

Supplementary Information

STEM-Focused Activities to Support Student Learning in Primary School Science

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Appendices

Appendix-1

Question	Discrimination Indices	Difficulty Indices
1	0,42	0,5
2	0,83	0,36
3	0,50	0,55
4	0,83	0,16
5	0,80	0,25
6	0,58	0,66
7	0,79	0,41
8	0,86	0,33
9	0,67	0,66
10	0,58	0,5
11	0,76	0,36
12	0,26	0,33
13	0,26	0,28
14	0,83	0,65

15	0,78	0,58
16	0,52	0,36
17	0,88	0,42
18	0,96	0,38
19	0,33	0,6
20	0,63	0,57

Appendix-2

1. Section	
Lesson	Science
Grade	3 rd grade
Subject	The characteristics of matter
Concepts	Hardness / softness, flexibility, fragility, color, taste, roughness and smoothness
Unit	Let's Know the Matter
Duration	11 * 40'

2. Section	
Objectives	<p>The students will be able to</p> <ol style="list-style-type: none"> 1. explain the features that characterize the substance by using the five sense organs. 2. define the matter's characteristics as hard / soft, flexible, brittle, color, odor, taste, rough and smooth. 3. discover whether a surface is roughened or smoothed. 4. notice various examples that will appeal to the five sense organs are brought to the course environment. 5. discuss that touching, looking, tasting, and smelling certain substances can harm his/her body. 6. determine and take the security precautions. 7. behave responsibly for security while working individually or in groups.
Values and Skills	<ol style="list-style-type: none"> a. Science Process Skills b. Life Skills <ul style="list-style-type: none"> ⊗ Analytical thinking ⊗ Decision making ⊗ Creative thinking ⊗ Entrepreneurship ⊗ Communicatiob ⊗ Teamworking

	<p>c. Engineering and Design Skills</p> <ul style="list-style-type: none"> ⊗ Innovative thinking
Learning Model, Methods and Techniques	5E model, inventive teaching strategy, computer aided instruction, lecturing, discussion, question-answer teaching, brainstorming, drama, concept map, worksheets
Educational Technologies and Tools	Textbooks, projections, computers, worksheets, materials to help explain the subject.
Teaching-Learning Activities: 5E MODEL	<p>Enter:</p> <p>Activity 1: What is this? Students watch videos from educational websites such as Morpa campus, EBA, Okulistik etc. about the subject.</p>
	<p>Explore:</p> <p>Activity 2: Let's learn. Activity 3: What is the characteristics of that matter?</p>
	<p>Explain:</p> <p>Activity 4: With short stories, a discussion is made that touching, looking, tasting and smelling substances can harm the living body. Activity 5: Students select an object, they are asked to replace the object of their choice and revive the properties of the object.</p>
	<p>Elaborate:</p> <p>Activity 6: Is this object smooth or rough? Activity 7: STEM-focused activity</p>
	<p>Evaluate:</p> <p>Activity 8: Students prepare a poster introducing the properties of the matter.</p>

Appendix-3



Appendix-4

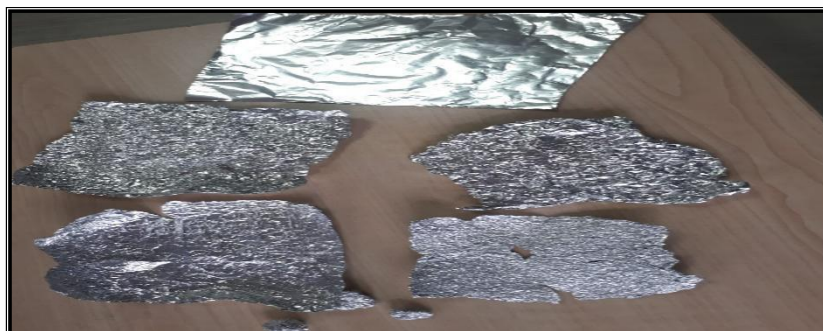
Dramatization Worksheet 2

You went to the forest picnic with your family to evaluate the good weather on the weekend. The picnic area was a very nice place. You played games together in this

place covered with lush trees where bird chirping is heard. Everything was going very well. Then you wanted to take a stroll in the forest with your brother. Your family elders allowed you to go but warned you not to stay away from the picnic area. While you were picking flowers, your brother said he ate a mushroom he found under the trees and his stomach started to ache.

- 1) Have you ever encountered such a situation? What would you do if you were in this situation?
- 2) What are the dangers we may encounter by tasting some of the substances we do not know what it is?
- 3) What precautions can be taken to protect from these dangers?

Appendix-5



Appendix-6

STEM STORY

Little Inventor

Ali was born and raised in a village where rain was constantly falling in autumn. Ali, who went to grade 3, always took his umbrella when he was going to school. Again on a rainy Monday, Ali started walking out of school and had difficulty keeping his umbrella due to the strong wind blowing from the opposite direction and tried to keep his balance. But the wind suddenly turned over Ali's umbrella and caused it to break. Ali did not know what to do and went to the house. When her mother saw Ali, she said, "Ali, what happened? Didn't you take your umbrella with you?" Ali told about the accident that happened to him.

Ali and his family, who lived in the village, could only go to the town once a week. Usually this would be Sundays and they had already gone to town one day before. Until next Sunday, Ali knew that he wouldn't be able to get into town and buy a new umbrella. While Ali was thinking about how to go to school in the rain, he also started to be established behind the stove. At that time, the voices he heard from television caught his attention. On TV, people were telling how they did it while doing things gathered in a workshop. Then an idea appeared in Ali's mind at once, and he said unintentionally, "Why shouldn't I do something to protect myself from the rain?" said. Hearing his voice, Ali's mother turned to Ali and asked, "What happened, Ali?" Then Ali said, "Mum, will you help me, I will do something to be protected from the rain." Let's help children to protect Ali from the rain.







