



INTEGRATING EDUCATION FOR CLIMATE CHANGE ADAPTATION AND DISASTER PREVENTION IN GRADE 12 FOR HIGH SCHOOL STUDENTS

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Abstract

In the current new period, the orientation of fundamental and comprehensive renovation of general education has made the point of view: “Integrated learning day, to develop competence in learners, helping them to be able to solve real problems and respond to the rapid changes of modern society to regain the highest success in life.” This perspective has begun to be implemented in teaching at all levels. study, subjects in high school.

Keywords

Integration; Integrated teaching; Integrating climate change adaptation education (CC) and natural disaster prevention (PCD) in teaching Geography grade 12.

In school subjects, information is disseminated through many grades and grades, subjects such as Chemistry, Biology, Technology, Physics, and especially Geography. Geography is a subject that has many favorable possibilities and opportunities for integrated teaching and brings many positive results due to the subject’s characteristics associated with the natural reality and life around learners. Reflects a way of solving today’s burning problems. Because subject knowledge is very broad, including the natural environment, the socio-economic environment, and its basic relationships. To understand and understand geographical knowledge deeply, it is necessary to have knowledge of many different subjects, from which it is possible to apply geographic knowledge to solve practical problems. In the content of this article, we refer to the integrated analysis of education on climate change adaptation (CC) and disaster prevention (DRR) in Grade 12 Geography for high school students, to create interest. study, develop motor capacity to apply geographic knowledge to explain natural phenomena and social issues of concern, especially climate change and natural disaster risks that have been affecting have a strong positive and direct impact on the natural system, economic activities, and environment of the Vietnamese people.



TÍCH HỢP GIÁO DỤC THÍCH ỨNG BIẾN ĐỔI KHÍ HẬU VÀ PHÒNG CHỐNG THIÊN TAI TRONG MÔN ĐỊA LÝ LỚP 12 CHO HỌC SINH TRUNG HỌC PHỔ THÔNG

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Tóm tắt

Trong giai đoạn mới hiện nay, việc định hướng đổi mới căn bản, toàn diện giáo dục phổ thông đã đưa ra quan điểm: “Dạy học tích hợp, với mục tiêu phát triển các năng lực ở người học, giúp họ có khả năng giải quyết các vấn đề thực tiễn và đáp ứng sự biến đổi nhanh chóng của xã hội hiện đại để đem lại thành công cao nhất trong cuộc sống”. Quan điểm này đã bắt đầu được thực hiện trong dạy học ở tất cả các cấp học, môn học ở nhà trường phổ thông.

Từ khóa

Tích hợp; Dạy học tích hợp; Giáo dục thích ứng biến đổi khí hậu (BĐKH) và phòng chống thiên tai (PCTT) trong dạy học môn Địa lý lớp 12.

Ở các môn học ở trường phổ thông thông qua nhiều bậc học, cấp học, môn học như Hóa học, Sinh học, Công nghệ, Vật lý và đặc biệt là Địa lý. Môn Địa lý là một môn học có nhiều khả năng và cơ hội thuận lợi để dạy học tích hợp và mang lại nhiều kết quả khả quan bởi đặc trưng môn học gắn liền với thực tế thiên nhiên, nó phản ánh một cách sát thực vấn đề nóng bỏng hiện nay. Vì kiến thức môn học rộng bao gồm môi trường tự nhiên, môi trường kinh tế xã hội và các mối quan hệ cơ bản của nó. Muốn hiểu rõ, hiểu sâu các kiến thức địa lý rất cần đến kiến thức của nhiều môn học khác, từ đó có thể vận dụng kiến thức địa lý vào giải quyết các vấn đề thực tiễn. Nội dung của bài báo này chúng tôi đề cập đến việc tích hợp giáo dục thích ứng biến đổi khí hậu (BĐKH) và phòng chống thiên tai (PCTT) trong môn Địa lý lớp 12 cho học sinh THPT, nhằm tạo hứng thú học tập, phát triển năng lực vận dụng kiến thức địa lý để giải thích được các hiện tượng tự nhiên và vấn đề xã hội đang quan tâm, đặc biệt vấn đề biến đổi khí hậu và rủi ro thiên tai đã và đang tác động mạnh mẽ tiêu cực và trực tiếp đến hệ thống tự nhiên, hoạt động kinh tế và môi trường của người dân Việt Nam.

1. Introduction

Climate change and natural disaster prevention and control are among the issues that are of concern to the whole world because of their influence and extent. Vietnam is one of the most vulnerable countries, most heavily affected by climate change and annual natural disaster risks, especially in coastal areas and coastal plains such as the Mekong Delta, the Red River, the Southeast, and the South Central Coast. Climate change and natural disaster risks have been having strong negative and direct impacts on the natural system, economic activities, and environment of the Vietnamese people. Therefore, each Vietnamese citizen, especially the young generation, needs to have the right awareness, corresponding changes to suit the actual situation, and practical actions to cope with changes and risks. this undesirable.

