

from Glenn Starkey (Pasco Scientific) via [Dropbox Business](#)

Sorted by name



1 Phone Orientation



2 Sound Level



3 Energy Flow



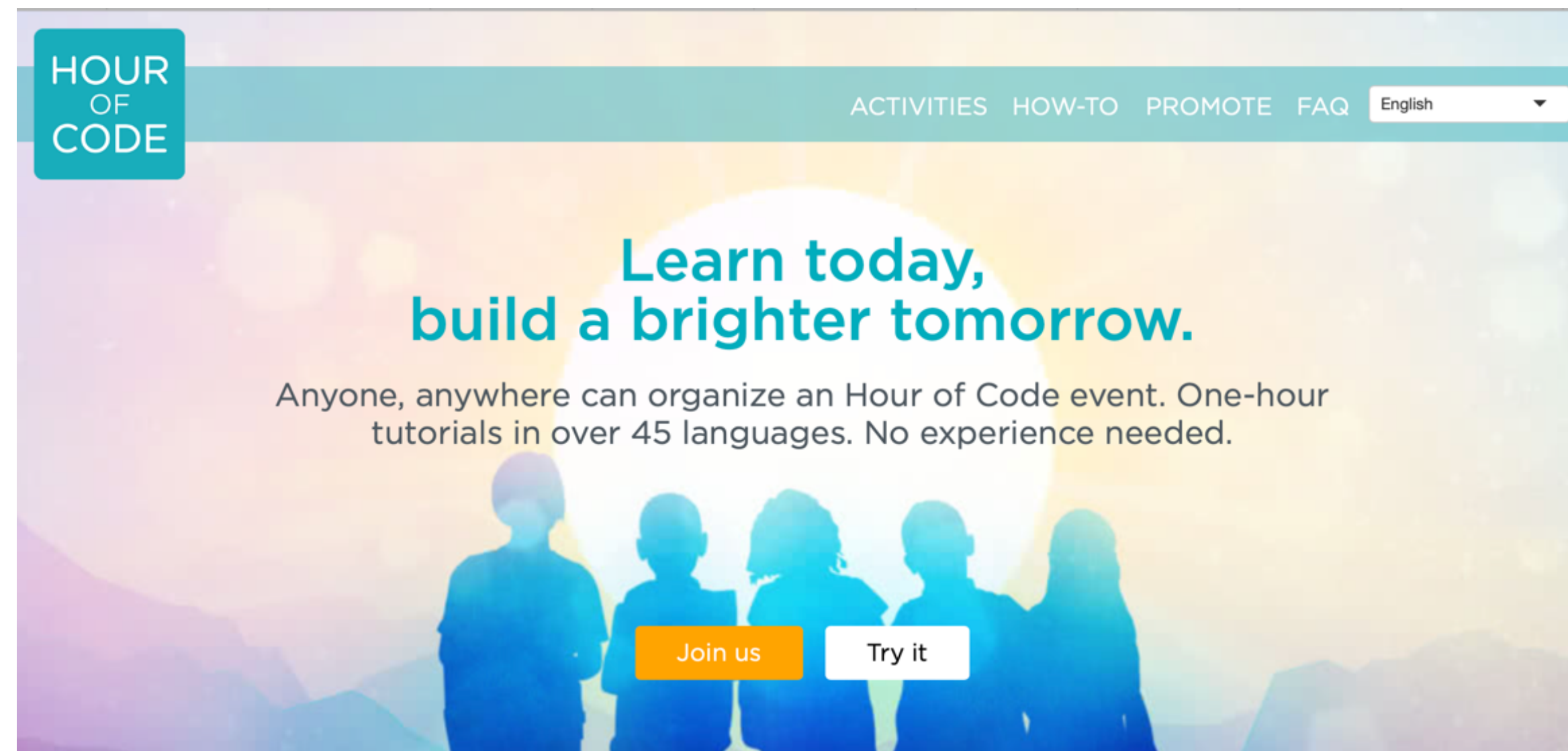
4 Chain on Pulley



Resources

Hour of Code

<https://hourofcode.com>



What is the Hour of Code?

The Hour of Code started as a one-hour introduction to computer science, designed to demystify "code", to show that anybody can learn the basics, and to broaden participation in the field of computer science. It has since become a worldwide effort to celebrate computer science, starting with 1-hour coding activities but expanding to all sorts of community efforts.

