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# The Effect of Chemistry Activities Applied in a Science Camp on Secondary School Students

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## Abstract

The purpose of the study is to evaluate the effects of chemistry activities applied in summer science camp on secondary school students. Action research was used in the study as the method. The sample of the study consists of 48 7th grade students who study at elementary school in Çayeli district of Rize province, in Turkey. Each week 24 students participated in the camp, which lasted two weeks. The activities that were carried out are; "The Gases in the Air", "Sad Tears of the Sky", "Recycling", "Let's Use Soap and Be Clean", "Soap Foam Fountain". During the activities, "Chemistry Science Interview Form" including four open-ended questions related to chemistry was applied to the students before and after the activities in the camp. Besides, "Reflective Journals" were used to reveal the participants' thoughts about the chemistry activities that were applied in the camp. Content analysis was used in analyzing the data collection tools. It was found out that students can use more conceptions and statements on chemistry, and they can associate them with daily life in a better way after the science camp. Also, the findings indicate that chemistry activities which were carried out within the scope of the project contribute to chemistry, and to the students' interest in this profession.

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## INTRODUCTION

Science laboratories are the most important learning environments that have a positive effect on students' cognitive learning levels and attitudes. Therefore, in science teaching, activities in science laboratories, which enable students to discover scientific conceptions, need to be emphasised more (Bilgin, 2006). Since lessons are mostly taught as teacher-centered and they are exam based, students' negative attitudes generally cannot be removed. Besides, teachers cannot include these laboratory practices because of various reasons such as time problem, insufficiency of the instruments, and preparation for common examinations. The studies that were done revealed that such problems cause students to lose their interest in science subjects and to develop negative attitude (Cürebal, 2004; Çakır, Şenler and Taşkın, 2007; Eryaman, et al. 2010; Jelinek, 1998; Osborne, Simon and Collins, 2003; Weinburgh, 1995).

In the examinations, which are held in Turkey, especially at the national level, students mostly fail in science lessons. It is also seen that there are similar results in international examinations, and the level of our country is lower than most countries regarding the average of countries. The reason for this fact is that students are not interested in the science lessons and they have negative attitudes towards these lessons. Marulcu, Saylan and Güven (2014) state that there are many ways to develop science literacy, and one of these ways is the practices including scientific activities such as science schools and science camps. It can be considered that the projects involving science camps make a great contribution to students' interest and motivation towards science lessons. Akay (2013) stated in his study that the science school project based on learning by doing enhances a positive contribution to secondary school students' thoughts towards the fact that science is a knowledge resource learnt by joy thanks to a lot of experiments, observation, and trip organisations.

Within the scope of this project in which the results of this study are examined, it is aimed at enabling students to develop a positive attitude towards science and environment via enjoyable experiment and activities and to increase their interest in scientific conceptions and natural phenomenon. With this aim, activities related to various disciplines were carried out as students centred. The students who are deprived of applied practices in laboratories and classrooms at school need to take part in such projects and activities in order to benefit from extrascholastic learning environments. By this way, there may be a positive change in students' attitudes towards the courses, and it may contribute to their future educational stages (Ornstein, 2006). It is a fact that students' learning problems emerge at the primary education level, and unless they are corrected, they are carried to upper levels as misconceptions. Primary school program has a spiral structure, and it causes students to carry their problems to future. Therefore, it is vital to change students' attitudes towards science and enable them to be productive, searcher, debating, learning and deciding individuals.

Within this content, the purpose of this study was determined as evaluating the effects of chemistry activities that were applied in summer science camp on secondary school students.

## METHOD

In accordance with the aim of this study, action research method was used. Since the definition of the application process of the camp was revealed regarding chemistry, and the researcher presented the evaluation of the effects of the process on students, this study can be considered as action research. There is a flexible approach in action research; besides, it is pointed out that the researcher is close to the data and follow the process closely (Yıldırım and Şimşek, 2009: p.84). While Johnson (2003-2014) defines action research as "a research process that is done to determine the quality of actions or to learn in the classroom or school environment and develop them", Bogdan and Biklen (2003) explain it as "systematic data collection process to ensure social change".