To respond to climate change and natural disaster risks, over time, all levels of sectors and localities have been directly affected, under the leadership of state agencies combined with the support of the international community. Initially, there were positive measures to respond to climate change and disaster prevention. The new 2018 GDPR program has indicated the role of education and training through its integration into the program to raise public awareness of current climate change issues and disaster risks. Climate change adaptation and disaster prevention education are implemented in high schools through many levels, grades, and subjects. In the subject of Geography, education on climate change adaptation and disaster prevention has many favorable opportunities to organize the integration of climate change adaptation education and disaster prevention in teaching 12th-grade Geography for high school students and can bring many positive results. This is also an important premise for more practical education on climate change adaptation and disaster prevention in our country. Therefore, based on the above factors, we focus on researching the integration of climate change adaptation education and disaster prevention in teaching 12th-grade Geography for high school students to improve the effectiveness of integrated teaching and development, and develop students' ability to solve problems related to current reality.

2. Research methods

2.1. Theoretical research methods

This method is used to collect, select, and process documents related to the topic, including documents on teaching theory, articles on climate change, environmental education, scientific basis environment, general and specific teaching methods of the subject of Geography, etc. to solve the task of the topic.

2.2. Practical research methods

2.2.1. Method of observing and predicting time

Attend teachers' teaching hours, see the implementation of climate change education, observe students' attitudes and levels of acquiring new knowledge

2.2.2. Methods of investigation, data collection and processing

Using questionnaires with teachers and students of high schools in the Ho Chi Minh City area

2.2.3. Interview method

In the process of finding out the actual situation, I directly interviewed and investigated with teachers and students to choose the most suitable option, the question was directed at the content of integrating education on climate change adaptation and disaster prevention in class Geography. 10 high schools.

2.2.4. Experimental method of pedagogy

Includes exploratory experiments and formal experiments. The use of experimental methods to verify the integrated methods of the topic. The results will be analyzed and compared with the theory to draw accurate and necessary conclusions for the completion of the research topic.

2.2.5. Mathematical statistical methods

Used to collect data and issues related to the research topic. At the same time, make statistics of survey results of teachers and students in high schools to analyze and draw conclusions

3. Research results

3.1. The process of integrating climate change adaptation education and disaster prevention in teaching Geography grade 12

3.1.1. General Process Diagram

General process diagram on the organization of integrated teaching

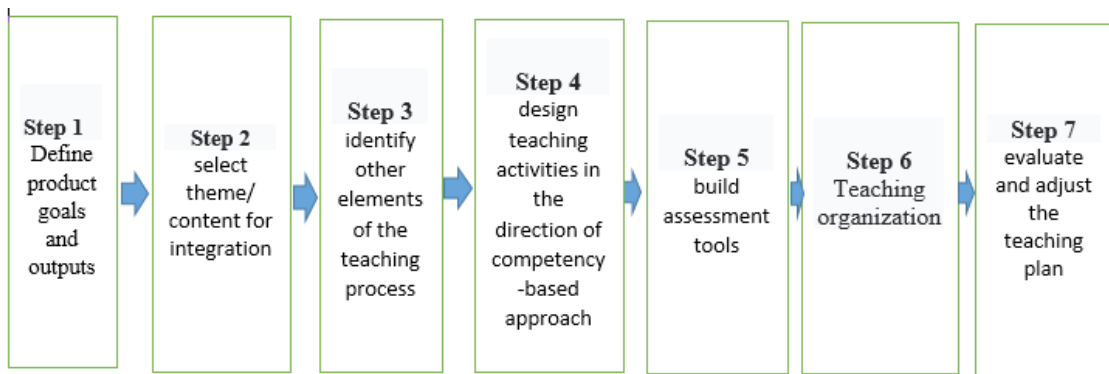


Diagram 3.1. Flowchart of the integrated topic teaching process [7]

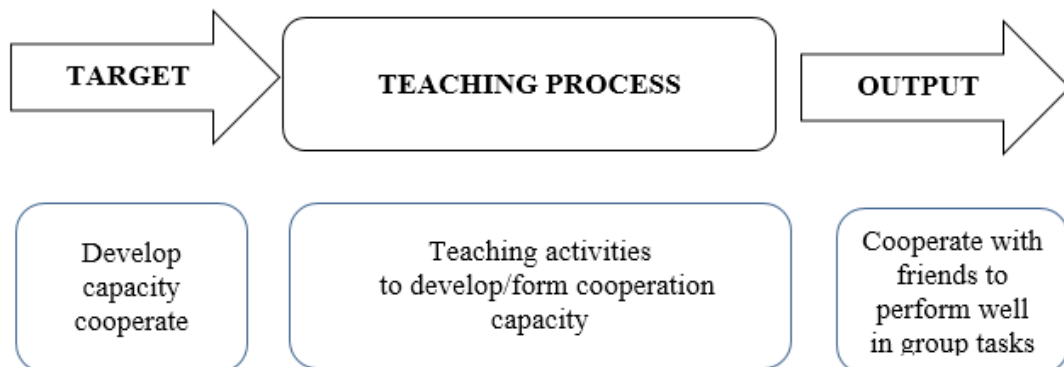
3.1.2. Analyze the steps in the process

The organization of integrated teaching needs to be organized flexibly and proactively, usually with seven steps as follows:

