



Lesson Plan for Positive Actions

Please send your Queries/Submit the lesson plan to Dr Pramod Kumar Sharma at pramod@fee.global

1. Author/s Details

a. Name/s:	Vítor Moreira Martins
b. Institution	AE André Soares Portugal and Externato Paulo VI
c. Email Id	
d. Would you like to receive monthly updates through our Newsletter?	Yes
e. Phone no.	00351 934210789
f. Address with postal code	Rua José Maria Rodrigues, nº 43, 4710 – 080 Braga
g. Submission date of the lesson plan	

2. Has the lesson plan tried in a classroom (Please write a brief)

Yes, as a hands on approach using students from 6th grade. Data has been collected and analysed to elaborate an improved lesson plan.

3. The lesson plan

A. Introduction: Background information describing the key concepts in the lesson plan and which SDG they are linked to.

Forest fires are a man made catastrophe raising many and varied questions to be debated. The contamination of surface waters with ash and the accelerated erosion of burnt soils are two of the most relevant problems (15.1),(15.2). The degradation of water quality happens when ash is carried to the water courses after the passage of the fire (6.3).

Through exploration type activities, we would like to test the harmful effects of ash (Leaching from fly ash and soil with fire-extinguishing) on the quality of water and the effects these contaminants have on aquatic and land based inhabitants and on the pollution of subterranean waters

(6.6),(14.1). The quality of surface and subterranean water in an important indicator for the preservation of the forest and its biodiversity (14.3).

B. Age Group – Classes that it is suitable for (Age 6 to 9, Age 10 to 11, Age 12 to 14, Age 15 to 16 and Age 17 to 18)
Age 10 to 11, Age 12 to 14

c. Objectives or Learning Outcome/s Select from the learning outcomes listed in the publication.

SDG	Learning Outcome
SDG 6	<ul style="list-style-type: none"> • Does not pollute water. • Does not waste anything, recognising that water is a resource used to produce everything. • Practices water saving techniques. • Participates in actions for rainwater harvesting. <p>Investigates and reports about different issues of water and likely future scenarios due to climate change.</p> <ul style="list-style-type: none"> • Protects trees and green spaces that are an important part of the water cycle.
SDG 14	<p>Throws waste in the proper place to stop litter reaching oceans, rivers, streams and waterways. •</p> <ul style="list-style-type: none"> • Protects coastal ecosystems. • • Investigates and report on water pollution. • Investigates various wetlands aspects such as local biodiversity, environmental phenomena. • Supports businesses that have proper waste and wastewater treatment, such as Green Key awarded tourism establishments, avoid the use of hazardous cleaning products and sources its materials from sustainable sources.
SDG 15	<ul style="list-style-type: none"> • Protects and promotes the importance of biodiversity. • Spends time in nature, visit nature parks, sanctuaries. • Does not eat the meat of wild animals/games that are endangered or protected by law. • Does not buy products that use animal testing or wild animal parts especially endangered animals. • Greens spaces with local species. • Grows own food.

	<ul style="list-style-type: none"> • Reports on positive aspects of protecting life on land. • Supports businesses that respect and care for the local biodiversity.
--	--

D. Time required to deliver the lesson plan.

120 minutes + 50 + 50+ Exhibition/Explanation

E. Resources Required to deliver the lesson plan (Material, equipment and reading resources)

- **Photographic camera**
- **Notebook**
- **Alcohol burner**
- **Fireproof tile**
- **Water**
- **Matches**
- **Scissors**
- **White cloth**
- **Ash**
- **2 funnels**
- **2 empty water bottles of 33 cl**
- **2 beakers**
- **2 piece of white cloth**
- **Map of the burnt area**

F. Activity – Steps or description of how the lesson plan will be conducted/facilitated by the teacher.

Parte I Observe

1. Visit a burnt forest area and observe the transformations which have occurred: what type of vegetation do you find? Compare it with vegetation that you find in an unburnt area. Record what you observe.
2. Find water courses nearby (small rivers, streams).
3. Take photographs of the burnt area and of an area that is unburnt.
4. Reflect upon the differences in biodiversity between the burnt and unburnt areas.
5. Take samples of water using the 33cl bottles in the burnt and unburnt areas.
6. Compare the colour of the water in both cases and record the presence of any suspended particles.
7. Pour each water sample into a clean recipient. Use a funnel and filter paper for this task.

8. Observe the state of the filter paper in each situation and the transparency of each of the filtered solutions.
9. Interpret the influence of fires on the quality of the water.
10. Repeat this procedure 30 days later and preferentially after periods of rainfall. Record the differences observed.

Note for the teacher:

Practice and develop the skills of systematic observation, questioning, planning and recording to obtain evidence

Explain the use of the machine photographic and use for macro and close-up photography

The teacher does not function, in the eyes of the children, as the sole bearer of expert knowledge. Instead, the main role of the teacher is to facilitate negotiation of ideas and to highlight criteria for formulating classroom knowledge.

Parte II Experimentation

1. Cut two pieces of dirty cloth (the cloths should evenly dirtied with dust from furniture from tables in the classroom).



2. Place a small amount of ash in the beakers and then place the pieces of cloth into the beaker as well.



3. Heat the water in the beaker to almost boiling. Do not forget to place the same amount of hot water in both beakers.

NOTE: After this part of the experiment wait 12 hours. After this time remove the cloths and observe the differences in dirtiness between them.

- 4. Describe in your notebook the differences between the two cloths referring specifically to the difference in dirtiness between them.**

The cloth in the beaker with no ash.

The cloth in the beaker with ash.

- 5. What can you conclude about the results?**
- 6. Answer the question: Is the water from areas near forest fires affected by the passage of the forest fire?**

Parte III

Examination and communication of results to the academic community

Poster with his themes (to be chosen by each group):

- Harmful effects of forest fires on the water quality and biodiversity.**
- Effect of water runoff to demonstrate the need to avoid these situations.**
- Ways to avoid the runoff water by for example using straw to avoid soil erosion and runoff from fly ash and soil with fire-extinguishing.**
- How to use native plant species to help avoid the propagation of forest fires and protect the soil.**
- How to repopulate burnt forest areas and which plant species should be used in these spaces to regenerate the forested area.**
- Find out the which forest species and rivers are present in different locations and how they help the ecosystem and biotic relationships.**

- G. Evaluation and Assessment – How achievements of Outcomes both in short term and long term will be evaluated after the lesson is delivered?**

Acquisition and development of science/mathematics knowledge, skills, and attitudes should be assessed.

Value its assessment strategies as best examples of practice that may be transferred to real world.

Recognize the degradation of water quality happens when ash is carried to the water courses after the passage of the fire.

Recognize the quality of surface and subterranean water in an important indicator for the preservation of the forest and its biodiversity

Posters for the Parte III

H. Suggestions of variation or further reading of the lesson plan

I. References – Acknowledging the resources that were used while developing the Lesson Plans.