**Sample Group**

The sample group consists of 48 seventh grade students at primary schools in Çayeli district, in Rize province in Turkey. Every week 24 primary school students attended the camp that was carried out in Recep Tayyip Erdogan University during two weeks. These students were chosen from 5 different schools, and especially voluntary students' participation were taken into consideration. Some students were not able to participate in the data collection process due to various reasons. Therefore, the findings were evaluated considering 44 students' participation in the study.

**Camp Period and Application Process**

Summer Science Camp aimed at enabling primary school students to develop a positive attitude towards science and environment with the help of enjoyable experiments and activities, comprehend basic scientific concepts and natural phenomenon, and increase their interest. In order to realise this aim, instead of traditional education methods, student-centred activities were involved in the camp program to increase students' sense of wonder, the eagerness of investigation and learning by enabling them to realise basic scientific phenomenon. In this camp, first four days of a one-week (5 days) program were carried out in the building of Faculty of Education in the university, and last day was carried out as technical visit and nature trip in different places. The purpose of the last day was to make students observe the species of birds and butterflies in their surroundings, take their photos, distinguish between the species and be informed about the agricultural and husbandry activities (tea shop and faculty of aquaculture) done in their environment.

In the activities that were carried out, students' understanding basic scientific phenomenon in physics, chemistry, biology and environmental sciences, and their noticing the fact that these fields are inside the life were emphasised. The activities were visualized as far as possible, and teaching techniques (drama, brainstorming etc.) that need students' active participation were preferred. Besides, multimedia factors (animations, presentation, video, interactive software) were benefitted in designing the learning environments.

It is emphasised involving activities, which can be carried out outdoors as well as in laboratories, in the program. The laboratory was organised for the activities that were done in laboratories, and this place was used for all disciplines. In the laboratory, tools and experiment equipment etc. were placed on the tables that were designated for each discipline, and it was facilitated for the students to reach them when needed. Instead of traditional desk arrangement in the laboratory, face-to-face desk arrangement, which enables group work, was created. During the activities, one moderator instructor who administered the activity, and three assistant instructors guided students.

While the moderator instructor administered the activity process in general, assistant instructors took part near the groups that they were responsible for and had the responsibility to enable the groups to do the activities as in desired productivity.

The camp was organised as two stages, and each stage lasted five days. Each day of the camp included just one discipline. 1$^{st}$ day was planned as "Journey to physics world" related to physics subjects. 2$^{nd}$ day was planned as "Journey to biology world" related to biology subjects. 3$^{rd}$ day was planned as "The mystery of chemistry" related to chemistry subjects. The 4$^{th}$ day was planned as "Geography explorer" related to geography subjects, and 5$^{th}$ day was planned as "Let's learn by travelling". The details related to the activities that were carried out on "The mystery of chemistry" day were presented in Table 1.

**Table 1.** The features of activities that were carried out on "The mystery of Chemistry" day

| Name of the Activity | Purpose of the Activity | Type of the Activity | The Way of the Activity |
|---|---|---|---|
| **Gases in the air** | Comprehend the components that forming the air and the poisonous gases that harm the environment. | Drama<br>Setting a Model<br>Discussion | Individual-Team Work |
| **Sad Tears of the Sky** | Identify the acids and an acidic substance, understand how acid rain occurs. | Experiment<br>Simulation Animation<br>Discussion | Individual-Team Work |
| **Recycling** | Realize the advantages of recycled waste materials for the environment. | Experiment<br>Simulation<br>Discussion | Team work |
| **Let's use soap and be clean** | Understand how soap is produced chemically, and which substances it includes. | Experiment<br>Animation<br>Discussion | Team work |
| **Soap Foam Fountain** | Comprehend the importance of substances in the development of events via an example of a chemical reaction. | Experiment<br>Discussion | Team work |

In "The gases in the air" activity, students put green, blue, white and yellow beads together in a jar, considering the proportions of the gases in the air, and tested it representatively. Later, students shared roles for the drama named as "We are Poisonous Gases", and presented it after they practised it. With the help of this drama activity, students have learnt that the gases such as CO, $SO_2$, $NO_2$ pollute the air, and where these gases come from, how they merge into the air and cause pollution. Besides, this drama activity includes the necessary solution offers to reduce the air pollution.