*Step 1: Determine the student’s goals and outputs at the end of the topic

The goal of the topic can be the goals of knowledge, skills, attitudes, values, general competencies, or specific competencies that orient the development/formation of students at the end of the topic. Outputs are the (expected) outcomes that students will achieve by the end of the theme; This result is the concretization of the learning objective of the topic.

For example:



*Step 2: Select theme/integrated content

Integrated topics may be introduced or suggested in the program. However, teachers can also jointly identify integrated topics to suit the local circumstances and the psychology of the students. To identify topics that integrate the social sciences, keep in mind:

- For students: it is necessary to consider and consider the level, experience, and interests of students to choose a topic that is appropriate and attractive.

- Development-oriented capacity for students in the topic: It can be general capacity and specific capacity. However, it is necessary to choose the oriented competencies that are formed to avoid developing too

many competencies at the same time, which will not achieve the desired results.

- Subject-related subject areas: when determining interdisciplinary topics, it is not necessary to ensure fairness in content scope between subjects, but only based on the purpose of topic construction. topic, the solving of tasks related to the topic covers what areas of knowledge.

Define the subject type, which can be:

- + Apply knowledge
- + Forming new knowledge
- + Complex (combination of type 1 and type 2)

- Determine the logic and development circuit of the topic:

- Determine the duration for the topic (in how many periods)

- Determine the level/class to conduct subject teaching.

* Step 3: Identify other elements of the teaching process including:

- Forms of teaching.
- Teaching methods.
- The art of teaching
- Teaching facilities and equipment

Teachers pay attention to the use of active teaching methods and techniques to achieve the set goals, especially the development goals/capacity forms.

Step 4. Design teaching activities according to the competency approach

Teachers based on the expected time, teaching objectives, methods, teaching techniques, psychological characteristics, and regional factors... to design appropriate teaching activities.

* Step 5: Build an assessment tool

Evaluation tools allow teachers to know if the teaching objectives have been achieved or not. The assessment process can be integrated with the teaching process or using independent assessment tools. Therefore, the assessment tool will include both questions/exercises/activities during the implementation of the topic/situation and questions/exercises/observation sheets/assessment tables... after the end of the topic/content.

Table 3.1. Examples of building assessment tools in integrated teaching

The knowledge content of the topic	Teaching goals	Output products	Evaluation Tool
Concept	State the concept...	State the concept...	Question: Briefly describe the concept...
The relationship of	Analyze the relationship between the factors...	Find out the relationship between the factors...	The exercise draws diagrams to describe the relationship between the elements...
Cause of....	Understand....	Prove/explain...	
			Essay: Provide arguments, arguments, and practical examples
Looking for information...	Using information and communication technology to do...	Information technology products such as PowerPoint presentations, Websites, newsletters, flyers designed by computer software	State the concept...
Assign group work	Collaborate with a group of friends.	Combine to create group products	Group assessment sheet

*Step 6: Organize teaching

The organization of integrated teaching is implemented flexibly depending on specific material conditions, students' level, and time allowed. Organized teachers need to be flexible in the teaching process to avoid machines, this will reduce the effectiveness of the lesson.

*Step 7: Evaluate and adjust the teaching plan

After organizing integrated teaching, it is necessary to pay attention to evaluate the following aspects:

- The suitability of the actual teaching and the expected duration.
- The level of achievement of students through the assessment of learning activities.

- Students' interest in learning through observing and interviewing students.
- The level of feasibility with physical conditions.

The assessment of class time is of great significance because it helps teachers see the limitations that exist in the lesson so that they can adjust the teaching plan to be more appropriate and effective.

3.2. Developing integrated content of climate change education for lessons in the 12th-grade Geography curriculum

3.2.1. Methods of integrating climate change adaptation education and disaster prevention in teaching Geography grade 12

Many teaching methods can be effectively applied to education on climate change response and disaster prevention.

3.2.1.1. Conversational, suggestive methods

This method uses a system of questions and guides, helping students answer the questions posed by the teacher so that they can learn and understand the content of climate change and disaster prevention. When organizing activities of teachers and students in the conversational method, teachers can apply the following ways:

- The teacher poses a system of questions and asks each student (or group of students) to answer. Here the source of information for the whole class is a combination of questions and answers.
- The teacher gives the main question along with suggested questions to create debates. Here the source of information for the whole class is the main question accompanied by stimulating debate, the content of the debate itself is the summary solution.

