

Planting Seeds for the Future: Hands-on Ocean Education for K-12 students at the Dauphin Island Sea Lab

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Dauphin Island Sea Lab

Alabama Center for
Marine Education and Research



Dauphin Island Sea Lab

DISCOVERY HALL PROGRAMS



Sea Grant

MISSISSIPPI-ALABAMA

Experiential education is effective

- All levels education – university, K-12, free-choice
- Many fields of study –math, engineering, biology

at the middle school level. Using a convergent-parallel mixed methods design, researchers investigated the program and discovered (a) students in the experiential program perceived school as more enjoyable, (b) learning to successfully collaborate was a key factor leading to positive experiences for students, (c) students showed evidence of noncognitive skill growth, and (d) students in the experiential program progressed appropriately on standardized tests and did not differ significantly from their counterparts in traditional classes.

Scogin, S. C., Kruger, C. J., Jekkals, R. E., & Steinfeldt, C. (2017). Learning by Experience in a Standardized Testing Culture: Investigation of a Middle School Experiential Learning Program. *Journal of Experiential Education*, 40(1), 39-57. <https://doi.org/10.1177/1053825916685737>

Teaching and Learning Science Outdoors in Schools' Immediate Surroundings at K-12 Levels: A Meta-Synthesis

Ayotte-Beaudet, Jean-Philippe et al. "Teaching and Learning Science Outdoors in Schools' Immediate Surroundings at K-12 Levels: A Meta-Synthesis". *Eurasia Journal of Mathematics, Science and Technology Education*, vol. 13, no. 8, 2017, pp. 5343-5363. <https://doi.org/10.12973/eurasia.2017.00833a>

Biology Beyond the Classroom: Experiential Learning Through Authentic Research, Design, and Community Engagement ^{FREE}

Alexandria K Hansen, Patrice Connors, Dermot Donnelly-Hermosillo, Robert Full, Alisa Hove, Hayley Lanier, David Lent, Jasmine Nation, Kimberly Pause Tucker, Jennifer Ward, Lisa Whitenack, Erika Zavaleta, *Biology Beyond the Classroom: Experiential Learning Through Authentic Research, Design, and Community Engagement*, *Integrative and Comparative Biology*, Volume 61, Issue 3, September 2021, Pages 926–933, <https://doi.org/10.1093/icb/icab155>

The results of experimental research with 32 middle school students showed that a series of experiential tasks in engineering design process are effective activities to cultivate knowledge construction, intrinsic motivation and satisfaction of students, and stimulate students' interest in STEM fields.

The Role of Experiential Learning and Engineering Design Process in K-12 STEM Education
Long, Nguyen Tien; Yen, Nguyen Thi Hoang; Van Hanh, Nguyen
International Journal of Education and Practice, v8 n4 p720-732 2020

Outdoor education is ~~valuable~~ essential for students of all ages

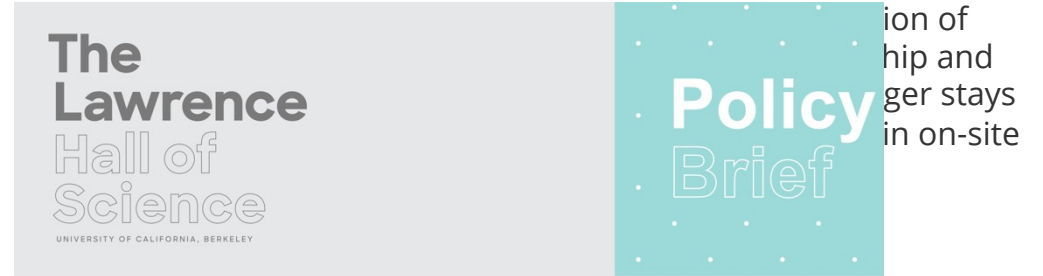
- Increases content knowledge, understanding
- Adds or improves skills
- More engaged, pay better attention
- More positive attitudes towards school
- More connected to nature / environment

essential

What Difference Does It Make? Assessing Outcomes From Participation in a Residential Environmental Education Program

Marc J. Stern, Robert B. Powell & Nicole M. Ardoin

...Great Smoky Mountains National Park and biodiversity. The authors found significant positive, short-term effects on all outcomes of interest. Also,



ion of
hip and
ger stays
in on-site

Research indicates that outdoor education, as conceived, administered, and taught and effective for learners opportunities to develop their knowledge and skills in ways that add value to their everyday experiences in the classroom.

