

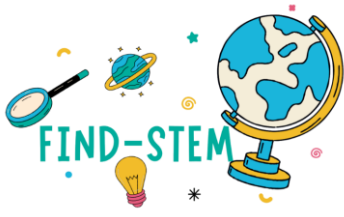
# **Fostering Innovations and Nurturing Diversity in STEM Education**

**- FIND STEM -**

**2024-1-EL01-KA210-SCH-000249907**

**Continuous Professional Development  
Curriculum and Teacher  
Training**

**Module 4: Digital Literacy and  
Technology Integration**



# Digital Literacy and Technology Integration

## Description

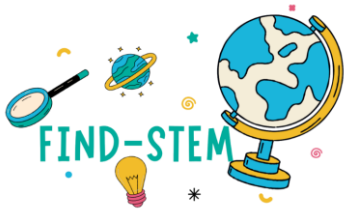
This module introduces teachers to **creative, student-centred pedagogies**—namely **project-based, inquiry-based, and experiential learning**—while embedding **inclusive practices** within STEM teaching. The session emphasizes **practical implementation** to cater to diverse learning needs and foster engagement across varying contexts.

## Key Topics

- Digital literacy;
- technology integration;
- real-world problem solving

## General Learning Outcomes

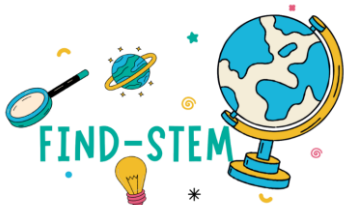
- Learn how to design STEM project that promotes teamwork and real-world application
- Understand how to practice structuring lessons using guiding questions to promote critical thinking
- Explore hands-on activities to engage different sensory and cognitive styles



## Activities

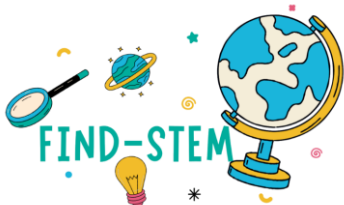
<b>Activity 1</b>	
<b>Create a Weather Report Using a Digital Presentation Tool</b>	
<b>Specific Learning Outcomes</b>	Understand basic weather concepts (temperature, precipitation, wind). Learn to gather and interpret simple weather data. Use a digital presentation tool (e.g., Google Slides, PowerPoint) to present findings.
<b>Teaching Methods and Approaches</b>	Project-Based Learning (PBL) Framework Collaborative Learning
<b>Duration</b>	45 min
<b>Delivery format</b>	Face to face
<b>Activity description</b>	
<p>This activity helps teachers in several meaningful ways by supporting both pedagogical goals and technology integration in STEM education, such as: supports cross-curricular teaching; builds student digital literacy; promotes collaboration and communication by using different presentation tools.</p> <p><b>Session flow:</b></p> <p><b>1. Introduction</b></p> <ul style="list-style-type: none"> <li>• Begin with a short interactive discussion: “What is weather?”</li> <li>• Show a sample weather report from TV or YouTube (2–3 mins clip).</li> <li>• Explain today's task: "You will create a digital weather report!"</li> </ul> <p><b>2. Research &amp; Planning</b></p> <ul style="list-style-type: none"> <li>• Divide teachers into groups of 3–4.</li> <li>• Guide them to a child-friendly weather website (e.g., <a href="https://weather.com">https://weather.com</a>, BBC Weather).</li> <li>• Each group records: <ul style="list-style-type: none"> <li>○ Today's temperature and condition (e.g., sunny, cloudy)</li> <li>○ Forecast for tomorrow</li> <li>○ Suggestions on what to wear</li> </ul> </li> </ul> <p><b>3. Presentation Creation</b></p> <ul style="list-style-type: none"> <li>• Introduce Google Slides or PowerPoint basics.</li> <li>• Slide guide: <ul style="list-style-type: none"> <li>○ <b>Slide 1:</b> Title and today's weather</li> <li>○ <b>Slide 2:</b> Tomorrow's forecast</li> <li>○ <b>Slide 3:</b> Advice: “What should you wear?”</li> </ul> </li> <li>• Teachers insert icons/images (e.g., sun, rain), text, and voice if possible.</li> </ul> <p><b>4. Reflections</b></p> <p>a) Ask each group to share:</p> <ul style="list-style-type: none"> <li>○ A quick summary of their project idea (30–60 seconds)</li> </ul>	





	<ul style="list-style-type: none"> <li>○ The digital tools they selected</li> </ul> <p>b) End with a <b>whole-group reflection</b> prompt:</p> <ul style="list-style-type: none"> <li>○ “What’s one idea from another group you’d like to adapt for your classroom?”</li> </ul>
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>• Peer feedback</li> <li>• Group presentations</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• Canva: <a href="https://www.canva.com/templates/s/weather/">https://www.canva.com/templates/s/weather/</a></li> <li>• Slidesgo: <a href="https://slidesgo.com/theme/weather-forecast-infographics">https://slidesgo.com/theme/weather-forecast-infographics</a></li> </ul>