In the activity named as "Sad Tears of the Sky", firstly students measured the acidity degree of some substances on simulation, then they put a coin, meat, fabric, zinc metal, pieces of marble into various acid solutions and observed them. In addition, as an example of the association of acids with daily life, they examined the occurrence of acid rain and its effects on the environment on an animation, and they discussed on it. With this activity, awareness was created in students about the areas of daily usage of acids, and their negative effects.

In "Recycling" activity, students soaked old newspaper and papers, mashed them and pulped them. Then, they experienced the process of reacquiring paper from the pulped paper. By this way, they had the opportunity of discussing the importance and advantages of recycling for nature. Students had the opportunity of spending enjoyable time not only with the activities but also with a simulation game related to the environmental cleaning.

In the activity named as "Let's use soap and be clean", students experienced how soap which is an important cleaning factor, is produced and which substances it includes by conducting producing soap experiment. They found out that olive oil which we frequently use in daily life is used in producing soap, and its reaction with sodium hydroxide. They were enabled to watch an animation

about which soap feature provides the cleaning things, and they were provided with necessary explanations.

In the activity named as "Soap Foam Fountain" students saw an example of a reaction that can occur as a result of the interaction of different substances underlying the chemistry science. They had an enjoyable time with an amazing gas out as a result of the interaction between potassium iodide and hydrogen peroxide with the liquid soap. They ended this activity with a discussion about how that happened. The pictures related to the activities that were carried out in chemistry day are demonstrated in Appendix 1.

**Data Collection Tools**

"Chemistry Science Interview Form" including four open-ended questions was applied before and after the implications of the activities in the camp. This form includes questions related to students' situations such as what the chemistry is, their interest in chemistry, being able to associate chemistry with daily life (Table 2). These questions were prepared after three experts had checked them.

**Table 2.** The questions in chemistry science interview form

| **Before the Science Camp (Pre-test)** | **Science Camp** | **After the Science Camp (Post-test)** |
|---|---|---|
| I have interest in chemistry. Because;<br>I am not interested in chemistry. Because; | CHEMISTRY DAY ACTIVITIES | Did your interest in chemistry increase? Why? |
| I think that chemistry is science related to daily life because; | | I think that chemistry is science related to daily life because; |
| I think that chemistry isn't science related to daily life. Because; | | I think that chemistry is not science related to daily life. Because; |
| What is chemistry? What comes to your mind when we say chemistry? | | What is chemistry? What comes to your mind when we say chemistry? |
| | | Would you like to choose a career related to chemistry? Why? |

Besides, to reveal the participants' opinions about the chemistry activities that were carried out in the camp, reflective journals were used. Students were asked to involve the parts that they think as the most enjoyable, most surprising, most difficult, most boring etc., while they were writing their journals (Table 3).

**Table 3.** The questions that students used to fill in reflective journals

| **AFTER THE ACTIVITIES ON CHEMISTRY DAY** | |
|---|---|
| The activity that I enjoyed most on chemistry day:……. | Because;……. |
| The activity that surprised me most:……. | Because;……. |
| The activity that I had difficulty most:……. | Because;……. |
| The activity that I was bored most:……. | Because;……. |
| To evaluate the day in general, how do you feel about it? | |

**Data Analysis**

In the analysis of chemistry science interview form, which includes reflective journals and open-ended questions, content analysis was used, and the data were coded separately by two researchers, and it was concluded that these codes were coherent. Then, the statements on which there is a consensus were presented in tables as percentage-frequency. The main procedure done in content analysis is to gather the similar data within the scope of certain concepts and themes and organise and interpret them as readers can understand (Yıldırım and Şimşek, 2006).

## FINDINGS

In this part, the findings, which were collected with chemistry science interview form and reflective journals, were demonstrated in tables. After the explanations for tables, students' statements were involved.