A Field at Risk:

The Impact of COVID-19 on Environmental and Outdoor Science Education

Melissa Collins, Rena Dorph, Jedda Foreman, Aparajita Pande, Craig Strang, Aujanee Young

mental health benefits value to their everyday experiences in the outdoors, such as reduced stress and loneliness, and increased physical activity and resilience.

Dillon, Justin, Mark Rickinson, and Kelly Kearney. "The Value of Outdoor Learning: Evidence from research in the UK and elsewhere." *Towards a convergence between science and environmental education*. Routledge, 2016. 193-200.

Students make career choices well before college

- Students need to be engaged/excited
- Importance 21st century / soft skills
- Role models are important

VIRGINIA'S ACADEMIC AND CAREER PLAN EMPHASIZES

Middle School

Middle school is an important transition stage between elementary and high school and provides the perfect opportunity for life or career planning through the development of skills, knowledge, attitudes and awareness of careers.

Jones, V.; Oct. 2010: 24-27 acteonline.org

Comprehensive Guidance and Systematic Educational and Career Planning: Why a K-12 Approach?
Marion F. Starr | J. Career Development 23(1) Fall 1996

Exploring when, why, and how students circumscribe and compromise science careers

Lee Kenneth Jones | Rebecca I. Hite

Career Dev Q. 2023;71:68-81.

Using Robotics as a Tool to Engage Students in Technical Curriculum

Abstract

Student engagement is a necessary but complicated variable within STEM education, especially when dealing with technical curriculum. There are fewer curriculum resources available for teachers which are structured around a Technology and Engineering (T & E) STEM focus, and integrating robotics activities into teaching strategies for technical subjects provides an exciting and relevant learning platform. Experiential, "hands-on", programs that incorporate robotics provide practical experiences that positively influence a student's academic pursuit of STEM, and may help "hook" youth into technical college and career pathways and ultimately, the technical workforce. Students working with robotics have the opportunity to experience a team-based learning environment and are introduced to "real" engineering thought processes using problem based learning approaches on a robot with predictable behavior patterns. Students exposed to these types of experiences in a controlled environment gain an increased appreciation for the application of STEM topics learned in the classroom, and are introduced to the technical and engineering world of work and the challenges and successes that engineering teams face in their careers.

M Barger, MA Boyette
2015 ASEE Annual Conference & Exposition, 2015•peer.asee.org

[Middle Grades Review](#)

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Article 2

September 2019

Career Exploration at the Middle School Level: Barriers and Opportunities

Godbey, S., & Gordon, H. R. (2019). Career Exploration at the Middle School Level: Barriers and Opportunities. *Middle Grades Review*, 5(2).
<https://scholarworks.uvm.edu/mgreview/vol5/iss2/2>

What about Sea Grant?

- 34 Sea Grant programs around the US, all have education programs, many include K-12 programs
- At K-12 level, activities are not as focused on 'research to application', focused on environmental literacy (general)
- Sea Grant Education Network (SGEN) - large group of educators within NOAA



Plus Guam





The Dauphin Island Sea Lab

- Alabama's marine research & education center
- University Programs, Discovery Hall Programs Alabama Aquarium
- In 52nd yr of operation - chartered in 1971,
- Resilient – hurricanes, oil spills, pandemic
- 1st K-12 education programs in 1975!
- Key – have residential facilities