The evocative conversation method often helps students understand the problem better, students are involved in the construction of the lesson, so they will be more active, through which they develop thinking skills. This method also reflects students' understanding of the lesson, and teachers can detect students' mistakes and promptly correct them.

However, this method takes a lot of time. If the general organization for the whole class is usually only a few students participate, teachers need to choose the appropriate content and time to apply it.

For example: In Geography 12, there is lesson 31 "The problem of exploiting strengths in the Northern Midlands and Mountains" in section 2. "Mining, mineral processing, and hydropower", teachers can use the method. suggestive dialogue to integrate the content of responding to climate change and disaster prevention.

The teacher may ask the following questions:

Question 1: What types of minerals does BB TDMN have? Name and state their distribution.

Question 2: What hydropower plants does the Northern Midwest have? Where is the distribution? What is the size of the factories?

Question 3: Describe the changes in landscape and environment in the area of mining or building hydroelectric plants that you know.

Question 4: In your opinion, how are mining and hydroelectricity related to climate change and natural disasters?

Question 5: In your opinion, as a Ha Giang person, what disaster prevention skills do you need to have? Why?

3.2.1.2. Methods of using visual aids

- * Use the map

This is the traditional teaching method typical for Geography in high schools. Maps have both illustrative and knowledge-source functions. Therefore, in teaching, teachers can use maps to illustrate and analyze lesson content and to guide students to explore and discover knowledge. Thereby, teachers form and train students to read and analyze maps. High school students have been trained in map use skills from the lower grades, so they can proficiently use the map to receive new knowledge, including knowledge about the environment, climate change, and prevention. disaster. Teachers need to pay attention to monitoring students' use of the map according to the prescribed steps. For high school students, the focus should be on discovering mutual and causal relationships, showing signs that do not show up on a map but are related to their manifestations. The question associated with the map normally takes the form: Where? Why there? or: How are they related to each other? ...

Example 1: When teaching lesson 35. "Socio-economic development problems in the North Central

Coast” (Geography 12), section 2. Forming the structure of agriculture, forestry, and fishery, teachers can ask to learn Students observe the natural map of the region and explain why forest protection and forest restoration are so important in the North Central region.

Example 2: When teaching lesson 15. “Environmental protection and disaster prevention” (Geography 12), item 2 means a “storm”. Teachers can ask students to observe the Atlas on page 9, which part of our country suffers the most storms? What time should you avoid traveling in the North Central Coast? Why?

* Use pictures, videotapes

Pictures and videos are also a source of knowledge for students. Pictures and videotapes create clear and specific symbols of geographical phenomena, including those of climate change and natural disasters. Purposeful use and analysis of the content of pictures and video tapes, exploitation of different aspects of pictures and videos related to educational content on climate change response and disaster prevention will have a strong impact related to feelings, and emotions and forming the right attitude for students before behaviors that are harmful to the environment, the impacts of climate change, the consequences of natural disasters on people’s lives. Currently, thanks to the strong development of information technology, teachers can ask students to collect images of climate change, and natural disasters, and videos on disaster prevention skills to serve the needs of the community. learning. When using pictures and videos, teachers pay attention to suggesting that students observe and describe things; and express students’ thoughts and feelings about the content of pictures and videos.

For example, when teaching lesson 15. “Environmental protection and disaster prevention” (Geography 12), section 2 “Some major disasters and prevention measures”. Teachers can prepare a 5-7 minute video about Vietnam’s natural disasters for students to observe. Then ask questions

Question 1: What kinds of geniuses does Vietnam have? Name and state where, when, and what are the consequences of some major natural disasters. Contact your home province.

Question 2: What do you think when you see natural disasters happening in your place and other places?

3.2.1.3. Methods of exploiting practical experience to educate

High school students already have a relatively large knowledge base that is expanding and deepening. Their vision is no longer limited to school and family. On the other hand, in theory, it is necessary to build up students’ knowledge and skills based on their education. Teachers should put children in situations where they need to learn and solve, forcing them to apply their knowledge and find the necessary knowledge and skills to solve problems, thereby gaining more knowledge. new knowledge and skills, enriching their educational capital.

Climate change and disaster prevention are issues that are very close to students such as abnormal phenomena of climate, weather, floods, landslides, pollution, etc., sometimes occurring in the locality where they live. they see, hear, and experience those problems in reality. Teachers need to take advantage of this feature when educating children about climate change and disaster prevention.

Example when teaching lesson 6. “Country with many hills and mountains” (Geography 12). Section 3. “Natural strengths and limitations of hilly and plain areas for socio-economic development”. Teachers should not immediately point out strengths and limitations but should give students practical connections and provide examples that demonstrate the strengths and limitations of the mountainous area or the plain.

