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Development of research skills at Geography lessons through the use of the modeling method.

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The purpose and relevance of the topic

Purpose: to determine which methods are more effective to use for organizing research activities to develop high-order skills in students as part of the implementation of the subject-language integrated learning (SLIL).

Relevance: In the age of globalization, there is an increasing need for people who quickly adapt and make decisions in new or changing conditions. Therefore, in the modern education of students, it is necessary to create conditions and organize the educational process aimed at active research activities.

Research questions

- To identify effective methodological tools for the development of research activities in the framework of the implementation of multilingual education.
- Determine the methodological foundations for the effectiveness of methodological tools.
- Compile a training set of types of models for the development of research activities of students.
- Establish the nature of the influence of the modeling method on the development of students' research activities.

Research Methodology

Research tools:

- analysis of curricula in the subject Geography
- input diagnostics, questioning, observations, interviews,
- analysis of the content of completed tasks of formative and summative assessment of students
- focus group interview

Study participants*:

- students of grade 7 (12 students), 2017-2018 admission, current grade 12
- students of grade 7 (12 students), 2019-2020 admission, current grade 9

The research activity of a student is an activity in which the student is engaged in an independent search and analysis of information, acquires new knowledge, forms skills and develops skills that are used in practice.

Research Skills:

- independently explain, prove new facts, phenomena, patterns;
- classify, compare, analyze, summarize previously studied phenomena, patterns; find rational solutions;
- conduct experiments, establish cause-and-effect relationships;
- apply scientific research methods, evaluate their own research work and the work of classmates.

Methodological foundations and concepts of research activities of students

Socrates. Heuristic conversation involves the use of witty questions by interlocutors to each other; contradictions, *search for new knowledge, solution and think independently.*

A.I. Savenkov characterized research activity as a *need for search activity*, which includes divergent and convergent thinking of the student.

John Dewey considered research activity from the standpoint of *school* activity, which should *create opportunities and conditions for the intellectual initiative of the student himself* and the manifestation of students' aspirations to master the world, and the *role of the teacher in organizing learning* was aimed at ensuring that the student was in the *position of a researcher.*

Analysis of the content of the curriculum in the subject of Geography and language goals

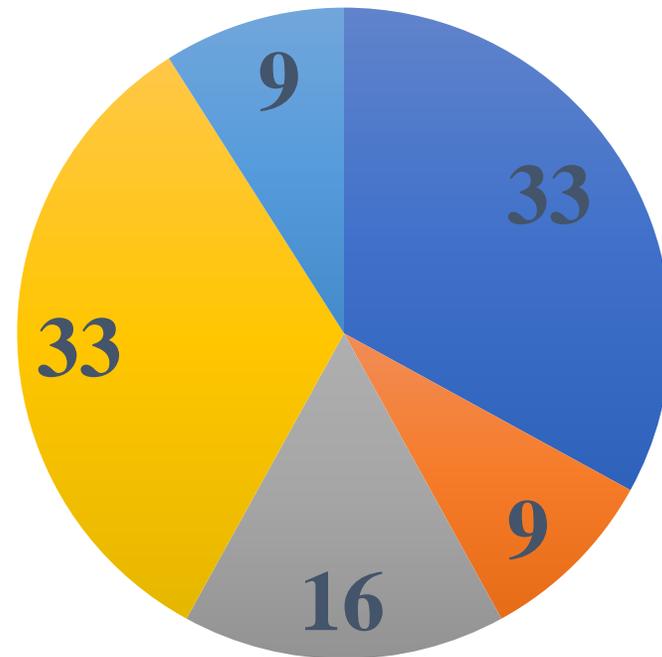
	Number of high-order learning goals		
Grade	7	8	9
Physical Geography	11	22	15
Economical Geography	6	18	14
Total	17 out of 36	40 out of 63	29 out of 41

Language goals of the basic school

- The development of the **scientific language** of the subject in students.
- Formation of a **working** language: work with terminology.
- Application of the **four language skills** of students to achieve learning goals.
- Development of **language competencies** through listening, interpretation, development of metalinguistic and metacognitive cognition for information retrieval, use of language cliches/synonyms, vocabulary skills.

