# Leveraging the Power of Reflection and Digital Representation in Middle-Schoolers' Learning **During and After an Informal Science Visit** Amanda Dickes<sup>1</sup>, Catherine Haden<sup>2</sup>, David Uttal<sup>3</sup>, Leigh Peake<sup>1</sup>, Lauren Pagano<sup>2, 3</sup>, Danielle Rothschild<sup>3</sup>, Grace Ocular<sup>2</sup> & Eliza Jacobs<sup>1</sup>

## Background & Project Goals

Informal science learning experiences can greatly contribute to knowledge and interest in science, however, learners may have difficulty recalling and using scientific information and practices emphasized during these experiences.

Children acquire knowledge of science cumulatively across formal and informal activities and contexts, highlighting the need for informal science institutions to identify critical effective practices that support the consolidation of learning and memory from exhibit experiences to foster portable, usable knowledge across contexts.

This project harnesses the power and potential of visual representations for enhancing learning and seeks to understand how the use of visual representations can facilitate learners' conversational reflections during an informal science experience - LabVenture - and their subsequent use of knowledge acquired in the informal experience in future contexts, such as school and the home.

### Research Questions

- 1. Does reflection during an informal science learning experience promote students' retention, and subsequent use of science information and practices that are part of the experience?
- 2. Does interpreting and constructing visual representations, such as drawings, improve students' understanding and retention of information, and if so, how and when?
- 3. Does combining visual representations and narrative reflections confer benefits on students' science learning and engagement in science practices both during the informal learning experience, and later in their classrooms and at home?

### Acknowledgements



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# Focal Informal Learning Environment: LabVenture

LabVenture is a 2.5 hour inquiry-based informal science learning experience annually serving 70% of Maine's 5th and 6th graders, ~9,000 students, at no cost to schools. The experience combines data collection, visualization and interpretation, and narrative reflection to support learning about key changes in the Gulf of Maine ecosystem due to climate change.



### Connecting Learning across LabVenture, School, and Beyond Building infrastructure to conduct research at scale

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**Research Dashboard organizes data assets collected during LabVenture** 



Past Visit	View and export coort 12 months at a time	ding notes fr	om past visits up to
From: (06/01/20	23 To: 06/15/20		) <u>Go</u>
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Jun 09, 2023		01:00 PM	Start Coding
Jun 08, 2023		03:54 PM	<u>Start Coding</u>
Jun 08, 2023	Middle School of the Kennebunks	12:45 PM	Start Coding
Jun 08, 2023	Middle School of the Kennebunks	08:45 AM	<u>Start Coding</u>
Jun 07, 2023	Falmouth Elementary School	12:05 PM	<u>Start Coding</u>
Jun 07, 2023	Falmouth Elementary School	09:00 AM	Start Coding
Jun 06, 2023	Falmouth Elementary School	12:05 PM	<u>Start Coding</u>

Narrative reflections & Quick Coding



5:57	a8d3ba5
	Okay so um the ideal temperature have it for lobster has it's gone a lot warmer?
5:05	a8d3ba5
	So in the first image it was like cold and yeah cold.
5:07	8d78572
	It's like at this point couple of minutes ago and she said swimming.
5:10	a8d3ba5

he fourth one it is verv is a lot warmer and i he middle you missed the camera up now it all blurr 02:16:31 a8d3ba5

**Overhead video of touch table and** transcription of student talk

Combining Data Collection, Visual Representations & Narrative Reflection to Foster Learning about Climate Change

Out-of-School Contexts (Home)

Formal Science Classroom

### .abVenture

Investigating the portability of science knowledge acquired during LabVenture into school and beyond the classroom





### **GMRI LabVenture Response**

Jan 12

**Post-LabVenture video reflections recorded by** students and uploaded to the Flip! video sharing platform



**Digital companion classroom lessons re-introduce** familiar visual representations, support construction of novel visual representations, and provide opportunities to refine reflection responses