3.2.2. *Address, content, and form of integrating climate change and disaster prevention in geography Grade 12*

The content of Geography in high school refers to the natural, population, and socio-economic factors of different countries and territories in the world. Including many contents related to environmental issues and natural disasters. Geography grade 12 has content on the Geography of Vietnam, especially about the use and protection of our country’s natural resources. Therefore, Geography in general and Grade 12 Geography in particular can perform the task of integrating climate change education and disaster prevention for students. Therefore, the content, address, and form of integrating climate change adaptation and disaster prevention education content in teaching Geography grade 12 for high school students are shown in Table 3.2:

Table 3.2. Content, address, integrated form

Post/Title	Built-in content	Built-in address	Integrated form
Lesson 2. Geographical location and territorial scope	Climate change increases natural disasters. It is necessary to focus on active and proactive prevention.	Section 3. Meaning of Vietnam's geographical location	Contact
Lesson 7. The country has many hills and mountains	- Mountainous areas: CC à increase in natural disasters in conditions of strongly dissected terrain and steep slopes à the more severe the consequences. - Delta region: CC à sea level rise à causing flooding and saltwater intrusion on a large scale.	Section 3: Natural strengths and limitations of hilly and plain areas for socio-economic development	Contact
Lesson 8. Nature is deeply influenced by the sea	Climate change increases the impact of natural disasters on coastal areas: Storms increase in both frequency and intensity, and sea level rise causes inundation, saltwater intrusion, and coastal erosion... Measures are needed to mitigate and adapt climate change response in coastal areas.	Disaster	Contact
Lesson 9+10. Tropical monsoon humid nature	- Effects on agricultural production: Climate change increases the volatility of weather and climate factors. - Impact on other production activities and life: Climate change increases natural disasters and erratic weather phenomena.	Section 2: Other natural ingredients: a) Alluvial and accretionary topography b) Rivers and rivers of the humid tropics c) Feralit soil d) The monsoon humid tropical forest ecosystem. - Section 3: Effects of tropical monsoon climate on production and life.	Contact
Lesson 11+12. Diversified nature	In each natural geographic region, there is a need for measures to mitigate the impacts of natural disasters and adapt to the increasing challenges posed by climate change.	4. Natural geographic regions	Contact
Lesson 14. Using and protecting natural resources	- Excessive reduction of forest resources and other ecosystems causes climate change. - Impact of climate change on water resources.	1. Using and protecting biological resources 3. Use and protect other resources	Contact
Lesson 15. Environmental protection and disaster prevention	- Environmental change will lead to climate change and vice versa. - Climate change will increase the consequences of natural disasters. - Need measures to mitigate and adapt to natural disasters: storms, floods, droughts. - Implementing the tasks of the strategy is to contribute to limiting climate change.	1. Environmental protection. 2. Some major natural disasters and prevention measures 3. National strategy on protection of natural resources and environment	Combine

Post/Title	Built-in content	Built-in address	Integrated form
Lesson 16. Population characteristics and population distribution in our country.	Rapid population growth puts great pressure on the environment and climate change.	2. Rapid population growth, young population structure	Contact
Lesson 18. Urbanization.	Rapidly growing city à increase in transportation activities & air pollution à CC. Coastal cities are heavily affected by climate change.	3. Effects of urbanization on socioeconomic development	Contact
Lesson 21. Characteristics of our country's agriculture	The precariousness of agricultural production is increasing sharply due to the impact of climate change.	1. Tropical agriculture.	Contact
Lesson 22. Agricultural development issues.	- Increased temperature due to climate change à affects crop yield. - Increased temperature due to climate change affects the quality of livestock products.	1. Cultivation industry. 2. Livestock industry.	
Lesson 24. Development issues of fisheries and forestry.	Natural disasters, especially storms, are increasing due to climate change à greatly affecting fishing. The development of afforestation will limit the effects of climate change.	1. Fishery industry. 2. Forestry.	Contact/part
Lesson 25. Organization of agricultural territories.	Each region is subject to different impacts of climate change à affecting agroecological conditions.	2. Agricultural areas in our country.	Contact
Lesson 26. Industry structure	Completing the industrial structure, renewing equipment and technology to use less fuel and reduce emissions.	1. Industry structure by industry	Contact
Lesson 27. Development issues of some key industries.	Climate change strongly affects the construction and operation of hydropower projects and vice versa.	b. Electricity industry.	Contact
Lesson 30. Development issues of the transport and communication sector.	The sharp increase in means of transport leads to air pollution, which contributes to climate change	1. Transportation.	Contact
Lesson 31. Trade and tourism development issues.	Climate change has a great impact on tourism activities.	2. Tourism.	Contact
Lesson 32. The problem of exploiting strengths in the Northern Midlands and Mountains.	- The construction process and operation of large hydropower projects are greatly affected by climate change and vice versa. - The increase in natural disasters: erosion, landslides, extreme cold, harmful cold... due to climate change affecting crop and livestock productivity. - It is necessary to actively respond to the impacts of climate change in the region.	2. Mining, mineral processing and hydropower 3. Planting and processing industrial plants, medicinal plants, subtropical and temperate fruits and vegetables 4. Cattle raising	Contact

