



# Where are the squids?

The impact of climate change on the migrations of the squids

Type of pedagogical project, activity, action, accompanying	Activity
Key words of relevant disciplines/ Pedagogical content	living conditions, squids, migration change
Problematic	<i>What are the consequences of climate change on the sea life?</i>
Thematic	<i>Biodiversity</i>
Disciplines (sciences, geography)	<i>Science</i>
Pedagogical Objectives/New targeted skills	<p><b>The students will be able to:</b></p> <ul style="list-style-type: none"> <li>- Indicate changes of living conditions in the sea that are associated with climate change</li> <li>- Explain the direct impact of the warming of the sea on the decreasing of the squid population in the seas</li> <li>- Explain the indirect influence of sea warming on the movements of squids in their homeland during the winter months</li> <li>- Predict and describe the possible developments of situation in the future regarding climate change</li> <li>- Suggest solutions to a problem.</li> </ul>
Public target(s) (age, requested skills...)	Students of age 11 to 13
Description (step by step)	<p><b>Step 1)</b></p> <p>Association game on the topic of "Climate Change". The teacher and the students review previously learned and well-known facts about the climate (what is climate, what is the type of climate in Dalmatia, characteristics of the Mediterranean climate...). Then they review known facts about molluscs: name, groups, evolutionary progress, habitat...</p> <p>In the conversation they focus on squid in their habitat. It's been reported by local fishermen and published in some magazines that the catch of squid has been significantly reduced in the last few years. Then the question that comes up is: "What is the cause of it?"</p>





The students make their assumptions and then the teacher announces the task of the day: "Today we are going to try to answer the following question: are the squid migrations affected by climate change?"

### Step 2)

Group work. Each group studies the text about squids; in groups they solve the tasks that lead them to solve the main question.

*(links to the Croatian texts can be found below; in order to adapt the activity in other languages, texts about squid need to be prepared.)*

### **TASKS THAT FOLLOW THE READIN OF THE TEXT**

- How has the number of squids evolved in the world's oceans?
- How has the number of squids evolved in the Adriatic?
- How did the living conditions evolve in the seas?
- How does the rising of the sea temperature affect the life of squids?
- Except the evolution of the sea temperature, what else does affect the life of squids?
- Explain how the part of the food chain from plankton to the squid does work.

### Step 3)

The teacher and the students analyse the text they have read. They conclude that the reduced number of squids in the sea is caused by the following changes:

Because of the raised sea temperature, the plankton remains in the open sea. Because of that, the small blue fish (sardines, anchovies, sprats...), which feed on plankton, also remain in the open sea.

Consequently, the squids which feed on small blue fish, remain in the open sea.

At first sight, there is a discrepancy in warm sea-squids relation: the higher temperature of the sea causes an increase in the number of squids, so the direct impact of the raised sea temperature on squids is not negative. On the other hand, it changes the food chain, which leads to a decrease in the number of squids in coastal areas.

Conclusion: ***Climate changes indirectly led to the movement of squids, moving them away from our coast in the winter period.***

(In further work students can focus on further consequences of these changes





	<p>on the food chain)</p> <p><b>Step 4)</b> What can the local fishermen do to adjust to this changed situation?</p> <p>Students with the help of teachers come to the conclusion that human intervention, aiming at quick prevention or mitigation of the negative effects of climate change in the sea, is complex and demanding.</p> <p>These micro examples confirm what the students know already: <b>in nature everything is connected</b>. Clean air means “health” for the sea and for the land and also for all the living world. Our duty is to act locally. Students should find ways to raise awareness amongst their fellow citizens about the damaging local and concrete consequences of climate change.</p>
<b>Place (meeting room, outside space, ...)</b>	classroom
<b>Individual and / or collective actions</b>	Individual & group work Work on text, writing, drawing, exploring literature (textbook, internet, ...)
<b>Material needed</b>	Text about squids, worksheets
<b>Duration of pedagogical project or activity</b>	<b>2 hours</b>
<b>Evaluation of the new acquired skills</b>	Evaluating the understanding of the causal process in other examples, verbally and in writing
<b>Eco-citizen adaptation, knowledge enhancement and links to other topics</b>	<p><b>Link to:</b>  <a href="#">Activity sheets: Exploring the consequences of climate change in our environment</a> / <a href="#">Activity to introduce Climate Change to students</a> / <a href="#">The impacts of Climate change in your region</a> / <a href="#">Experiment about CO2 impacts on earth temperature</a> / <a href="#">When Mediterranean species are threatened by climate change</a> / <a href="#">The impact of climate change on sardine growth</a></p> <p><b>Croatian:</b></p> <ul style="list-style-type: none"> <li>• <a href="https://www.dw.com/hr/bez-planktona-u-moru-nema-%C5%BEivota/a-19164920">https://www.dw.com/hr/bez-planktona-u-moru-nema-%C5%BEivota/a-19164920</a></li> <li>• <a href="https://www.squid-world.com/squids-and-global-warming/">https://www.squid-world.com/squids-and-global-warming/</a></li> </ul>





	<p><b>Greek:</b></p> <ul style="list-style-type: none"> <li>• <a href="https://www.lifo.gr/now/tech_science/101700">https://www.lifo.gr/now/tech_science/101700</a></li> </ul> <p><b>French:</b></p> <ul style="list-style-type: none"> <li>• <a href="https://www.futura-sciences.com/planete/actualites/rechauffement-climatique-rechauffement-rapide-mediterranee-fragilise-mollusques-coraux-33042/">https://www.futura-sciences.com/planete/actualites/rechauffement-climatique-rechauffement-rapide-mediterranee-fragilise-mollusques-coraux-33042/</a></li> </ul>
<p><b>Observations</b></p>	<p>Ordinary and compulsory teaching topic has become a good opportunity to deal with the consequences of climate change with the students.</p> <p>Using the students' daily experience and speaking in conversational language, instead of a scientific meta language, helps in understanding the processes (causes and consequences).</p> <p>A good assumption has been created for further learning and understanding of the chemical processes that will be dealt with in the chemistry lessons.</p>

