

Experiential Outdoor-based STEM Activities with Diverse Students

Dr. Lynn Knight and Celeste Carrera
Colorado State University Pueblo

Courage to Risk Conference

8:15 -9:25 SAT 1/22

Zen Walk In

- Let's take a moment to “Walk In” with a Zen mind to the work we will be doing.
- Grounding
- Mindset “Think Outdoors – even when indoors” –



OUTDOORS WITHIN

- Bring Nature into your classroom virtually:
- https://youtu.be/PyFN_FYwqvc
- [#VirtualHike](#) [#4KUHD](#) [#Canada](#)
4K Virtual Hike through Canadian Forest (with Nature Sounds)



Individual Reflection Time



- Field Note Journals
- ZEN time to reflect: Plan time for your students to have quiet reflection time to just “be” and share through their own way (art or writing that is “hands-on”)
- Then you can share in group.



STEM and Students in Special Education and/or at-risk

- STEM education is an ongoing opportunity for students to use problem-solving skills and higher-level thinking in a fun way.
- Exposing students to a variety of ways to learn expand opportunities and work the brain in a way that creates more active connections.
- A special needs child may be delayed in one subject like reading but be exceptional (and even gifted) in another like math.
- This is called Twice Exceptional.
- Participating in a subject he excels at will give him a sense of achievement that he doesn't feel otherwise.
- Not only are students with special needs capable of doing STEM activities, but they also enjoy them.
- STEM/A activities are more exciting and interesting.
- When they are active with their bodies with their minds in the activities they will more often retain what they learn.



How to Help Students with Disabilities Thrive in STEM using Nature and Outdoors

- Differentiate instruction to support all students to include nature and movement.
- Capture student attention with short, interesting and meaningful activities based on STEM/A.
- Embrace Failure and Encourage Risk-Taking.
- Technologies can support students who struggle.
- Promote creative communication through the use of a variety of experiences.
- Nature in itself can bring about neurodevelopmental activity in the brain.

How do you become a Teacher that is comfortable with STEM/A, Outdoor Based Experiential Learning with your students of diverse needs?



- Lead by Example
- Create short opportunities for success before big ones
- Have creative and interesting ideas by expanding what you think you can do
- Hands On, Feet Down and Nature In
- Support for Disability Needs
- Be Flexible
- Keep Expectations High
- Bring Nature In as well as take students out

Experiential Education Cycle



- Complete the cycle by having a clear **Itinerary**.
- Being Flexible and yet still structured.

Having Fun/Being Creative



- All work and no fun makes no one happy.
- Joining in with excitement helps to build strength within your group.
- You can always pull any activity back into what skills can be connected back to good teaching.

Safety and Health Issues to Consider

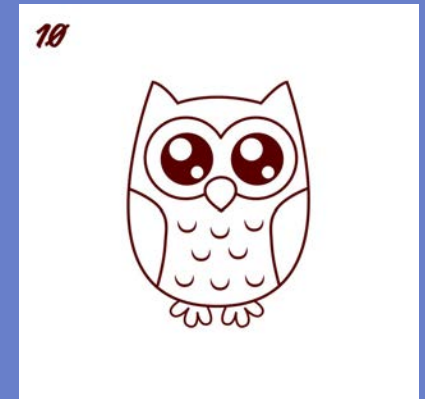


- Have a discussion about any concerns with health and safety ahead of time.
- Make sure you have consent from the school administration
- Work ahead to have students prepared physically for what you will be doing.
- Have an alternative plan for them if they can't do the activity and yet still can be included.

STEM/A Owl Pellet Experiential Outdoor Activity

<https://youtu.be/wsDQNYAOitU>: How to Draw an OWL

- Owl Pellet STEM/A activities
 - <https://youtu.be/aY1zsBH0vnk>
 - Dissection of Owl Pellet
 - Drawing bones
- Art Project – Paint/Draw Owl
 - <https://www.diybunker.com/how-to-draw-an-owl-easy-step-by-step/>



OWL Pellet Dissection

- Not poop! But it is regurgitated by the OWL.
- Owls eat a variety of small animals, including mice, rats, frogs, birds, squirrels, snakes, fish, and lizards.
- They often swallow these prey whole. Since the owl's body can't digest fur, bones, or teeth, these pieces are later regurgitated, or coughed up, as small oval objects known as owl pellets, just like cats cough up hairballs!



OWL Pellets

These owl pellets have been freshly regurgitated.

- **Materials**
- Owl pellets
- Two (2) pairs of tweezers
- Paper towels
- A guide to prey animal skeletal anatomy
- A magnifying glass (optional)
- water
- **Question and hypothesis**
- Before you begin your lab, think of a question you'd like to answer. Write down your question in your notebook.



BREAK OUT Discussion

- What concerns or thoughts do you have about being outdoors or doing experiential activities with your students?
- What can we do to make STEM/A activities connect with standards?



Scouts and Community Children



Being with Students



Rocky Mountain Conservatory Lab (RMBL)



Contact Information

- Lynn Knight at CSU-Pueblo
- lynn.knight@csupueblo.edu
- (828)-550-2267



Resources



- **How STEM Education Can Help Children With Special Needs**
- <https://specialedresource.com/stem-education-can-help-children-with-special-needs>
- Here are a few [Special Education Resources](#) specifically for math and science you can work on together at home.
- [Strategies To Assist In Today's Math](#)
- [3 Incredible Science Strategies](#)
- [4 Outside Of The Box Ideas For Children Struggling with Math](#)
- [Educational Resources Online](#)
- **Here are a few other great resources for finding STEM activities:**
- [50+ Hands-On STEM Activities for Learning](#)
- [5 Best STEM Products for Kindergarten Students](#)
- [STEM for Students with Special Needs](#)
- <https://www.dreamclasses.org/blog/2016/hc/stem-and-special-needs-students.html>

STEM – Outdoor Experiential Resources



- SeaCoast Science Center: https://www.seacoastsciencecenter.org/explore-and-learn/your-learning-connection/?gclid=CjwKCAiA_omPBhBBEiwAcg7smRXFifaFZ7_HLV9cMnmELBFV1MkEZ9Y7GLiO2IJMEOAN8POPYY39XxoCZSoQAvD_BwE
- Example: **STEM Design Challenge**
- Raspberry, the Three-toed Box Turtle: <https://youtu.be/wEvXINVcJlQ>
- **Build a Box Turtle Habitat**
- Our very own three-toed box turtle, Raspberry, is getting a new habitat at Seacoast Science Center! What type of habitat do you think would suit him best? If you were a box turtle, would you like a large space or a cozy space? Hidden or exposed? Up high or underground?
- <https://www.seacoastsciencecenter.org/wp-content/uploads/Build-a-box-Turtle-Habitat.pdf> Worksheet for students
- <https://kids.nationalgeographic.com/nature/habitats>

Resources

- **Why Are Students With Disabilities So Invisible in STEM Education?**
- <https://www.edweek.org/education/opinion-why-are-students-with-disabilities-so-invisible-in-stem-education/2020/07>
- [Office of Special Education and Rehabilitative Services Blog](#)
- **U.S. Department of Education**
- [Early Education Inclusion in STEM Can Lay Groundwork for Future](#)



INNOVATION FOR INCLUSION IN EARLY EDUCATION