Poll

What's your experience level with coding?

Your Facilitators



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PASCO Curriculum and Professional Development

Today's Activities

presenter	topic	key equipment	software	features
	phone orientation	phone	SPARKvue	Blockly basics: sensor input, text output, program flow
	sound levels	//code.Node	SPARKvue	compound conditionals, physical outputs
	energy flow	temperature sensor	SPARKvue	variables, time, math operations, text & number outputs, lists
	chain on pulley	rotary motion sensor or photogate and pulley	PASCO Capstone	math model output & comparison to measurements

PASCO Software with Blockly Coding



licenses (and free trial) available for
Windows and macOS
free app for iOS, Android, and Chrome OS

data collection and analysis for all
sciences, elementary school through early
university



licenses (and free trial) available for
Windows and macOS

data collection and analysis especially for
physics and engineering, upper high
school through upper university

**includes Blockly coding for controlling
outputs based on sensor inputs**

software comparison: <https://www.pasco.com/products/guides/software-comparison>

Activity 1: Phone Orientation

aka: Turn that Frown Upside Down



Inputs Available on Smartphones

iPhone

✓ On-board Acceleration Sensor
<input type="checkbox"/> Acceleration, X
<input type="checkbox"/> Acceleration, Y
<input type="checkbox"/> Acceleration, Z
<input checked="" type="checkbox"/> Accel (Resultant)
✓ On-board Microphone
<input type="checkbox"/> Sound Level
<input checked="" type="checkbox"/> Sound Intensity

