IN2STEAM Lesson Plan

1. Unit title	**Recognise the Matter**
Teacher & School	Pınar Parmaksız / Tekirdag Doga Schools, Turkey
2. Target group	8 years old
3. Duration	2 or 3 lessons of 40 mins each (actual length depends on time to be allowed to each experiment, to the drafting of the experiment reports and to the creation of the concept cartoons in the evaluation phase)
4. STEAM Skills/ 21st Century Skills	Problem Solving Critical Thinking Communication 
5. Expected learning outcomes	Students will be able to: • Observe substances using one or more sensory organs • Recognise the basic properties of substances (hard, fluid, volatile, etc.). • Suggest explanations based on observations • Make informed guesses about the substance's solid, liquid and gas states • Carry out experiments safely and effectively under teacher supervision, by choosing simple materials • Interpret processed data and experiments • Report their findings
6. Subjects and topics covered	Science: properties of substances, states of substances Native Language: writing reports, formal and informal narratives Arts
7. Methodologies	Inquiry Based Learning
8. Integration of ART	Arts are integrated in the activity as students will create their own concept cartoon to explain the idea generated during the inquiry-based process. Therefore, students will be able to reproduce the idea in a visual form in order to capture the visual feel of the topic.
9. Learning Environment	Laboratory
10. Required resources	Required materials • 4 plastic containers • 4 tablespoons • some starch • some water

	• 4 plastic bottles • 4 balloons • some vinegar and some baking soda • Some oil, some water, ice cubes Substance samples (beads, stones, rice, erasers, lentils, apples, glasses, vinegar, water, liquid soap, fruit juice, milk, spray, mirror, cardboard pieces) Cardboard cups, pipette and plastic gloves for breathing exercise.
11. Prior knowledge **a. teacher** **b. students**	Teachers will need to refresh their knowledge of Inquiry Based Learning. It would be useful to have a thorough understanding on how emotional intelligence affects the learning experience. In order to attend and contribute to this course, students will have acquired basic knowledge about the states of substances and the substances in their surroundings.
12. Detailed description of the step-by-step sequences of the unit, incl. specific activities to support the learning experience	STEP 1: ASKING QUESTIONS AND BOOST STUDENT'S CURIOSITY To start brainstorming and exploring the topic, the teachers ask some questions to boost student's curiosity and launch the discovery process. Possible questions could be: A. "I have three friends who would like to play games with you. Do you want to play?" The students are then asked which game they would like to play. If somebody suggests hide and seek, the story continues as follows: "Try to find my friends by answering these riddles." One by one, the teacher shows the riddle cards to the class. B. My shape is obvious, I do not deteriorate unless there is an effect. You hold in your hand but you can't squeeze me. What are the examples for me? C. I flow and go. I can't stop. Whichever container you put in; I'll take that shape right away. What are the examples for me? D. I fly around everywhere. You will find me by sniffing. It's easy to squeeze, but my shape is not clear. What are the examples for me? STEP 2: EXPLORE 'What substances do we encounter in our environment? Do you think all of these substances have the same properties? If not, what differences are there?". The teacher brings various items to the classroom. These items are examined by the students. The students give their opinions about the substances. They can describe the substances. The common properties of these substances are discovered. 'How are these substances named? Does anyone have an idea?" Then proceed to the explanation part. STEP 3: EXPLAIN The existence of substances in nature is called "states of substances". Substances exist in three 'states' (forms) in nature: solid, liquid and gas. Substances that have a certain shape and can be held by hand and visible to

	the eye are called 'solid substances'. Solid substances do not change their shape unless an external force is applied to the solid materials. They are not fluid. They cannot be compressed. Some solids take the shape of the container they are in because they have small particles and they look like fluids. Such as sand, granulated sugar, flour, rice, lentils Fluid substances that take the shape of the container in which they are placed are called 'liquid substances'. They do not have a specific shape. When spilled, they spread and take the shape of the ground. 'Gaseous substances' are substances that are not visible by naked eye, cannot be touched, but whose presence can be felt by other sensory organs. They spread easily in their environment. They completely fill the container in which they are located. It has volatile properties. They come out easily even through a small hole and spread around. Students are then given pictures of substances and are asked to list them on the board based on their state. STEP 4: ENHANCE Students: observe, touch and examine the items which are brought to the classroom. Teacher: asks students to describe these items and to point out common features Materials are introduced for the experiment named "Starch and water". The class is divided into 4 groups. The necessary materials are distributed among the groups. Each group experiments with the instructions and the instructions of the teacher. Each student in the group participates and examines the experiment; a report is prepared alongside the experiment. The group's spokesperson shares the experiment report with the class. Students will be able to distinguish and comprehend solid and liquid. The experiment called 'Balloon inflation with gas' can begin. Each group takes the necessary materials, and the experiment is designed safely with the guidance and instructions of the teacher. A report is prepared alongside the experiment. The group's spokesperson shares the report with the class. Students will be able to distinguish and comprehend the gaseous state. The following experiment observes the mutation of ice from solid state to liquid state. Each group takes the necessary materials. The experiment is designed safely with the direction of the teacher. The transition of the substance from solid to liquid state is observed in a concrete way. STEP 5: EVALUATE The learning can be evaluated by using 'concept cartoons". This approach creates a visual representation of ideas. Based on simple cartoon style drawing, they show different characters arguing about an everyday situation. Whilst they are designed to intrigue, to provoke discussion and to stimulate thinking, there may not provide a single 'right answer'. Concept cartoons are used to forward a range of viewpoints about specific ideas, in situations that are designed to motivate and engage students and stimulate discussion of their ideas. This is particularly the case in science lessons, but can equally be deployed in other subjects, including creative arts.

	Concept cartoons are the visual representation of ideas; they include a minimum amount of text, in dialogue form. The viewpoints of the aspect being studied are applied in everyday situations. The generally accepted viewpoint is included in the alternatives, and all alternatives are given equal status. By using concept cartoons to begin a science investigation, teachers are able to see what the students currently understand about a particular topic. This in turn allows them to plan future interventions to address and gaps or misconceptions before a topic is over. If concept cartoons are used after the science investigation, students will provide immediate feedback as to what they understand and can articulate. Furthermore, concept cartoons provide hands-on activities to practice the use of discussion and reasoning skills to embed science vocabulary.
13. Gender-inclusive strategies and activities planned	Girls and boys should be equally distributed across the groups, so that the final results are not grouped into “girls” and “boys” work. The concept cartoons should also reflect that.
14. Assessment & Evaluation	Large and important part of the assessment will be the observation to be made during the course. When the students present the reports prepared on the basis of the experiments, it will be a good opportunity to observe whether any learning has occurred. It will be especially important for children to stay focused on the task. The teacher can support them with hints as soon as you feel they need support. Take note of any aspect that is not understood or of any unclear citation, so that further interventions can be planned.