Post/Title	Built-in content	Built-in address	Integrated form
Lesson 33. The problem of economic restructuring by sector in the Red River Delta.	<ul style="list-style-type: none"> - Climate change causes sea level rise, reducing cultivated area. - Climate change causes an increase in natural disasters such as storms, floods, etc., which severely affect agricultural production and food security. - It is necessary to actively respond to the impacts of climate change in the region. 	2. Major regional restrictions.	Contact
Lesson 35. The issue of socio-economic development in the North Central region.	<ul style="list-style-type: none"> - Climate change increases natural disasters: hot, dry wind, storms, floods... - Protecting and developing forest capital to mitigate the impacts of climate change. 	2. Forming the structure of agriculture - forestry - fishery.	Part/Contact
Lesson 36. The issue of socio-economic development in the South Central Coast.	<ul style="list-style-type: none"> - Climate change increases the risk of natural disasters: storms and floods in the north, and drought in the south of the region. - Climate change affects ecosystems and biodiversity. - It is necessary to actively respond to the impacts of climate change in the region. 	2. Integrated development of the marine economy.	Contact
Lesson 37. The problem of exploiting strengths in the Central Highlands.	<ul style="list-style-type: none"> - Climate change increases the risk of natural disasters: the dry season is prolonged, and the groundwater level is lowered. - The decline of forest resources contributes to climate change. - Climate change affects the ecosystems and biodiversity of the region. - It is necessary to actively respond to the impacts of climate change in the region. 	<ul style="list-style-type: none"> 2. Development of perennial industrial plants. 3. Exploiting and processing forest products. 	Contact
Lesson 39. The issue of territorial exploitation in depth in the Southeast region	<ul style="list-style-type: none"> - Industrial development should be associated with reducing fuel use and emissions into the atmosphere to reduce the risk of climate change. - Develop irrigation to minimize the impact of climate change. 	3. Exploit the territory in depth.	Contact
Lesson 41. The issue of rational use and natural reclamation in the Mekong Delta.	Climate change sea level rise shrinking delta area, increasing saltwater intrusion à impacting agricultural production and food security à need to proactively respond to the impacts of climate change in the region.	2. Main strengths and limitations.	Contact
Lessons 44 - 45. Learn the geography of cities and provinces.	Integrate theory and skills in disaster prevention and mitigation measures	Organize experience activities in the room and the field	Combine

3.2.3. Build lesson plans

Lesson 15. ENVIRONMENTAL PROTECTION AND DISASTER PREVENTION

I. LEARNING OBJECTIVES

1. Knowledge

- Know some of the main issues of environmental protection in our country: ecological imbalance and environmental pollution (water, air, soil).

- Understand several major natural disasters (storms, floods, droughts, earthquakes...) that frequently occur and cause harm to our country's life and economy.

- Understand the content of the national strategy on the protection of natural resources and the environment.

2. Skills

- Make practical connections to explain the causes and harms of each type of disaster.

- Know how to avoid natural disasters that often occur in the locality.

3. Attitude, affection

- Have a sense of participation in environmental protection, disaster prevention, and climate change mitigation.

4. Capacity development orientation

- General competencies: autonomy and self-study, communication and cooperation, problem-solving and creativity

- Specific and specialized competencies are formed: language competence, ability to explain geographical phenomena and processes, capacity to perceive and

understand relationships, capacity to understand nature, capacity to technology, information technology, capacity to collect, process, and communicate geographic information, ability to apply knowledge and skills into practice.

II. MEDIA AND TEACHING METHODS

1. Teaching media

- Natural Geographical Map of Vietnam.

- Some pictures and videos about the situation of resource degradation, destruction of natural landscapes, and climate change.

2. Teaching methods

- Conversational method.

- Intuitive method.

- Group discussion method.

III. TEACHING AND LEARNING ACTIVITIES

1. Stable class organization

2. Check the old lesson

- State the status of degradation of forest resources and biodiversity in our country. Measures to protect forests and biodiversity.

3. New lesson

“Our country has a tropical monsoon climate, rich resources, favorable natural conditions but also many difficulties caused by natural disasters. Therefore, the issue of environmental protection and disaster prevention is a very urgent requirement. So how to protect the environment and prevent natural disasters, let's learn lesson 15”.