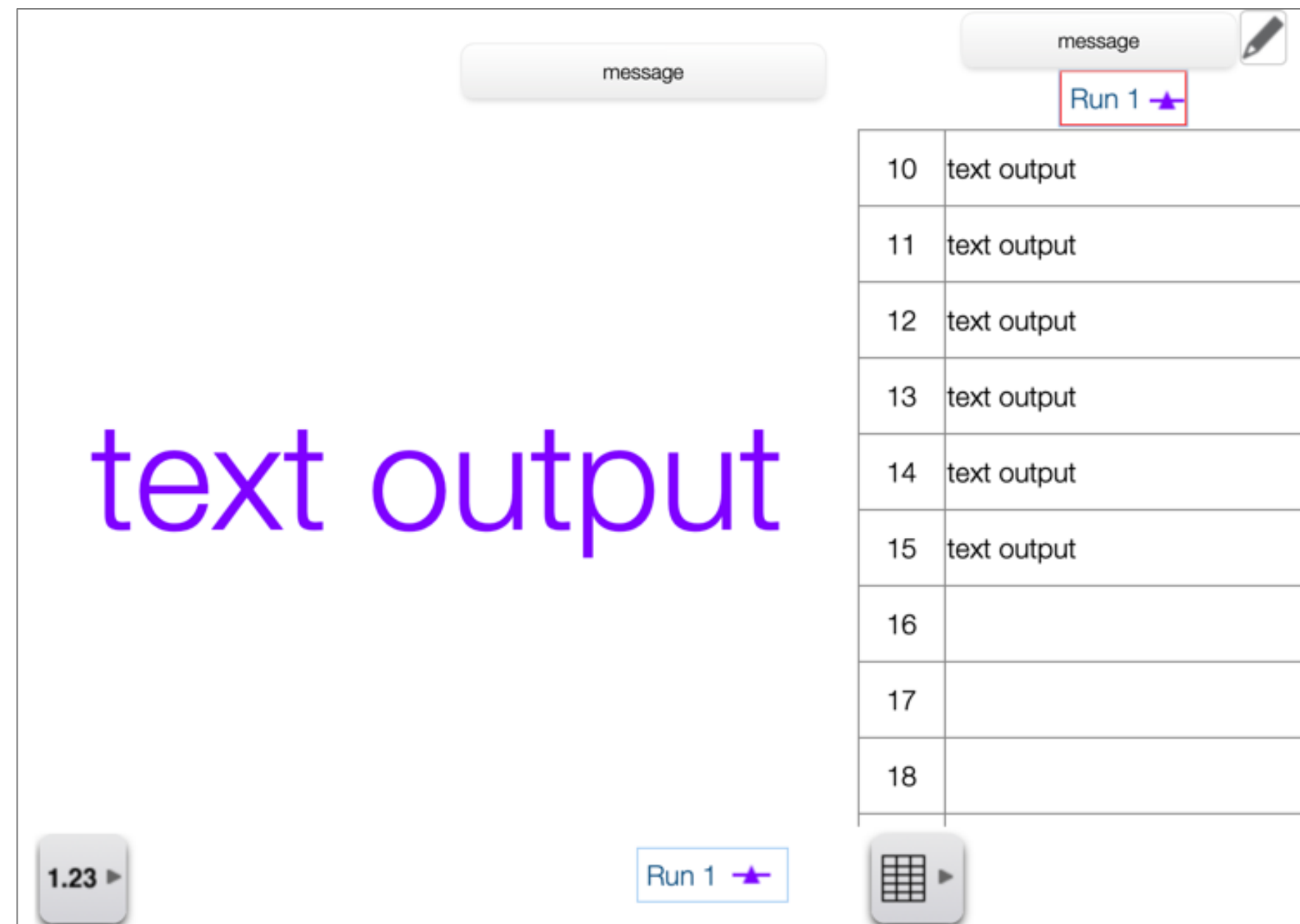
Android

✓ On-board Acceleration Sensor
<input type="checkbox"/> Acceleration, X
<input type="checkbox"/> Acceleration, Y
<input type="checkbox"/> Acceleration, Z
<input checked="" type="checkbox"/> Accel (Resultant)
✓ On-board Microphone
<input type="checkbox"/> Sound Level