Discovery Hall Programs

**Marine Science Adventures
along Alabama's Natural Coastline**

Discovery Hall

School year field trips
revenue-based, non-scripted
focus – vessel-based program - MASGC

Summer camps – day, overnight
In house, and collaborative

Summer Marine Science class for
high school students

Professional Learning...
Summer in-person workshops
School year - Virtual workshops

Other programs
Sea Stars, Family Camp, Sea Lab
Science Fridays

Outreach
Classroom program- *BayMobile*
Public - festivals



Year	# students	# classes taught	% Alabama students	BayMobile reach
2022	8894	1130	77%	10284
2021	7737	356	76%	2424
2020	2013	250	76%	3840
2019	9785	903	88%	12843
2018	8496	714	86%	7426

Hands-on,
feet wet!!

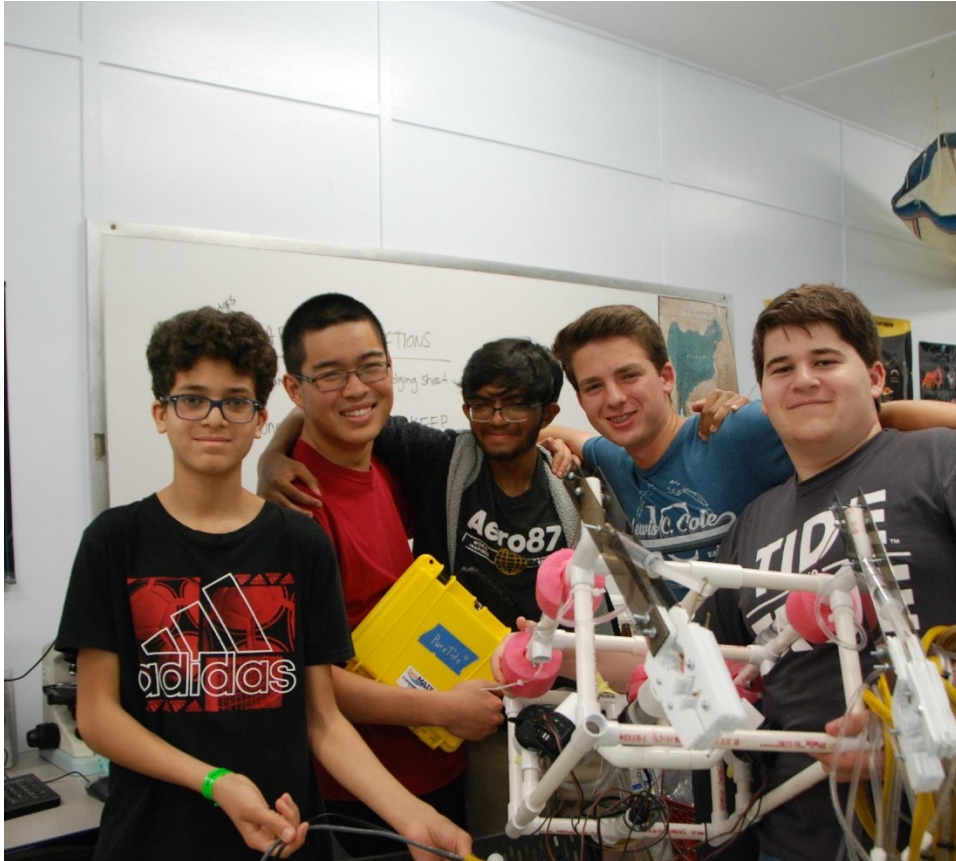


DHP's Marine Science Course for High School students

- Residential summer program
- >150 contact hrs
- Accepted for state science credit
- Eligible for college credit (BIO)
- Content, involvement of research faculty, field & lab experiences, small research project & oral presentation
- >1400 alumni



STEM Ed Program



- Focused on ROVs (remotely operated vehicles)
- Field class, build workshop, student competitions – 2 platforms (MATE, SeaPerch), outreach program, summer camp
- New loaner program
- Expanded – drifters, SLR, plankton

Making Waves in STEM
with Discovery Hall Programs

America's STEM Landscape

Applying STEM skills at Discovery Hall Programs

Making an impact

Category	Pre-test	Post-test
Learning science content knowledge	~40%	~60%
Choosing the gender gap	~30%	~50%

After participating in the "Making the Surf" class, UK students averaged 45% growth in science content knowledge scores and 15% the gender gap in science content knowledge score.





