**1.6 Phenomena in Action**

**Overview:** Students enhance their knowledge of natural or cultural fire ecology through restoration project (plan, monitor, and/or execute), policy change effort, or outreach campaign.

**Subjects:** Science, others dependent on project

**Duration:** 1 class period- 1 school field day

**Group Size:** Whole class

**Setting**: Outside

**Vocabulary:**dependent on project

 **Goal:** To give students on the ground experience applying their learning about the natural and cultural fire ecology of the oak woodlands of Northern California.

**Objectives:** Students can

* Use their understanding of natural and cultural fire ecology to complete an action project

|  |  |  |
| --- | --- | --- |
| **Standards:**  |  |  |
| **NGSS** | Cross Cutting Concepts  | Depends on Action Project |
|  | Science and Engineering Practices | Dependent on Action Project |
|  | Disciplinary Core Ideas | Dependent on Action Project |
| **Environmental Principals and Concepts**  |  |  Principle 1- People depend on natural systems. Principle 2- People Influence Natural Systems Principle 3- Natural Systems Change in Ways that People Benefit From and Can Influence |

**Teacher Background:** This lesson will largely be built around what interests the studentshave to build an action project around. Have student reflect on what they think is a good project to utilize their new knowledge about natural and cultural fire ecology. How long or involved the project is at your discretion.

While it can be a lot of work to plan an action project, giving students an opportunity to apply their learning and make a positive impact on their community is a crucial part of the learning cycle. The sky is the limit with this lesson!

**Preparation:**

* For partnership opportunities, reach out to local tribes, USFS, state parks, local parks, land trusts, environmental non-profits, or other land managers.
* Fire ecology projects: Monitor before and after prescribed fire or other fuels reduction treatment
* Wildfire recovery projects: remove invasive plants, restore trails, assist with fuels reduction, or tend re-sprouting oak trees. Restrict planting efforts to home landscaping, repair bulldozer lines, or large areas (>200 acres) where all trees died.
* Outreach projects:
* Create a natural and cultural fire ecology informational booklet/app for an existing trail and share with the public.
* Write city council to tend to public lands and restore natural process of fire.
* Write informational letter to newspaper about region’s fire ecology and steps forward for land management.

**Assessment:**

* Use student’s participation in the action project to assess students.
* Have students write a reflective essay about their participation in the action project.

**Evaluation:**

* Utilize the sample rubrics below that are based on the Phenomena in Action Rubrics from the CA NGSS Rollout.

**Awareness Campaign Sample Rubric: Local Fire Ecology Informational Campaign**

(ex. public service announcement, video, brochure, assembly, infographic for school/community)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Good  | Fair  | Poor |
| The Action*Construct an**explanation using**models or**representations.* | Constructed a detailed,evidence-basedexplanation using amodel of the areas current and historic fire ecology. (local plants adaptations to fire, the data available about current and historic fire occurrence) | Constructed anevidence-basedexplanation that uses amodel but is lackingsufficient details. | Constructed anexplanation that islacking in evidence anddetails. |
| The Action*Communicate scientific**and/or technical**information or ideas in**multiple formats*. | Effectivelycommunicated scientificinformation in writingand through an oralpresentation (eyecontact, spoke clearlyand slowly, etc). | Effectivelycommunicated scientificinformation in writingbut oral presentation islacking in keycharacteristics (lack ofeye contact, spoke toofast, etc). | Ineffectivelycommunicated scientificinformation in writtenand oral forms. |
| Informational Content(Science) | All applicable scienceideas are appropriatelyused to inform theaction. | Some science ideasare appropriately usedto inform the action. | Science ideas are notappropriately used toinform the action. |
| Reflection | Reflection on theeffectiveness of theaction and possiblenext steps identified. | Some reflection on theeffectiveness of theaction. | Little to no reflection onthe effectiveness of theaction. |

**Policy Change Effort Rubric: Infographic**

(ex. letter to city council, proposal to principal/board, infographic for community)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Good  | Fair  | Poor |
| The Action *Apply scientific ideas, principles, and/or evidence to construct, revise and/or use an explanation for real- world phenomena, examples, or events.* | Applied scientific ideas and evidence to construct an explanation for real- world phenomena. | Applied scientific ideas or evidence to construct an explanation for real- world phenomena. | Constructed an explanation for real- world phenomena lacking in scientific ideas and evidence. |
| The Action*Integrate qualitative and/or quantitative scientific and/or technical information in written text with that**contained in media and visual displays to clarify claims and**findings.* | Integrated qualitative and quantitative scientific information in written text with thatcontained in media and visual displays to clarify claims and findings. | Integrated qualitative or quantitative scientific information in written text with that contained in media and visual displays to clarify claims and findings. | Qualitative and quantitative scientific information present in written text but not integrated with media and visual displays to clarify claims and findings. |
| Informational Content (Science) | All applicable science ideas are appropriately used to inform the action. | Some science ideas are appropriately used to inform the action. | Science ideas are not appropriately used to inform the action. |
| Reflection | Reflection on the effectiveness of the action and possible next steps identified. | Some reflection on the effectiveness of the action. | Little to no reflection on the effectiveness of the action. |

**Hands on Project: Field Work**

(ex. Helping with pre/post monitoring of a controlled burn, wildfire recovery projects: remove invasive plants, restore trails, assist with fuels reduction, or tend re-sprouting oak trees.)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Good  | Fair  | Poor  |
| The Action*Apply scientific ideas or**principles to**design, construct,**and/or test a design of**an object, tool,**process or system.* | Applied all relevantscientific ideas todesign a restoration plan to help a woodland recover after a prescribed fire.  | Applied some relevantscientific ideas todesign a restoration plan to help a woodland recover after a prescribed fire. | Applied some scientificideas to design a restoration plan to help a woodland recover after a prescribed fire. |
| Impact  | Restoration work had a noticeable positive impact on the oak woodland. | Restoration work had some positive impact on the oak woodland. | Restoration work had no noticeable impact on the oak woodland. |
|  Informational Content (Science) | All applicable science ideas are appropriately used to inform the action. | Some science ideas are appropriately used to inform the action. | Science ideas are not appropriately used to inform the action. |
| Reflection | Reflection on the effectiveness of the action and possible next steps identified. | Some reflection on the effectiveness of the action. | Little to no reflection on the effectiveness of the action. |