<b>Activity 2</b>	
<b>Build a Virtual Bridge Using Digital Tools</b>	
<b>Specific Learning Outcomes</b>	Understand forces (load, tension, compression). Explore engineering design through trial and error. Apply math concepts like symmetry and measurement. Use simulation tools to model and test structures.
<b>Teaching Methods and Approaches</b>	<ul style="list-style-type: none"> <li>• Project-Based Learning</li> <li>• Gamified Learning</li> <li>• Collaborative Learning</li> </ul>
<b>Duration</b>	50 minutes
<b>Delivery format</b>	Face to face
<b>Activity description</b>	
<p>This activity provides powerful benefits for teachers by combining engineering principles, math application, and technology integration in a highly engaging and hands-on format, such as: integrates technology purposefully; supports problem-based and experiential learning; builds resilience and growth mindset.</p> <p><b>Session flow:</b></p> <p>a) <b>Introduction</b></p> <ul style="list-style-type: none"> <li>• Ask: “What makes a bridge strong?” Show examples (suspension, arch, beam).</li> <li>• Play a video showing bridge failures vs. strong designs.</li> <li>• Introduce key concepts (tension, compression, load distribution).</li> </ul> <p>b) <b>Demonstration</b></p> <ul style="list-style-type: none"> <li>• Introduce bridge-building simulation (e.g., <i>Bridge Constructor</i>, <i>West Point Bridge Designer</i>, <i>PhET Interactive Simulations</i>).</li> <li>• Demonstrate building a simple bridge.</li> </ul> <p>c) <b>Bridge Challenge</b></p> <ul style="list-style-type: none"> <li>• Teachers work in pairs. Goal: Build a virtual bridge that can:               <ul style="list-style-type: none"> <li>○ Hold a car or truck without collapsing</li> <li>○ Stay within budget (if using simulation with cost constraints)</li> <li>○ Use no more than X materials (e.g., 20 beams)</li> </ul> </li> </ul> <p><b>4. Testing &amp; Reflection</b></p> <ul style="list-style-type: none"> <li>• Teachers test their bridges.</li> <li>• Reflect with guiding questions:               <ul style="list-style-type: none"> <li>○ What part failed first?</li> </ul> </li> </ul>	



	<ul style="list-style-type: none"> <li>○ How did you fix it?</li> <li>○ What did you learn about balance and support?</li> </ul>
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>• Peer feedback</li> <li>• Group discussions</li> </ul>
<b>Resources</b>	<ul style="list-style-type: none"> <li>• Interactive simulations:  <a href="https://phet.colorado.edu/en/simulations/magnet-and-compass/activities">https://phet.colorado.edu/en/simulations/magnet-and-compass/activities</a> </li> </ul>

<b>Activity 3</b>	
<b>Code a Simple Animation About the Water Cycle</b>	
<b>Specific Learning Outcomes</b>	Plan a storyboard representing these stages. Use block-based programming (Scratch) to animate a scientific process. Demonstrate digital storytelling using sequencing and logic.
<b>Teaching Methods and Approaches</b>	Scaffolded Instruction Constructivist Approach
<b>Duration</b>	50 minutes
<b>Delivery format</b>	Face to face

### **Activity description**

This activity empowers teachers to integrate science, technology, and creativity while fostering digital competence in students. It bridges science content with coding, makes abstract processes visual and interactive, builds digital literacy and coding confidence, encourages creativity and student voice.

#### **Session flow:**

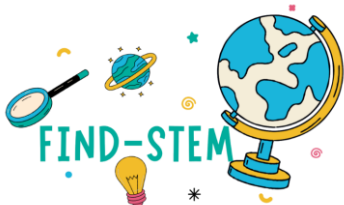
#### **Session 1: Introduction and Planning**

- Water Cycle Recap**
  - Use diagrams or an interactive animation to review evaporation, condensation, precipitation, and collection.
  - Discuss what happens in each stage and how they repeat.
- Coding Demo**
  - Log into <https://scratch.mit.edu>
  - Show a simple animation (1 sprite moving across 4 backgrounds)
  - Walk through key blocks: motion, looks, events
- Storyboard Design**
  - Teachers draw or write 4 stages in sequence.
  - Decide what the sprite (e.g., water droplet) will say/do at each stage.

#### **Session 2: Coding & Presentation**

- Coding**
  - Teachers build their water cycle animation with help:
    - Use 4 backdrops (one per stage)
    - Use sprites with speech bubbles
    - Add transitions or sound effects
- Presentations**
  - Each teacher or group shares their Scratch animation.





<b>Reflection</b>	
c) Ask each teacher / group to share: <ul style="list-style-type: none"> <li>○ A quick summary of their project idea (30–60 seconds)</li> <li>○ The technical specifications they selected</li> </ul> d) End with a <b>whole-group reflection</b> prompt: <ul style="list-style-type: none"> <li>○ “What’s one idea from another group you’d like to adapt for your classroom?”</li> </ul>	
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>• Peer feedback</li> <li>• Group discussions</li> </ul>
<b>Resources</b>	Scratch: <a href="https://scratch.mit.edu/projects/editor/?tutorial=getStarted">https://scratch.mit.edu/projects/editor/?tutorial=getStarted</a>

## Resources

Canva: <https://www.canva.com/templates/s/weather/>

Interactive simulations: <https://phet.colorado.edu/en/simulations/magnet-and-compass/activities>

Scratch: <https://scratch.mit.edu/projects/editor/?tutorial=getStarted>

Slidesgo: <https://slidesgo.com/theme/weather-forecast-infographics>

## Summary of key takeaways

- Develops students' basic research, digital presentation, and public speaking skills
- Encourages integration of science and digital storytelling;
- Promotes computational thinking through storytelling

## References

- Digital Literacy for All Through Integrative STEM:  
[https://link.springer.com/chapter/10.1007/978-3-319-07482-5\\_12](https://link.springer.com/chapter/10.1007/978-3-319-07482-5_12)
- Teaching Digital Literacy & STEM:  
<https://kidsparkeducation.org/blog/teaching-digital-literacy-stem>
- Technology Integration in STEM Education: Tools and Techniques:  
<https://onlineprograms.education.uiowa.edu/blog/technology-integration-in-stem-education-tools-and-techniques>