**Table 4.** Students' interest in chemistry in pre-test and post-test

| **Statements** | **Pre-test** | | **Post-test** | |
|---|---|---|---|---|
| | **N** | **%** | **N** | **%** |
| I am interested. | 32 | 73 | 44 | 100 |
| I am not interested in chemistry. | 12 | 27 | - | |
| I would like to choose a career related to chemistry. | 8 | 18 | 22 | 50 |
| I wouldn't like to choose a career related to chemistry. | 36 | 82 | 22 | 50 |

As it can be seen in Table 4, while ten students stated that they weren't interested in chemistry in the pre-test, this percentage was set to zero in the post-test; thus, all students stated that they were interested in chemistry. The table shows that students' thoughts have a positive increase in post-test about the choice of profession that is related to chemistry. The increase in the percentages implies that the chemistry activities that were carried out had a positive impact on students' interests towards chemistry and the professions related to this field. The examples from the students' statements are like that:

**S4:** *The images that emerged from the experiment and activities which we carried out aroused our curiosity and my interest increased. If the results of all experiments are interesting, my interest will increase more.*

**S10:** *Yes, I've understood the logic of the things I know. Therefore, my interest increased.*

**S18:** *It increased. Indeed, I was afraid of chemistry, biology, and physics. I was afraid that I wasn't able to succeed when I skipped to high school, but it is easy. I overcame my fear.*

**S30:** *It increased. Because I have seen that chemistry can do better things than ı know and see.*

**S44:** *It increased. It was interesting to deal with chemical substances and conduct experiments with them, and it aroused interest.*

**S14:** *I would like to be a chemist in order to teach and learn new information like scientist.*

**S34:** *Certainly, I would like to choose such a career. I want to learn by experimenting, not by reading the book, so it affects my career preference.*

**Table 5.** Students' thoughts about whether chemistry is related to daily life

| **Situation** | **Pre-test** | | **Post-test** | |
|---|---|---|---|---|
| | **N** | **%** | **N** | **%** |
| Chemistry is associated with daily life. | 24 | 55 | 39 | 89 |
| Chemistry isn't associated with daily life. | 15 | 34 | 4 | 9 |
| No answer | 5 | 11 | 1 | 2 |
| Total | 44 | | 44 | |

As it can be seen in Table 5, while in pre-test 24 of the students stated that chemistry is associated with daily life, in post-test this number increased to 39 so that in post-test the number of the students who stated that chemistry isn't associated with daily life reduced. Table 5 presents the students' statements that support the situation of association between chemistry and daily life.

**Table 6.** Students' ideas about the association of chemistry with real life

| Pre-test | Post-test |
|---|---|
| Making syrup | The substances in the human body |
| Water vaporization | Lots of natural events such as the formation of rain, snow |
| Mineral deposits | Plasma state of substances |
| The content of perfume, toothpaste | Everything in our life |
| Solution of sugar | Recycling |
| Breathing | Acid rain |
| The content of medicine, detergent, soap | Cleaning agents-producing soap |
| Corrosion of some substances | The content of salt and how it occurs |
| | The content of water and refining it |
| | Platinum that is used in the field of medicine |
| | Burning of coal and various petroleum products |
| | Blowing up of flying balloons |
| | Digestion |
| | Freezing of water and its importance for our life |
| | Respiration |

As Table 6 presents, in the pre-test, even if just a small number, students used simple statements such as "making syrup, water vaporisation, mineral deposits, the content of perfume and toothpaste, a solution of sugar, breathing, medicine, detergent, corrosion" about the association of chemistry with daily life. However, when the findings of post-test are analysed, it is found out that they can make very different chemistry associations as both a content and number. These associations are: "the substances in human body, many natural events such as formation of rain and snow, plasma state of substances, recycling, acid rain, producing cleaning agents-soap, the content and refining of water, platinum that is used in medicine, burning of coal and various petroleum products, blowing up of flying balloons, digestion, freezing of water, and its importance for our life, and respiration. Sample student statements:

**S24:** *Thanks to chemistry, I have learnt that the importance of breathing, respiration which we need most in daily life. It used to seem easy, but I have learnt it with details.*

**S44:** *Chemistry is certainly everywhere, chemistry has an important part in each science field.*

**S21:** *If we assumed that chemistry has no place in daily life, many problems would remain unsolved.*

The statements that students used as a response to "What is chemistry? What do you think about chemistry?" are presented in Table 7.

