

CAMP ACTIVITIES WITH A SCIENCE TWIST

ENHANCING YOUR CAMP PROGRAM
WITH FUN STEM EXPERIENCES



Edited by

Shannon J. Horrillo • Marianne Bird • Steven Worker

UNITS SUMMARY

Unit 1: Training Module

Session 1: Science Education at Camp

High-quality science education requires well-prepared educators. Facilitators need preparation to lead science activities that engage campers. The following three activities will help facilitators understand and feel confident leading experiential, inquiry-based activities. In Activity A, participants will compare experiential learning and inquiry-based learning approaches. Activity B will help participants learn the differences between broad/open versus focused/closed questions. Activity C helps participants search for evidence of camper learning.

Age Range: 15 years and older

Time to Complete: 2.5 hours

Learning Objectives:

- Support camp staff in developing a positive attitude and interest in delivering science education at camp.
- Prepare camp staff to facilitate experiential and inquiry-based learning.
- Increase skills in asking broad, open-ended questions to stimulate thinking, learning, and creativity.
- Learn different evaluation strategies to assess campers' learning.

Unit 2: Build Your Basecamp

Session 2: Safety First

Campers will discuss the importance of first aid while they are at camp. They will learn the importance of having a first aid kit with them while on an overnight hike, explore the types of injuries that could occur, and what is needed to treat these injuries. In Activity A, they begin by identifying the supplies necessary for a first aid kit. In Activity B, they will learn about common types of injuries. In Activity C, they will explore different methods of packaging a first aid kit.

Age Range: 10 years and older

Time to Complete: 1.5 hours

Learning Objectives:

- Learn which first aid supplies are needed for an overnight hike.
- Become aquatinted with the types of injuries that can occur on a hike.
- Learn different methods of packing a first aid kit for a hike.

Session 3: Fire It Up!

Campers will explore how to build a fire and what types of fires work best for specific purposes. In Activity A, they begin by identifying the elements necessary for fire. They work in small teams to investigate how heat, fuel, and oxygen are necessary to have fire. In Activity B, the teams will use the knowledge gained in the first activity to construct and start a fire. Campers will make comparisons as to how the fires burn.

Age Range: 10 years and older

Time to Complete: 1 hour and 50 minutes

Learning Objectives:

- Learn about the elements necessary for a fire.
- Experiment with different ways to start and keep a fire burning.
- Understand fire, its purposes, and how to use it safely.
- Learn what type of fire may best be used for specific purposes (i.e., cooking, light, warmth, and atmosphere).

Session 4: Take Cover

Campers will explore why shelter is important and experiment with building a shelter of their own. They will work in teams, be given a bag of simple supplies, and asked to construct a simple shelter. The teams then describe their design and evaluate their structure. Campers compare the different shelters, discuss their findings, and summarize important considerations in shelter building.

Age Range: Nine years and older

Time to Complete: 1 hour

Learning Objectives:

- Learn how materials and the environment might be used to build a shelter.
- Compare and evaluate different shelter designs

Unit 3: Exploring the Environment

Session 5: Compass Quest

Campers will learn about the compass, magnetism, and simple navigation. In Activity A, campers will learn about magnetism and how it affects a compass needle. In Activity B, campers will learn about the compass rose and cardinal and inter-cardinal directions. Activity C will provide campers hands-on experience in using a compass for hiking from one point to another. There are also some fun activities they can do using GPS to practice their new skills.

Age Range: Nine years and older

Time to Complete: 2.5 to 3 hours

Learning Objectives:

- Learn the order of directions.
- Learn the parts of a compass and how to read it.
- Learn how to take a heading and a bearing.
- Be able to travel from one point to another utilizing a compass.
- Learn that magnetism make a compass work.

Session 6: Discovery Hikes

Campers will have fun as they learn new things about themselves and the environment. In Activity A, campers explore what they need to do to prepare for a hike, including basic equipment and safety rules for hiking. In Activity B, campers will take a hike and sharpen their observation skills as they work in teams to find items on a list—similar to a scavenger hunt.

Age Range: 9 to 15 years old

Time to Complete: 2 hours

Learning Objectives:

- Learn what equipment and preparation is needed for a safe hike.
- Improve campers' awareness of natural surrounds through observation.
- Learn how to minimize human impacts on the environment.

Session 7: Astronomy Adventures

Campers will have fun learning about our solar system. In Activity A, The group discusses objects and bodies in our solar system. Using a set of astronomer's clues, campers will design a map of our solar system. In Activity B, campers engage in a traditional camp favorite: star gazing. Campers will first assemble a sky wheel and learn to use this tool. Then, they go on a night hike and use the sky wheel to locate constellations.

