

**74. Science, Technology, Engineering, and Mathematics Cluster - Biology Careers (4 hours)**

<b>Purpose/Abstract:</b> To introduce students to biology careers.			
<b>NCCCS Adult Education Standards:</b> R.5.2.8, S.1.2.1 , M.4.2.2			
<b>Learning Objective:</b> <i>By the end of the session, students will be able to:</i> <ul style="list-style-type: none"> <li>• Compare and Contrast two Biology careers -Biologists and Biological Technicians.</li> <li>• Describe what biologists do with examples.</li> <li>• Explain how biologists use statistics in their work.</li> </ul>			
<b>Soft Skills</b>	teamwork	<b>Resources</b>	<a href="#">Biologist Career Video</a>  <a href="#">What Biologists Do: Crash Course Biology #3</a>  <a href="#">Kentucky Elk Calf Study</a>
<b>Additional Materials</b> <ul style="list-style-type: none"> <li>• Graph paper - 2-3 for each student</li> <li>• Art supplies (glue, glitter, markers, paint, etc.)</li> <li>• Pencils, paper, and scissors</li> <li>• Computers for student use</li> </ul>			
<b>Icons</b>	 <b>Activity</b>	 <b>Check-In</b>	 <b>Review</b>

**PREPARATION**

- Watch the videos and be prepared to explain the contents during each section.
  - [Biologist Career Video](#)
  - [What Biologists Do: Crash Course Biology #3](#)
  - [Kentucky Elk Calf Study](#)
- Review the [Instructional Support Guide](#) and print/prepare referenced scaffolds.
- Print handouts.
- Familiarize yourself with [O\\*NET](#)
- Familiarize yourself with [Skills to Pay the Bills](#), though it won't be used directly in this lesson.

**INTRODUCTION (30 min)**

Welcome students to the class!

Inform students that they will continue exploring the STEM cluster in this lesson.

Ask the following questions and facilitate a brief discussion based on student responses:



- *Have you ever wondered about the work scientists do in the real world?*
- *What comes to mind when you think of biologists and their roles?*
- *Can you name any places or situations where you think biologists might work or be needed?*

Explain that today's lesson is about exploring careers in biology. Mention that biologists work in multiple areas. Play [Biologist Career Video](#) and explain that through this lesson students will dive deeper into this role and understand how their work is important to all of us.

Share the lesson objectives.

## VOCABULARY, READING & WRITING (45 min)

Begin by explaining the purpose of the activity: to compare and contrast two important science roles, Laboratory Technicians and Biologists. Mention that students will first listen as you read the role summaries aloud to the class. Project the role summaries as you read out loud or have students take turns to read out loud.

Read aloud the role summary for Laboratory Technicians, emphasizing key points. Discuss any unfamiliar words or concepts briefly, ensuring students understand the role. Repeat the same process for the role summary of Biologists.

Write the outline format on the whiteboard for students to see:

- Roles: Describe what each role involves.
- Comparison: List what is similar between the two roles.
- Contrast: List what is different between the two roles.

Divide the class into small groups, ensuring each group has access to the role summaries. Assign each group either "Laboratory Technicians" or "Biologists." Instruct them to work together and fill out the outline for their assigned role. Provide the following details for the role descriptions. Have students copy this down in their groups.

### Roles

1. Laboratory Technicians
  - What They Do
    - Help scientists with experiments.
    - Use special tools and machines.
    - Collect data and information.
    - Keep records of experiments.
2. Biologists:
  - What They Do:
    - Study all kinds of living things.
    - Learn about how life starts and changes.
    - Do research in labs and outside.
    - Write about what they discover.

After the groups have had time to discuss and complete their outlines, Instruct students to list out the similarities and differences for these roles.

Clarify any misconceptions or provide guidance as needed.

 REFLECTION (15 minutes)

✓ Ask each group to share their findings, starting with what they know of both the roles and then moving on to reading the key highlights of each role. Encourage students to listen and take notes as other groups present.

Use this compare/contrast list to add to student responses.

Similarities	Differences
<p><b>Both Laboratory Technicians and Biologists:</b></p> <ul style="list-style-type: none"> <li>● Do science experiments.</li> <li>● Collect data and information.</li> <li>● Need to be careful and pay attention.</li> </ul>	<p><b>Laboratory Technicians:</b></p> <ul style="list-style-type: none"> <li>● Work with machines and tools.</li> <li>● Help scientists with their work.</li> <li>● Need to be good at using computers.</li> <li>● Keep records of what they do.</li> </ul> <p><b>Biologists:</b></p> <ul style="list-style-type: none"> <li>● Study all living things.</li> <li>● Learn about life and how it changes.</li> <li>● Do research in different places.</li> <li>● Write about what they find out.</li> </ul>

Emphasize the importance of both roles in the scientific world.

**Instructor Note:** This activity encourages students to think critically, compare and contrast information, and gain a better understanding of different science roles. It also highlights the importance of teamwork and effective communication when working on assignments. If it helps, connect it to the reading standard of this lesson to explain.

Lower Level	Higher Level
<p>Ensure the groups have an equal mix of skills and abilities so students can get support from their peers.</p>	<p>Have students brainstorm more engaging ways of presenting this information.</p>

**GROUP WORK** (75 min)

Explain that students will work in groups to learn more about what biologists do and how data collection and statistics are important in biology.

Show the video: [What Biologists Do](#).

Ask students to pay close attention to the different aspects of biology careers and the diverse settings in which biologists work.