Time	Activities of teachers and students	Content
8 minutes	<p>Activity 1: Learn about major environmental issues in our country. (individual)</p> <p>GV: Environmental protection is one of the main contents of sustainable development.</p> <p>- <i>Could you please state the causes of ecological imbalance and the manifestations of these conditions in our country?</i></p> <p>Therefore, we must take timely measures and actions to minimize the impact of climate change.</p> <p>- <i>Could you name the causes of air, water, and soil pollution in our country?</i></p> <p>=> Caused by emissions in production and daily life poured into the environment.</p> <p>- The teacher emphasized that in many places, the concentration of pollutants exceeds the allowable target many times.</p>	<p>1. Environmental protection.</p> <p>In our country, there are two most important issues in environmental protection:</p> <p>- The state of ecological imbalance in the environment.</p> <p>+ Cause: Due to exploitation, excessive impact on natural ingredients.</p> <p>+ Manifestations: Increasing natural disasters such as floods, droughts, and abnormal changes in weather and climate.</p>

Time	Activities of teachers and students	Content
	<p>- Integrating knowledge of climate change: Teachers show video clips about environmental pollution and the harmful effects of climate change on human health, daily life, and production for students to observe more clearly the necessity of environmental protection and climate change mitigation.</p> <p>- The teacher emphasized that in many places, the concentration of pollutants exceeds the allowable target many times.</p> <p>- Integrating knowledge of climate change: Teachers show video clips about environmental pollution and the harmful effects of climate change on human health, daily life, and production for students to observe more clearly the necessity of environmental protection and climate change mitigation.</p>	<p>- Air, water, and soil pollution has become a serious problem in big cities, industrial zones, densely populated areas, and some areas of rivers and coastal areas.</p>
	<p>Activity 2: Learn about some natural disasters and prevention measures. (Group)</p> <p>Teacher: Divide the class into 4 groups.</p> <ul style="list-style-type: none"> - Group 1: storm - Group 2: flooded - Group 3: flash floods - Group 4: drought - Group 5: Other natural disasters. <p>According to the content recorded in the study sheet.</p> <p>The teacher revises knowledge.</p> <p>* Integrating CC knowledge:</p> <ul style="list-style-type: none"> - “Why is science and technology developing more and more, meteorological satellite equipment is more and more modern, forecasts about the formation process and direction of storms are becoming more and more accurate, but the damage caused by storms is increasing. widening?”. - Global climate change is becoming more and more serious, causing storms to increase in intensity and destruction, as well as their direction of movement, becoming increasingly complex and unpredictable. Therefore, the damage caused by storms is increasing. - Typically, the historic flood in 2008, not only the delta but also the midland and mountainous areas such as Phu Tho, Yen Bai, and Lao Cai also suffered heavy damage due to flash floods and landslides... 	<p>2. Some major natural disasters and prevention measures:</p> <p>(The study sheet and feedback are in the appendix).</p>
	<p>Activity 3: Find out the national strategy for protecting our country’s natural resources and environment. (class)</p> <p>GV: Our country’s strategy is built on the general principles of the global protection strategy (WSC) proposed by the International Union for Conservation of Nature (IUCN).</p> <ul style="list-style-type: none"> - Based on the content of the textbook and your understanding, would you please state the national strategic tasks of protecting our country’s natural resources and environment? - Integrating knowledge of climate change: As Vietnamese people, each of us must be conscious together with the Party and State to protect the environment and prevent climate change. 	<p>Activity 3: Find out the national strategy for protecting our country’s natural resources and environment. (class)</p> <p>GV: Our country’s strategy is built on the general principles of the global protection strategy (WSC) proposed by the International Union for Conservation of Nature (IUCN).</p>

Time	Activities of teachers and students	Content
		<p>- Based on the content of the textbook and your understanding, would you please state the national strategic tasks of protecting our country's natural resources and environment?</p> <p>-Integrating knowledge of climate change: As Vietnamese people, each of us must be conscious together with the Party and State to protect the environment and prevent climate change.</p>

4. Practice activities - apply

Question 1: Storms cause great harm to production and life because:

- A. Usually occurs over a long period.
- B. There is usually strong wind accompanied by heavy rain.
- C. Landing inland.
- D. Unpredictable.

Question 2: The reason why the Red River Delta is the most severely flooded area in our country is:

- A. There is no coastal forest.
- B. The influence of high tide.
- C. Low terrain, concentrated flood, surrounded by dike system, high degree of urbanization.
- C. many hollows have not been filled.

5. Exploration - expansion activities

- Students continue to collect documents on population characteristics and population distribution in our country.