Appendix-8

1. Section	
Lesson	Science
Grade	3 rd grade
Subject	The characteristics of matter
Concepts	Solid, Liquid, Gas (States of matter)
Unit	Let's Know the Matter
Duration	6 * 40'

2. Section	
Objectives	The students will be able to 1. classify the surrounding materials according to their states. 2. give examples of matter's states from daily life .
Values and Skills	a. Science Process Skills b. Life Skills ⊗ Analytical thinking ⊗ Decision making ⊗ Creative thinking ⊗ Entrepreneurship ⊗ Communication ⊗ Teamworking c. Engineering and Design Skills ⊗ Innovative thinking
Learning Model, Methods and Techniques	5E model, inventive learning strategy, brainstorming, question-answer, discussion, computer assisted instruction, lecturing, problem solving, educational game, experiments, observation.
Educational Technologies and Tools	Textbooks, projections, computers, materials for the activities (gloves, stone, milk, corn starch, water, glass, cologne, balloon, windshield, spoon, oil).
Teaching-Learning Activities: 5E MODEL	Enter: Activity 1: Do you know my features? Different items were put on the table. These were: solids such as eraser, pencil, glass; liquids such as water, milk, oil; gas such as air filled balloons. Students were asked to examine them and talk about their features. Activity 2: Three little gloves Different materials are put into 3 gloves. One gloves was filled with water, the other gloves was filled with



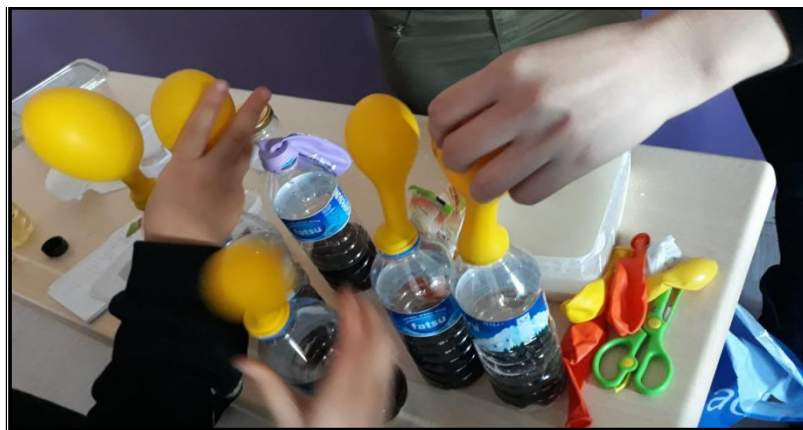
	<p>stone, and the other gloves was inflated with air. The differences between them were asked and students were asked to explain their reasons. The cartoon was watched and the items they see in the cartoon are asked. Their attention is drawn by asking riddles (Appendix-9).</p>
	<p>Explore: Activity 3: The magic of starch and water. Starch-water experiment is done to understand the concepts of solid and liquid. Activity 4: Feel it if you can. Students blew the wind rose to understand the concept of gas, and then they were asked to cool the cartons in their hands to their friends. It was provided to the students to inflate the balloons given and feel the gas exit from the balloon by touching the cheeks. Activity 5: Let's breathe Students do breathing exercises.</p>
	<p>Explain: Some theoretical knowledge was lectured for 10 minutes. After the lecture, the students were told to read the STEM text (Appendix-11) and questions were asked.</p>
	<p>Elaborate: Students were expected to come up with a new product based on the text described. In this process, students were asked questions at a level that they can have developed their products.</p>
	<p>Evaluate: The game (Appendix-12) prepared for students was played. What was learned through the game was reinforced, students were evaluated, if there was a missing place, it was completed. The subject was summarized by having the unit evaluation questions in their books.</p>

Appendix-9

Riddles		
<p>My shape is certain, Unless there is an effect.</p>	<p>I can't stop at my place,</p>	<p>I fly around everywhere, You find me by sniffing.</p>

<p>You can hold it in your hands but</p> <p>You can't compress me.</p> <p>What are examples for me?</p> <p>Guess come on.</p>	<p>No matter which container you put in,</p> <p>I'll flow,</p> <p>I'll take your shape immediately.</p> <p>What are examples for me?</p> <p>Guess come on.</p>	<p>It's easy to compress but</p> <p>It's not certain, my shape.</p> <p>What are examples for me?</p> <p>Guess come on.</p>
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Appendix-10



Appendix-11

STEM TEXT

One day, Ahmet goes fishing with his father to the seaside. They take their fishing line and go fishing. Not catching fish by the sea, Ahmet returns home unhappy. Seeing this situation, he tells his mother Ahmet not to worry. He says that if he designs

a boat, he can go fishing with his father so that he can catch more fish. Hearing this, Ahmet starts drawing something. He makes drawings but cannot decide how to do it.

Would you like to help Ahmet in this matter?

How can we help Ahmet?

Would you like to create a boat and give it to Ahmet?

Appendix-12

(The original version is in Turkish)



(In English)

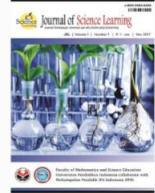
Start	Chickpe	Table	Milk	Natura	Orange	Spoon	Wind
☞	a			l gas	juice		
Soup							Ring
Shampo							Breath
o							e
Ice							Water



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Spray	Coal	Syru p	Smel l of meal	Sea	Cupboar d	Bicycl e	Pencil
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