Professional Learning Opportunities

- Free - through grant funding, refundable registration fee
- In person and virtual
- Single day, week-long at DISL, multiple online sessions and on the road
- Earn CEUs/grad credit through partnerships



Education Internship Program

- Stipend & housing and board provided
- Has been supported by MS-AL Sea Grant thru omnibus funding ~10 yrs
 - Mentored by the team
- Expanded to include high school students



Dauphin Island Sea Lab's Discovery Hall Programs present:

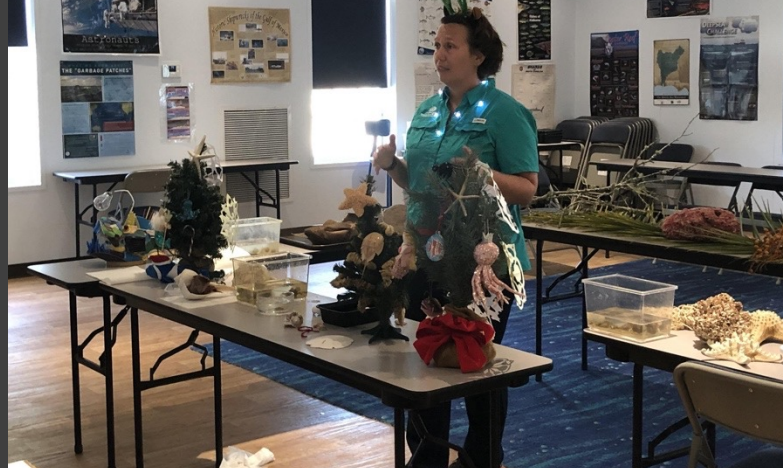
Marsh Mondays

Featuring: Salt Marsh Plants

Sea Grant
Mississippi-Alabama

DHP EDUCATOR: JOANN MOODY

0:05 / 3:38



Pandemic Pivots

- ED decided no layoffs even for revenue-based programs



Welcome to **Barrier Island Explorer's Virtual Summer Camp**

Day 1 Schedule:

- 9:00 - 9:15 Tech Check
- 9:15 - 10:15 Intros & Island BING
- 1:00 - 2:00 Exploring with SEEK
- 4:30 - 5:30 Animal Yoga & Night Beach Walk

Thanks!!!

- Some pivots have been sustained, others ...
 - Value of outdoor education compromised



Dauphin Island Sea Lab
DISCOVERY HALL PROGRAMS

Family CAMP

AT THE DAUPHIN ISLAND SEA LAB

This fun and educational overnight program includes guided adventures of Dauphin Island's diverse habitats, including kayaking the coastal wetlands and cruising aboard the Sea Lab's research vessel to see marine life up-close.

\$200 PER PERSON
Cost includes all activities, meals, and lodging.

For more information or to register, please scan the QR code below or email familycamp@disl.edu.

Adventure awaits!

DAUPHIN ISLAND SEA LAB

SCIENCE FRIDAYS!

Three different hands-on classes offered one Friday of each month in spring and fall.

Open to all ages and affordably priced for the whole family.

GREAT FOR SMALL HOME SCHOOL GROUPS!

Scan the QR code below for specific activities on each day!



It's a team effort!

- 8 full-time educators
- Administrative assistant / registrar
- Scheduler
- Whole team of counselors (summer)
- Support from other areas of the Sea Lab

Bigfin squid – Magnapinna
2400 m, Gulf of Mexico, 2021



*Waving fins
to say thanks for your time!*