IV. APPENDIX

1. Study Card No. 1

Type of disaster	Time happen	Happening place	Consequence	Measure Prevention
Storm				

2. Study Card No.2

Type of disaster	Time happen	Happening place	Consequence	Measure Prevention
Flooding				

3. Study Card No.3

Type of disaster	Time happen	Happening place	Consequence	Measure Prevention
Flash floods				

4. Study Card No.4

Type of disaster	Time happen	Happening place	Consequence	Measure Prevention
Drought				

5. Study Card No.5

Type of disaster	Time happen	Happening place	Consequence	Measure Prevention
+ Earthquake + Tornado + Hail + Mist				

6. Feedback panel.

Type of disaster	Time happen	Happening place	Consequence	Measure Prevention
Storm	- Starts in June and ends in November.	- The coast of our country.	- Storms accompanied by large waves cause great damage to people, properties and activities manufacture	- Precise early forecast. - Avoid storms, and evacuate people when necessary.
Flooding	In the rainy season.	- Downstream river systems.	- Causing damage to life and crops.	- Construction of works flood drainage, flow dredging.
Flash floods	In the rainy season.	- Occurs in mountainous river basins	- Damage about People and property: Damage to homes and businesses other construction, loss of land manufacture.	- Planning residential areas to avoid floods. - Planting forests, limiting surface runoff, and preventing soil erosion.
Drought	In the dry season in our country.	- North - Delta - Southern Vietnam, Central Highlands, Vietnam - the southernmost sea Central.	- Causes damage to Crops, Forest fires, affect people's lives and livelihoods.	- Construction of irrigation works
+ Earthquake + Storm, hail + Mist	Year-round - Summer - Winter	Northwest, Northeast, Central... The whole North country	- Causing great damage to people, animals, plants, infrastructure,...	Hard to avoid. - Hard to avoid. - Hard to avoid.

3.3. Initial results

Through research and experimentation in some 12th graders of high schools in Ho Chi Minh City, we have made a survey and survey about students' attitudes towards the integration of adaptive education. Climate change (CC) and natural disaster prevention (DRR) in the 12th-grade Geography subject for high school students, the results are as follows:

Table 3.3. Summary of points in Lesson 15: Environmental protection and disaster prevention

High School	Class	Students	Score							
			3	4	5	6	7	8	9	10
	TN	32	0	1	2	3	7	10	6	3
	ĐC	34	0	4	6	8	9	6	1	0
	TN	35	0	1	3	8	8	9	5	1
	ĐC	36	0	3	12	10	5	4	2	0
Total (students)	TN	67	0	2	5	11	15	19	11	4
	ĐC	70	0	7	18	18	14	10	3	0
Total (%)	TN	100	0	3,0	7,5	16,4	22,4	28,4	16,4	6,0
	ĐC	100	0	10,0	25,7	25,7	20,0	14,3	4,3	0

Through the process of testing Lesson 15: Environmental Protection and Organized Disaster Prevention, integrating, grading, and evaluating student learning results, we obtained the results as shown in the following table:

Table 3.4. Score classification results of two classes

Classes	Good, excellent type (7, 8, 9, 10)	Average type (5, 6)	Weak type (under 5)	Total
Control class	45	36	7	70
Experimental class	49	16	2	67
Total	94	52	9	155

Experimentally from the test results summarized in Table 2.3 and Table 2.4, the results show that the very good classification of the experimental class is also much higher than that of the control class, the average class, and the opposite is weak.

The learning quality of students in the experimental class was much higher than that of the control class, both in terms of average scores and the level of equality among students.

Thus, integrated teaching through capacity development-oriented lesson design with integrated content of climate change response, prevention, and mitigation of natural disasters brings high efficiency in teaching Geography. High school in general, Geography grade 12 in particular. Therefore, it can be affirmed that the integrated teaching of climate change response, prevention, and mitigation of natural disasters is suitable for the subject of Geography in high schools, by the innovation of teaching methods to improve the effectiveness of teaching Geography today.

The experimental results also show that The test scores of the students in the experimental class are

much higher, especially the good and good grades, accounting for over 70%. Meanwhile, the scores of classes following traditional methods are about 64.3% lower. This demonstrates the use of integrated teaching through capacity development-oriented lesson design that integrates educational content on climate change adaptation (CC) and disaster prevention (DRR). Geography class 12 for high school students, has brought effective and promoted the learning ability of students.

4. Conclusion

In teaching Geography at high schools in general and Geography 12 in particular, the integration of climate change adaptation and disaster prevention education content in Grade 12 Geography for high school students is essential and suitable for their abilities. Students aim to create interest in learning and develop the ability to apply geographical knowledge to explain natural phenomena and social issues of concern, especially climate change and disaster risks. has been having a strong negative and direct impact on the natural system, economic activities, and environment

of the Vietnamese people. The content of knowledge in Geography 12 includes Vietnam Geography, Population and Social Geography, and Geography of economic regions. These are great knowledge content and are suitable for each content of the lesson to integrate, exploit, and improve knowledge, suitable for each student's ability. This demonstrates the use of integrated teaching through capacity development-oriented lesson design that integrates educational content on climate change adaptation (CC) and disaster prevention (DRR). Geography class 12 for high school students, has brought effective and promoted the learning ability of students.

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