<input checked="" type="checkbox"/> Sound Intensity

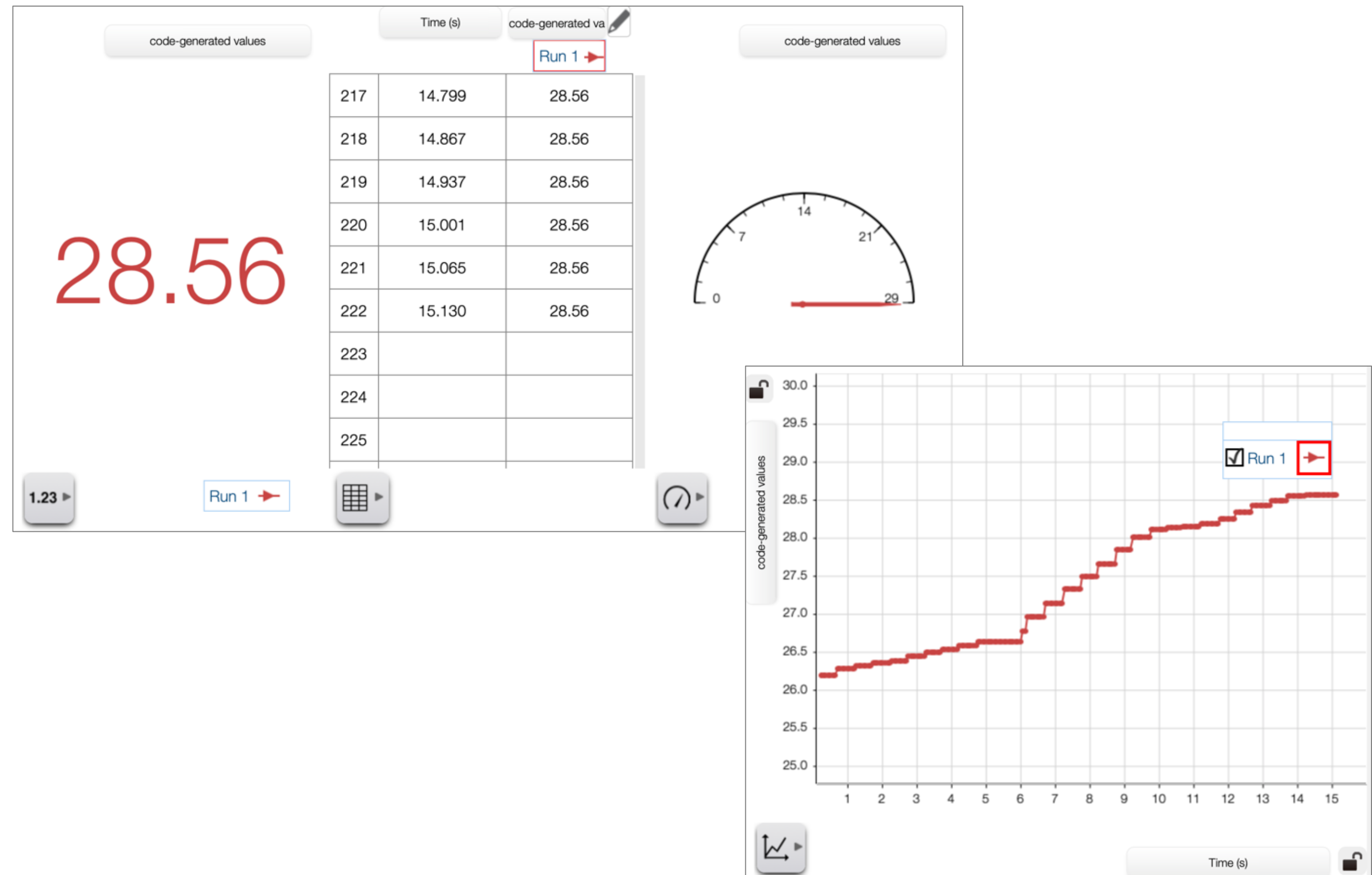
✓ On-board Light Sensor
<input checked="" type="checkbox"/> Light Level
✓ On-board GPS Sensor
<input checked="" type="checkbox"/> Latitude
<input type="checkbox"/> Longitude
<input type="checkbox"/> Altitude
<input type="checkbox"/> Speed