Divide students into groups of 3-4. Provide the groups with a list of discussion questions related to the video, such as:

- What are some unique environments or habitats that biologists study?
- What are the various settings where biologists work?
- How do biologists use data in their work?
- What are some examples of specialized areas within biology?

Instruct each group to discuss these questions and take notes. Consider sharing the video link with groups so they can rewatch these sections to get answers.

Have a few groups share their takeaways from this video.

Explain that the second video will demonstrate how biologists collect data in the field, specifically when tagging elk calves. Connect it back to statistics and data collection they learned in the previous lesson.

Play the video from 17:45 minutes: [Kentucky Elk Calf Study](#)

Ask students to pay attention to the data collection process and how it is applied in biology. Tell them to think about the following questions as they watch:

- What is the purpose of the elk calf study mentioned in the video?
- How do the researchers locate the elk calves in the Eastern area of the elk zone?
- Can you explain the process of putting an expandable VHF collar on an elk calf and taking body measurements?
- What challenges do you think the researchers might face when conducting this type of study in the field?
- How does data collection, such as tracking elk calf movements and measuring their physical characteristics, contribute to the research objectives?

In their groups ask students to discuss the answers to these questions. Consider sharing the video link or replaying parts if students want more clarifications.

Have a student volunteer from each group answer one of the questions they discussed.

Instruct groups to brainstorm other areas or situations in their county or neighborhood where biologists might rely on data collection. Give them a few examples such as: bird migration patterns, water quality monitoring, insect population, urban wildlife, traffic patterns vs. roadkill incidents, etc.

Encourage students to think creatively about what data they would collect if they were biologists. Have each group come up with a short speech about what they will choose to research if they were biologists and how they will collect and analyze the data.

 REFLECTION (15 minutes)

Have one person from each group present their speech. Discuss the real-world applications of biology and data collection in improving communities and the environment.

Summarize the main points from the activity, emphasizing the diverse nature of biology careers and the crucial role of data collection in biology.

**MATHEMATICS (45 min)**

Review bar graphs with students. Ask questions to help them remember activities they’ve done so far to practice graphing data. Remind students about the parts of a graph and what data sets are.

Explain that today they will create both bar graphs using fictional data obtained from biologists who study the elk calf population.

Distribute graph paper pencils, erasers, colored pencils or markers to students.

**Activity 1:**

Project the data table showing the number of elk calves found each month and give the following instructions.

Month	Elk Calves Found
January	5
February	7
March	10
April	8
May	12

- **Set up the graph:** Draw a vertical bar graph with months on the horizontal axis and "Number of Elk Calves Found" on the vertical axis.
- **Data entry:** Use the provided data to draw bars above each month, representing the number of elk calves found.
- **Complete the graph:** Add a title ("Number of Elk Calves Found Each Month") and use colors if desired.
- **Interpret:** Analyze the graph to find trends or differences in elk calf sightings each month.

Have a few students share what trends or differences they spot across the months.

**Activity 2:**

Inform students that they will create bar graphs for multiple data sets such as elk measurements (Weight, Body Length, Chest Girth). Draw an example of a scaled bar graph for

Project the data table and give the following instructions.

Elk	Weight (lb)	Body Length (in)	Chest Girth (in)
Elk 1	180	60	40
Elk 2	220	65	45
Elk 3	190	50	38
Elk 4	210	63	42

- **Set up the graph:** Draw one vertical bar graph with all elk labeled on the horizontal (x) axis and measurement values (Weight, Body Length, Chest Girth) on the vertical (y) axis.
- **Choose a scale:** Determine a suitable scale for the vertical (y) axis based on the measurement range for each parameter (e.g., each inch represents 10 units of Weight/ length).
- **Data entry:** Use the provided data to draw bars for each elk's measurement values under the respective measurement category (Weight, Body Length, Chest Girth).
- **Complete the graph:** Add titles for each measurement category ("Elk Weight," "Elk Body Length," "Elk Chest Girth") and use colors to differentiate between measurements. Include a key or legend.
- **Interpret:** Analyze the graph to compare elk measurements across all categories, identify the heaviest elk, longest elk, and any patterns or differences among elk.

Ask a few volunteers to share their findings and demonstrate how they interpret the data using the graphs they've drawn.

 REFLECTION (10 minutes)

- ✓ Summarize the importance of data collection and presenting the data visually in biology careers.

Lower Level	Higher Level
Draw example graphs for each activity to help students create their own.	Challenge students to think of two other graphs that can be created based on what they learned from the elk activity in the video or in the video on what biologists do.



**INDEPENDENT WORK TIME (30 min)**

Instruct students to reflect on the role of biologists and write how teamwork will help them excel in their fields. Encourage them to use examples from the videos to support their ideas.

Walk around and individually review students' work as they write.

**Lower Level**

Provide sentence starters as required.

**Higher Level**

Ask students to think about the different sets of people they will interact with if they are biologists working such as assistants, citizens, etc.

**WRAP-UP & REFLECTION (15 min)**

Ask students to share one new thing they found interesting in this lesson.

Distribute exit slips to students.

Ask for a few volunteers to share their reflections.

Collect and review the answers.

## Reflection Exit Slip

In one sentence, describe what you learned in this lesson.

Today, I learned \_\_\_\_\_.

Is one of the careers discussed today of interest to you? Why or why not?

I liked / did not like \_\_\_\_\_ career because \_\_\_\_\_

\_\_\_\_\_

Is there anything you still need help understanding?

What's one question you have?

Circle the emoji that shows how you feel about your mastery of content in this lesson.



Happy



Smart



Confused



Sad



Angry