**Table 7**. The concepts that students associate with chemistry

| **Associated concepts** | **Pre-test** | **Associated concepts** | **Post-test** |
|---|---|---|---|
| Atom | 4 | Atom | 24 |
| Experiment | 13 | Experiment | 20 |
| Substance | 9 | Substance | 20 |
| Element | 9 | Element | 16 |
| Compound | 3 | Compound | 14 |
| Mixture | 4 | Mixture | 11 |
| Periodic Table | 4 | Periodic Table | 10 |
| Molecule | 1 | Molecule | 8 |
| Formula | 3 | Formula | 7 |
| Solution | 1 | Solution | 6 |
| Electron | 1 | Electron | 5 |
| Laboratory | 2 | Laboratory | 5 |
| Gas | 11 | Science | 5 |
| Acid | 9 | Reaction | 5 |
| Base | 6 | Physical-chemical event | 5 |
| Research | 1 | Physical-chemical bond | 5 |
| | | Energy | 3 |
| | | Nucleus | 2 |
| | | Proton | 2 |
| | | Ion | 2 |
| | | Entropy | 2 |
| | | Neutron | 1 |
| | | Orbit | 1 |

As Table 7 demonstrates, the number of the concepts that students associated to chemistry in pre-test is not few, however, it is at a low level on the basis of the number of the students who stated them. It can be concluded that students are familiar with the common words such as "Experiment, substance, element, gas, acid, compound, laboratory etc.". However, the findings of the post-test reveal that there is a significant increase in the number of the students who used similar concepts with

the ones that they used in the pre-test. Besides, except for the association, some students use different words such as "energy, nucleus, proton, ion, entropy, neutron, and orbit". The statements that students expressed related to what chemistry is are like that:

**S19:** *Chemistry identifies the features of substance and what happens when they are combined. Explosions, reactions are examples of this fact.*

**S42:** *It is the science field which involves the changes in the structure of the substance and their interrelations with each other.*

**S40:** *It is the science field which investigates the features of substances and their interactions.*

**S34:** *Chemistry means trying, making a mistake, finding a result and getting information. If a human being had never asked why and had never said I wonder, neither chemistry, nor physics, or biology would have existed. People wondered, questioned and found the answers by trying.*

**Table 8**. Students' thoughts in reflective journals about the features of activities

| **Questions** | **Activities** | |
|---|---|---|
| **The activity that you enjoyed most** | Soap foam fountain (36 students) | Let's use soap, be clean (8 students) |
| **The activity that surprised you most** | Let's use soap, be clean (28 students) | Soap foam fountain (16 students) |
| **The activity that you had the most difficulty** | Sad Tears of the Sky (15 students) | Let's use soap, be clean (7 students) |
| **The activity that bored you most** | Recycling (8 students) | Gases in the air (6 students) |

According to Table 8, the activity students enjoyed most is "Soap foam fountain" (36 students) and "Let's use soap, be clean" (8 students) activities. They even expressed that they would like to repeat it individually since they like it:

**S1:** *Today, I had fun most in the activity called soap fountain, because that squirt was very beautiful and it was enjoyable to do it.*

**S8:** *Today I had fun most in soap fountain because it was the first time I saw such an activity. It was fun and interesting. I liked it very much.*

**S9:** *Today, of course, I had fun most in soap fountain experiment. I think that most students had fun in this activity because we did a great job with few materials. I was surprised by what I saw. I would like to conduct this experiment by myself.*

The activity that surprised students most were "Let's use soap and be clean" (28 students) and Soap foam fountain (16 students)". They explained this situation like that:

**S7:** *Today, I most surprised at making soap activity, because ı didn't know that oil is used in making soap and I didn't think that the compound in the beaker would surprise us so much.*

**S1:** *Today, the activity called soap fountain surprised me most. I didn't expect such a good activity, but it was great. We had an astonishment.*

**S9:** *I can't say that I was most surprised by any experiment. I can say that it was a day when I gaped with astonishment. Making soap is the first. Soap fountain; it was amazing. I was generally surprised by everything.*

The activity that had most difficulty was "Sad Tears of the Sky (15 students) and Let's use soap and be clean (7 students)" activities.