Outputs within SPARKvue

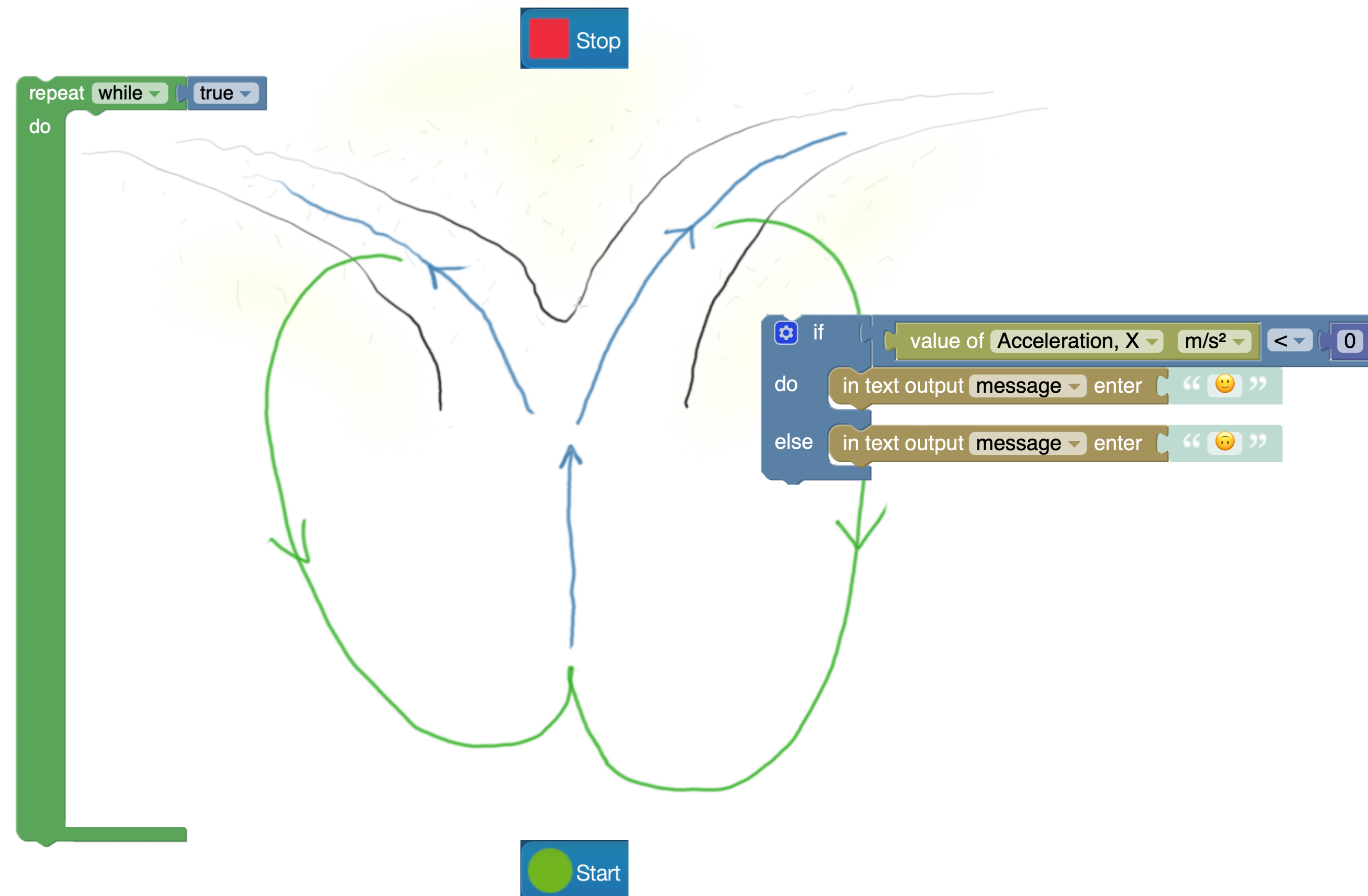
text



numerical



Program Flow



The Road Not Taken

BY ROBERT FROST

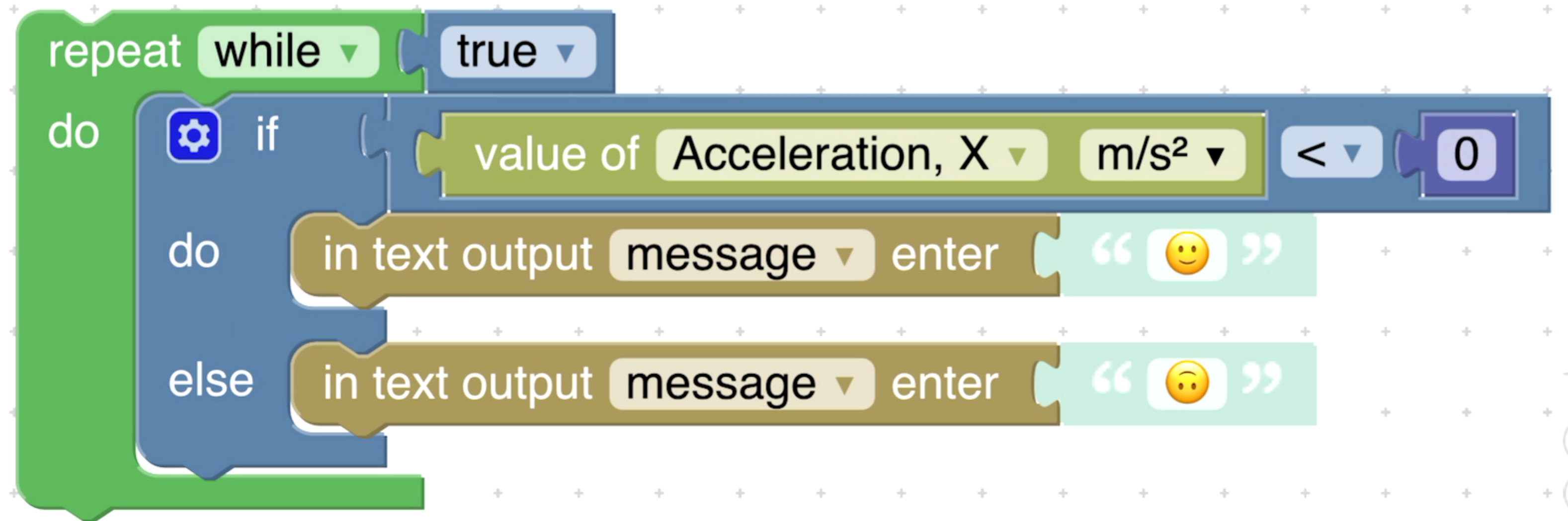
Two roads diverged in a yellow wood,
And sorry I could not travel both
And be one traveler, long I stood
And looked down one as far as I could
To where it bent in the undergrowth;

Then took the other, as just as fair,
And having perhaps the better claim,
Because it was grassy and wanted wear;
Though as for that the passing there
Had worn them really about the same,

And both that morning equally lay
In leaves no step had trodden black.
Oh, I kept the first for another day!
Yet knowing how way leads on to way,
I doubted if I should ever come back.

I shall be telling this with a sigh
Somewhere ages and ages hence:
Two roads diverged in a wood, and I—
I took the one less traveled by,
And that has made all the difference.