Age Range: 12 to 13 years old (Activity A), and 9 years and older (Activity B)

Time to Complete: 2 hours

Learning Objectives:

- Learn about objects and bodies in our solar system.
- Learn to use a sky wheel to locate constellations.
- Learn that celestial bodies have properties and patterns of movement that can be observed and described.

Unit 4: Doing it With Designs

Session 8: Crossing the Water: Boat Building

Campers collaborate and problem solve to accomplish their objectives. They must work as a team to design a basic blueprint for a boat. After the team has designed their boat, they will use the materials and implements provided to build it. The boat must float in water and support weight that will be added to it in the test phase.

Age Range: Nine years and older

Time to Complete: 1.5 hours

Learning Objectives:

- Design, construct, and test a boat that achieves optimum results.
- Learn about the relationship between buoyancy and density.
- Understand what designs are suitable for boat construction.

Session 9: Crossing the Water: Bridge Building

Campers work together as a team to design a basic blueprint for the construction of a bridge. After the team has designed and sketched their bridge, they will use the materials and implements provided to physically build it. The bridge must span a gap of 38 cm (15 inches) and support a weight of 4.5 kg (10 pounds).

Age Range: Nine years and older

Time to Complete: 1.5 hours

Learning Objectives:

- Be able to work as a team to design and construct a bridge that meets the requirements (i.e., spans a 38 cm (15 inch) gap and supports 4.5 kg [10 pounds]).
- Learn the different types of bridges.
- Understand important features of the engineering design process.

Session 10: Leonardo's Flight

Campers will learn about energy, motion, observations, models, and data collection. In Activity A, campers will design and construct a hot air balloon to rise at least 1.8 m (6 feet) from the ground and stay aloft for 30 seconds. They will then use a heat source to test the hot air balloon. In Activity B, campers will redesign their hot air balloon to become a vehicle or source of transportation. Campers will navigate a course with the hot air balloon, collect data to draw conclusions, and apply their knowledge.

Age Range: Nine years and older

Time to Complete: 1 hour and 45 minutes

Learning Objectives:

- Be able to identify and test the role of energy in motion.
- Be able to use observations and data to base scientific explanations.
- Learn how to use models to understand how hot air balloons work and the physical science underpinnings.

Unit 5: Cooking Over Campfires

Session 11: Stick Cooking

Campers explore cooking outdoors over coals or embers using a stick. Campers prepare two recipes using sticks. In Activity A, campers will make bread on a stick. In Activity B, they will explore making vegetable kabobs and record their observations. They will have the opportunity to test one kabob and then repeat the experiment with a second kabob.

Age Range: Nine years and older

Time to Complete: 1 hour and 50 minutes

Learning Objectives:

- Learn to cook outdoors using a stick as a cooking utensil.
- Experiment with the design and construction of these utensils.
- Learn basic cooking concepts.
- Learn basic concepts of heat (energy) transfer.
- Learn how to safely cook food outdoors on a stick over hot coals.

Session 12: Foil Cooking

Campers explore cooking outdoors over coals or embers using foil. In Activity A, campers will prepare and cook a cupcake using the materials provided. In Activity B, campers will make a popcorn popper designed to pop the most kernels without burning the popcorn. Campers have the opportunity test, redesign, and retest the popcorn popper to optimize results.

Age Range: Nine years and older

Time to Complete: 2 hours

Learning Objectives:

- Learn to cook outdoors using foil.
- Learn about cooking by conduction.

- Be able to use inquiry to develop recipes.
- Learn to experiment with the design and construction of foil utensils for cooking.
- Learn how to safely cook foods outdoors over hot coals.

Session 13: Dutch Oven Cooking

Campers will explore how to use a Dutch oven by testing different bread recipes and cooking techniques. They will work in teams to decide how to prepare their bread, and will experiment with heat source and cooking time. Each team will review their strategies and outcomes. Then, as a large group, they will compare their experiences to draw conclusions about best strategies for Dutch oven cooking.

Age Range: 12 years and older

Time to Complete: 1 hour and 50 minutes

Learning Objectives:

- Learn about the variables in Dutch oven cooking: temperature, fuel source, cooking time, type of food you are preparing.
- Understand ways Dutch ovens can be used in cooking.
- Be able to experiment with cooking different types of bread in a Dutch oven.