**S8:** *The activity that includes acid rain was difficult to form me because I had difficulty in learning the names of some elements. However, I understood how they occurred.*

**S12:** *I can say that I had difficulty in making soap because it was challenging for us to heat and stir the substance on fire.*

The reflective journals show that the number of the students who used the statement "I wasn't bored" is higher. They explained this situation like that:

**S1:** *I wasn't bored in any activity today. They were all good and fun. There was a sense of wonder at the beginning of each one, and we satisfied our curiosity in all activities.*

**S9:** *In general, I spent a day which I never got bored. All experiments were fun. Today, we did the things that we thought as very difficult.*

The activity that they got bored most was "Recycling (8 students) and Gases in the air (6 students). They expressed this situation like that:

**S5:** *I was bored in the Gases in the air activity because we did not do anything exciting as we did in other experiments. However, I have learnt something I do not know: the air consists of 78% nitrogen, not oxygen.*

**S9:** *I didn't get bored in general, but to put them in order, the gases in the air activity was a bit pale in comparison.*

**S15:** *I got bored in recycling activity today because mashing, shaping papers took some time, and I was bored of waiting.*

When students evaluate chemistry day, they generally expressed that they were pleased with such an atmosphere; they had fun so they have learnt the things that they can remember.

**S3:** *We did very nice activities; we both had fun and learnt something. I was happy to conduct experiments with my group friends.*

**S4:** *Chemistry day activities were nice and enjoyable. I was pleased to prepare the compounds and experiments together.*

**S9:** *I think that I have learnt many new things by having fun and I can keep them in my mind better thanks to the experiments and observations in chemistry day.*

**S8:** *I have learnt the importance of the substances in the progress of events, what soap consists of and the substances in the air, in an enjoyable way.*

## DISCUSSION, RESULT AND SUGGESTIONS

This study evaluated the effects of chemistry activities that were carried out in a summer science camp on secondary school students. The findings reveal that in post-test, students' interest increased as a result of the activities done in science camp, and they were able to associate chemistry to the events in daily life better. It was determined that they used chemistry concepts that include

different associations both numerically and as content. Journals and the student statements in the interview form also support this fact. Students' opinions about choosing a career related to chemistry increased positively in post-test. The increase in the proportions shows that chemistry activities that were carried out had a contribution to the students' interest in chemistry and the career in this field. In the study, it was established that science camp, which teachers applied to students, had a positive impact on their social skills and their opinions towards the nature of science (Hırça, 2012). Other studies concluded that the students who participated in the summer science camps developed a positive attitude towards science. They have positive effects on their desire of doing a career in chemistry (Avcı et al., 2015; Erdoğan, 2011; Foster and Shiel-Rolle, 2011; Gibson and Chase, 2002; Hammack et al., 2015; Knox, Moynihan and Markowitz, 2003; Özdemir, 2010; Sezen Vekli, 2013; Tekbıyık et al., 2013). Çelik (2012, p.17) stated that science camps and science festivals are the instruments which are used in specially developed countries to develop a positive attitude towards science and scientists.

It was also found out that students like surprising experiment and activities in which they can perceptibly observe the features like a gas outlet, colour changing; and which visually change quickly. Within the scope of the project, in evaluating the environment they were in, it was determined that students were pleased with the environments which involve such activities and experiments, they had fun, and they learnt different things that they can easily remember. The students were personally involved in the activity in this project, and they weren't involved in many activities and text environment in their schools so that such a result was found out. Students discover scientific concepts by doing and experiencing themselves and the knowledge which is acquired by discovering becomes more permanent (Uzal, Erdem, Önen ve Gürdal, 2010). In a study that was carried out in literature, it was concluded that students found the activities done in the project more enjoyable and instructive than the activities done in the school, they learnt a lot of new information thanks to the project activities and they wanted to do such activities at school (Yıldırım, Atila and Doğar, 2016). Marulcu, Saylan and Güven (2014) stated that there are lots of ways to develop science literacy; and one of these ways is using the activities involving science schools or science camps. (Buluş-Kırıkkaya, Bozkurt and İmalı (2011) and (Eş, Geren and Altan, 2015) point out in their studies that such projects make learning environments more enjoyable and productive; and the activities that students are most affected are the ones that they participate personally. Foster and Shiel-Rolle (2011) stated that in the six days long summer science camp, students were enabled to examine the concrete examples of abstract scientific concepts, and science camp developed the individuals'science literacy. Another aim of such projects is to prove that science lessons are enjoyable and easy to do (Marulcu et al., 2014). In the study carried out by Metin and Leblebicioğlu (2015), it was determined that the activities done in the camp have to impact on the students' opinions about scientific models after science camp, and during these activities, students had the opportunity of creating their models and discussing by collecting data at first hand. Besides, Gilbert (2004), stated that the best way of developing students' ideas about the nature of scientific models is to prepare them environments in which they can do different kinds of modeling activities actively and at first hand. The common point that can be inferred from all these studies is that it is vital for students to be in the environment that they can have their own experiences.