Phone Orientation Final Code



Additional Ideas with Phone Sensors

Acceleration

- pendulum timer
- step counter
- digital protractor/inclinometer
- (visual) motion/burgler alarm
- shake detector (→ dice or Magic 8 Ball)
- handwashing timer
- freefall detector (careful!)
- cart bumper design tester (careful!)
- visual accelerometer
- rolling wheel rotation → speed calculator
- righthand rule indicator
- dead reckoning position estimation
- reaction timer (via tap)
- motion-driven emoji-animated storytelling

Sound Level

- classroom loudness monitor
- visual loudness mapping w/ multiple phones
- acoustic stopwatch
- clap on | clap off
- dog bark “translator”
- sound-driven emoji-animated storytelling

Light (Android)

- pendulum timer
- fridge door opening counter

GPS (Android)

- Geocaching guidance
- compass heading indicator
- hike elevation gained/lost monitor
- car speeding (visual) alarm

Activity 2: Investigating Sound Levels



see separate slides

Activity 3: Energy Flow



see separate slides

Activity 4: Chain on Pulley



see separate slides

Hour of Code Tips

- Jump in, even if you don't know it all yourself yet. Look to students, school colleagues, community members, and this webinar's resources for help.
- Making coding mistakes and troubleshooting them is an expected part of the process and a key skill for programmers.
- When feasible, let your students' interests guide their explorations.
- Adapt to your students' (possibly widely varying) experience levels with coding. Consider:
 - grouping together students with diverse experience levels
 - for advanced students, coding from scratch, open-ended activities, extensions
 - providing partially-completed files for students to finish or fix:
 - complete complete except for variable values
 - "jigsaw puzzle" code for students to assemble
 - "broken" code for students to analyze and fix
- Celebrate your students' achievements and have fun.

visit <https://hourofcode.com> for more advice

Resources: Blockly Coding Reference

Blockly Coding
PASCO

Blockly Coding | 2 - Blockly Guide | 9

Logic

The logic blocks allow a user to make comparisons.

Logic

do

if

and

not

true

null

test

if true

if false

If Statement Block

An if statement will do some statements if a value is true. An **else if** and **else** statement can be added to the **if** block by clicking .

else if

if

else

do

The **else if** statement gets checked if the first **if** statement fails. If all the **else if** statements fail, then the **else** statement is performed.

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Blockly Coding | 2 - Blockly Guide | 48

Example 4: Perform Synchronous Functions



We can use the **get time in ms** block if we want tasks to happen every x amount of seconds. In this example, we set a variable `timeCheck` to the time stamp at the start of the program. We then use an if statement that has a condition where `timeCheck` will be set to the current time stamp every two seconds and also run the `setRandomLED` function (on page 31). At the same time, a separate conditional statement is set so that the `//code.Node` speaker will turn on by pressing Button 1 or turn it off by pressing Button 2. The loop does not have to stop before turning the speaker on or off. This does not work with the sleep blocks as seen in Example 2 (on page 46).

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PDF in bit.ly/codinginscience → Resources

Additional Resources

- products
 - SPARKvue: pasco.com/sparkvue
 - PASCO Capstone: pasco.com/capstone
 - comparison: bit.ly/comparesvcs
 - Blockly coding: bit.ly/pascoblockly
 - sensors: pasco.com/sensors
 - //code.Node: pasco.com/codenode
- experiments and activities:
 - Experiment Library: pasco.com/resources/lab-experiments (search/filter by keyword, subject, grade level, equipment)
 - Distance Learning Resources: pasco.com/resources/distance-learning
 - activity ideas: pasco.com/resources/blog
- free videos:
 - YouTube: youtube.com/pascoscientific
 - How Do I videos: youtube.com/pascohowdoi
- social
 - Twitter: [@pascoscientific](https://twitter.com/pascoscientific)
 - Facebook: facebook.com/pasco.scientific
 - Instagram: instagram.com/pasco.scientific
- live webinars: bit.ly/pasco-webinars
- Technical Support
 - email: support@pasco.com
 - chat: any page of pasco.com
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 - your regional PASCO rep: pasco.com/support

today's webinar files and resources:

bit.ly/codinginscience (Dropbox)

Q&A



You can leave the session by closing GoToTraining.

We'd appreciate your feedback if you have a moment to complete the brief post-training evaluation that will appear. Thanks.