



Wildfire in Nevada Ecosystems

High School Biology Unit



Fire Investigation Hide and Seek

This activity uses lessons that real firefighters learn in NWCG’s FI-110 Fire Investigation module. Groups of students will create a model landscape to hide an everyday object and burn. Groups will investigate other groups’ fires, attempting to find the point of origin and the hidden object in each landscape. This is tricky because, to find the point of origin, the landscape must remain relatively undisturbed, but the hidden objects may be buried.

Objectives

1. Students will understand the principles of fire investigation, including identifying the point of origin and the cause of fire.
2. Students will apply observational and critical thinking skills to investigate and deduce the point of origin of a fire.
3. Students will learn how different types of fuels affect fire behavior.
4. Students will work collaboratively to solve a problem and present their findings.

Materials:

- Foil pans (x1/group)
- Small everyday objects (one for each group’s landscape)
 - Examples of these materials can include: matches, paperclips, hair pins, coins, buttons, beads, marbles etc. Choose materials that are durable enough to withstand the heat and won’t emit harmful fumes when burned.
- Various burnable materials (dry leaves, wood, twigs, leaves, pine needles, rocks/pebbles, paper, cardboard, etc.)
- Lighter or torch (x1/instructor; handled only by instructors)
- Fire extinguisher (x1/instructor)
- Safety glasses or goggles (x1/instructor)
- Water buckets (x1/group)
- Notebooks or paper (x1/student)
- Pencils and coloring supplies (x1/student)

Vocabulary

Fire behavior	The way a fire acts as influenced by its interaction with fuels, weather and topography.
Point of origin	The place where a fire starts. This can be an exact point or a general origin area
Fuels	Combustible matter used to maintain fire.
Burn patterns	The visible or measurable physical changes or identifiable shapes formed by a fire
Investigation	The analysis of fire related incidents

Evidence	The available body of facts or information indicating whether a belief or proposition is true or valid
Hypothesis	A predication made based on limited evidence: a starting point for further investigation

Safety Instructions

This lesson involves lighting fuels on fire to learn about fire behavior and identifying point of origin. While this is great for student engagement, there are a few safety considerations. When these basic rules are followed, this activity is quite safe. However, these activities can be dangerous if rules are not followed. Please consider the maturity of your students and adjust the safety protocols as needed.

- Only have adults handle fire. Do not give students ways to independently start fires during this lesson.
- Students and instructors should tie back long hair or loose clothing.
- These activities can produce a short-lived flame up to 12 inches long. Burning should only be conducted outside in a place far from other flammable materials or in a lab hood.
- A lighter or torch with a long neck will help keep fingers away from the heat. Grill lighters work well, but a basic butane torch is the most effective.

Introduction (5 min)

Today we will be learning how to figure out where a fire started by looking at the whole area that burned. Fire can be a stressful topic to talk about and think about. We will be burning things during this lesson. If you are uncomfortable or scared at any point during the lesson, tell one of the educators and we can help you.

Discuss safety procedures and the importance of following them strictly. You can make this more interactive by asking students what THEY think we need to do to be safe if we're lighting fires during this lesson. They will likely list all of the safety procedures we have, but if they miss a couple, remind them of those as well.

Explain fire behavior, fuels, and fire investigation to students. These are concepts they will want to keep in mind while they are building their landscapes.

Activity Instructions

1. (5 min) Split students into small groups. Provide each group with a foil pan, various burnable materials, and one small everyday object (it may be best for groups to not know what each other's objects are).
 - a. Explain that we are going to be creating a model landscape in our foil pans and we will burn them later. Groups can create mountains with rocks, trees with sticks, and make sure to have debris on the bottom so the fire has something to catch onto.
2. (15 min) Each group will create a model landscape with the materials provided, and hide their object within the landscape.
 - a. Ensure groups understand that they need to balance between making the landscape detailed and hiding the object well.
 - b. Using water or primarily wet fuels in any one portion of the landscape will create interesting burn patterns. We like to make a V shape in our landscapes if we want the point of origin to be easily identifiable.
3. (10 min) Burning the models
 - a. One by one, take the models away from the other groups.
 - b. Each group chooses a point of origin for the fire in their model.
 - c. Instructor ignites the fire at the chosen point.
 - d. Once burned, allow the models to cool in a safe area.
4. (10 min) While the models cool, teach about a fire investigator's role and how they identify burn patterns to find the point of origin. Use the visuals attached to this lesson to illustrate burn patterns.
5. (20 min) Investigation and identification
 - a. Once models have cooled a bit, each group investigates one other group's landscape
 - b. Students use their observations to identify the point of origin and find the hidden object.
 - c. Encourage careful observation and minimal disturbance of the landscape to identify burn patterns accurately.
 - d. Provide guided questions to help focus their investigation and keep the lesson moving forward:
 - i. What is the overall appearance of the burned landscape? Do you see any visible burn patterns or significant features?
 - ii. Do you have a hypothesis about where the point of origin is? What are any specific pieces of evidence that support your hypothesis about the point of origin?
 - iii. When you find the hidden object, describe its location and condition.
6. Groups will report back to the original landscape's creators. They discuss where they think the point of origin was and their reasoning for this thinking.