

SCIENTIX LESSON PLAN

Title

PEELING OFF PAINT AND FLUFFY FORMATIONS ON WALLS – ANALYSING FUNGUS FORMATION AND EFFLORESCENCE ON WALLS

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Subject

Chemistry, Biology

Aim of the lesson

In this lesson, students:

- ✓ Analyze the reasons behind the peeling of paint and white fluffy formations on walls (which show up after the monsoon season) in school and neighborhood (see Figure 1).
- ✓ Look for solutions to address the problem.



Figure 1: Fluffy formations on walls

Age of students

15 – 16 years old

Time

Preparation time: 1 hour

Teaching time: 2 ¹/₂ hours

Teaching material

Online:

Article 1: Microscopic potassium hydroxide preparation:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3994805/>

Article 2 : <http://www.microlabgallery.com/gallery/Efflorescence%20871-04%20Recrystallized%201.aspx>

Article 3: <https://www.deckerhomeservices.com/what-is-efflorescence/>

Article 4: <https://www.gateshead.gov.uk/article/6553/Damp-mould-and-condensation>

Article 5: <http://professionalpainter.ca/3-ways-to-test-moisture-content/>

Article 6: <http://website.nbm-mnb.ca/mycologywebpages/Moulds/Examination.html>

Offline:

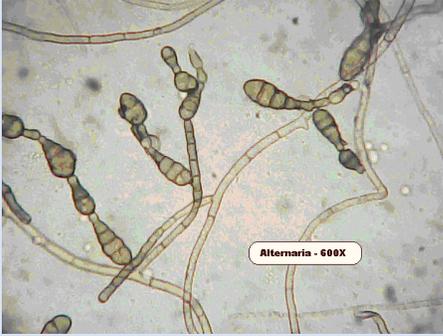
1. Microscopes.
2. Slides with cover slips having drops of 20% Potassium hydroxide.
3. Test tubes, scalpel, forceps, petri dish, gloves and lab coats.

21st century skills

Critical thinking and problem solving, collaboration and communication, research, analysis and evaluation, presentation skills.

Lesson Plan

Name of activity	Procedure	Time
Introduction	The teacher shows to students the picture of a wall in school, showing the white fluffy formations asking students to give possible causes.	10 min
Observation	The teacher demonstrates the online sources and facilitates a discussion about the white fluffy formations. In groups, students scrape fluffy formations using gloves and petri dish. Students are expected to investigate the substance and list the possible causes for its formation.	20 min
Hypothesis	Students arrive at plausible reasons, and following a class discussion, each group postulates a maximum of two hypothesis.	10min
Explanation	The teacher explains the lab activities but allows students to come up with their own alternative tests (supported by research) if these are appropriate.	30min

Name of activity	Procedure	Time
Testing for fungus and moulds	<p>Students investigate the white formations under a microscope and test for fungus. If fungus is seen, we can see fine thread like hyphae. They see if there is any living organism. If they find presence of fungus, they find solutions to address the concern (source: see Article 1 above).</p> <p>Caution: Immediate checking of the white formation under microscope (see Figure 2).</p>  <p>Figure 2: White formation seen through the microscope</p>	20 min
Test for efflorescence	<p>When pinched between the fingers, efflorescence turns into powder, as it will dissolve in water. Under the microscope, the image is as given below (Figure 3). If efflorescence is present, students research reason for this (see Article 2 above).</p>  <p>Figure 3: Efflorescence turns into powder</p>	10 min
Analysis	Students analyse the results and arrive to the conclusions.	10 min
Follow up	Students then work on possible solutions in groups to reduce formations in the present and future. They have Internet and library access to support their ideas.	25 min
Presentation	Students present their work in groups to the rest of the classes which involves the listing of evidences obtained through experimentation and exploration and possible solutions. The presentation is assessed by the teacher through a rubric given below.	15 min
Feedback	At the end of the lesson, the teacher gives to the students an exit slip to provide feedback on the lesson and offer further support.	

Assessment

Students present their work to the class through a presentation. The rubric is as follows:

Items	Developing (1 Points)	Accomplished (2 Points)	Exemplary (3 Points)
<i>Use of Evidence</i>	The results showed attempts to gather evidence through experimentation and exploration.	The results showed ample proof of evidences through experimentation and exploration.	The results were highly supported by evidences and thorough experimentation and exploration.
<i>Synthesis and Application of concept to find solution to real life problems</i>	Weak attempt to frame conclusions on sound evidences. Ineffective connection of STEM content to real life to find solution.	Conclusions moderately framed on sound evidences. Moderate Connection of STEM content to real life to find solution.	Conclusions framed on sound evidences. Robust Connection of STEM content to real life to find solution.
<i>Delivery of presentation and team work</i>	Students deliver the presentation with less confidence and exhibit poor collaborative skills.	Students deliver the presentation with good confidence and exhibit good collaborative skills.	Students deliver the presentation with confidence and exhibit strong collaborative skills.
<i>Structure of the overall presentation</i>	The presentation was structured inadequately. The statements lacked connection with each other.	The presentation was well structured leading one statement to another with logical explanations.	The presentation was very well structured leading one statement to another with high logical explanations.

Student feedback

Students give feedback through an exit slip on the following:

- One thing I learned in the lesson.
- One thing I still have doubts about following the lesson

The exit slips will be collected, and the doubts will be discussed in class.

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