In consideration of these findings, following suggestions can be done;

Since this kind of activities will contribute to students' scientific, social and personal development, the continuity of the applications, which can associate science with daily life, gains importance. Not only in science camps but also in schools such activities can be an example for teachers, pre-service teachers and students regarding an idea. Regarding the positive effects of camp on students, it can be suggested to popularise similar nature science camp applications in all the cities of our country with different target populations.

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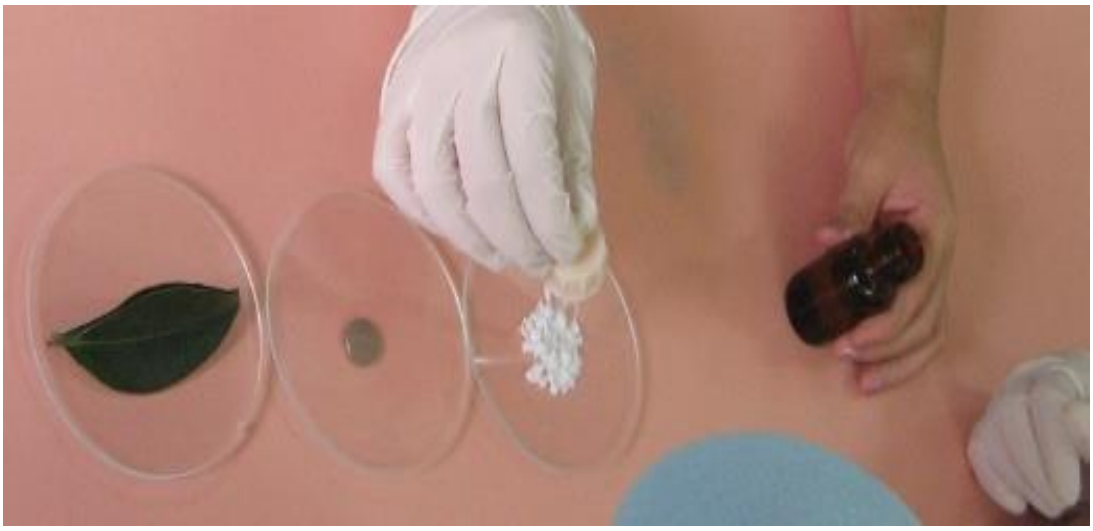
**Appendix: Pictures of activities**

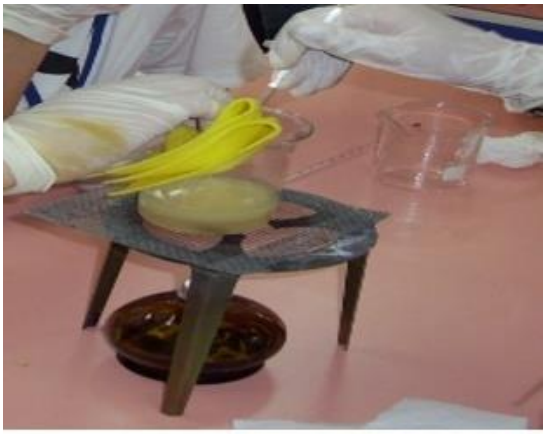
"The gases in the air" activity


"Sad Tears of the Sky" activity



"Recycling" activity


"Let's use soap and be clean" activity

"Soap Foam Fountain" activity