Motivational type of thinking of students according to M. Bityanova

Types of Motivational thinking,
students of the 2019-2020 admission year, in %



■ Researcher ■ Activist ■ Creator ■ Careerist ■ Designer

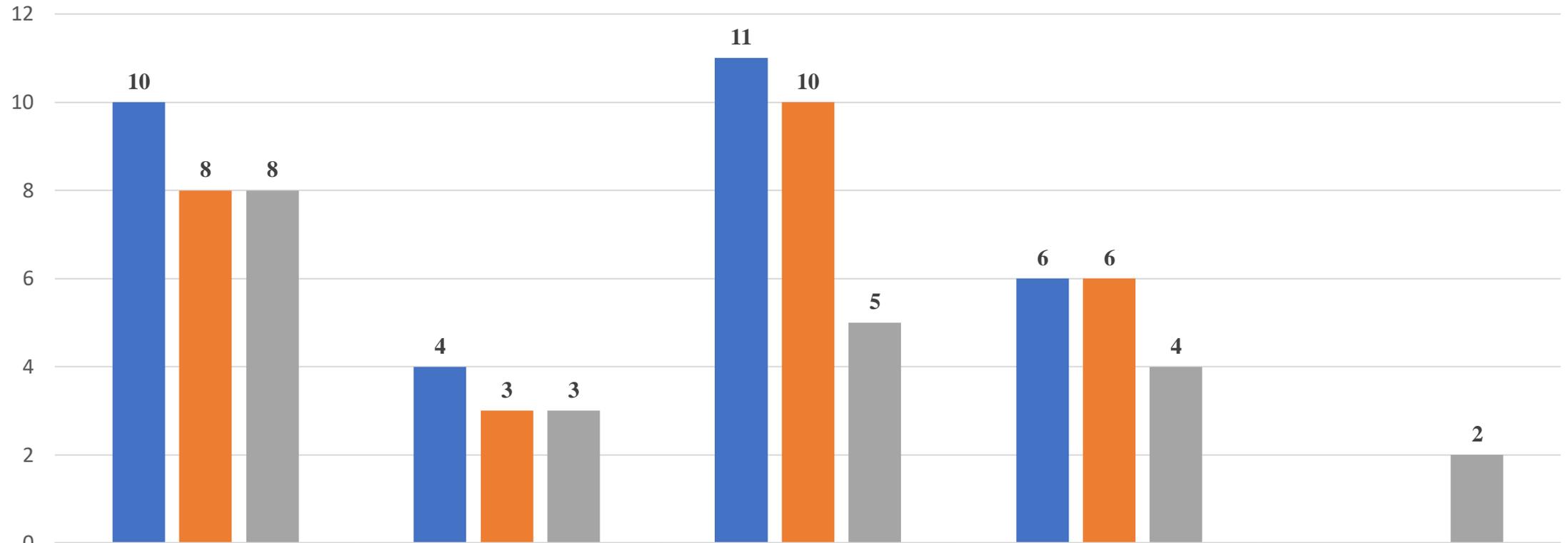
Motivational type of thinking of students according to M. Bityanova

Type of motivational thinking	Number of students	Characteristic
Researcher	4	They attract new knowledge , are interested in the structure of the world and its significance for people. There is a need for exploration, knowledge, discovery . Prefer: discussions, press conferences, intellectual game.
Creator	2	The need for creativity, in a situation of free search for knowledge, in a situation of immersion in a creative environment. An intellectually complex situation is interesting, assuming freedom of thought, choice, and a way of solving.
Activist	1	Motivates the situation of obtaining knowledge. The need for social recognition, socially significant action, and knowledge is a means of establishing relationships or providing assistance. Preferred: conference, role play, information sheet.
Careerist	4	Self-assertion. Interesting are those situations of obtaining knowledge in which there is competition , publicity, the opportunity to show oneself from the best side. The preferred way of presentation is a public report, report, show, holiday, performance. Самоутверждение.
Designer	1	Knowledge in itself has no value. Therefore, it is very difficult for them to "learn for the future." But knowledge becomes important when there is a goal . People of this type are focused on realizing themselves, their potential, their plans in the world of people.
Total	12	

Conditional separation of students at the level of language training*			
	Low	Intermediate	Advanced
2019–2020	5	5	2
2021–2022	4	4	4

* Joint work with a teacher of the Kazakh language, taking into account language competencies

Difficulties in learning a subject in a second language of thought, students of 2019-2020 admission year, total 12 students



	The language barrier	Psychological barrier	Difficulty in perceiving topics	Application of terms	I don't have difficulty
■ 7th grade	10	4	11	6	
■ 8th grade	8	3	10	6	
■ 9th grade	8	3	5	4	2

■ 7th grade ■ 8th grade ■ 9th grade

- **The modeling method** is a method that allows purposeful *involvement of students in rational intellectual and practical activities*, contributing to the disclosure of creative abilities and the formation of students' independence.

Application of the modeling method

- **Subject** (physical) models that reflect the external property or internal structure of objects, the essence of natural processes and phenomena (for example, students themselves made models of the solar system, meteor shower (imitation), volcanic eruptions, types of tectonic movement, the structure of the Earth, etc.).
- When creating the layout, students conducted **research work** aimed at **independent search for knowledge**, developed the **skill of analysis** — **understanding of cause-effect relationships**, the **skill of generalization**.



*8th grade students,
2017-2018 admission year*

Physical models, Grade 8

Section Physical Geography



1. Planets of the Solar System



2. The structure of the volcano



3. Coal formation

Research question:

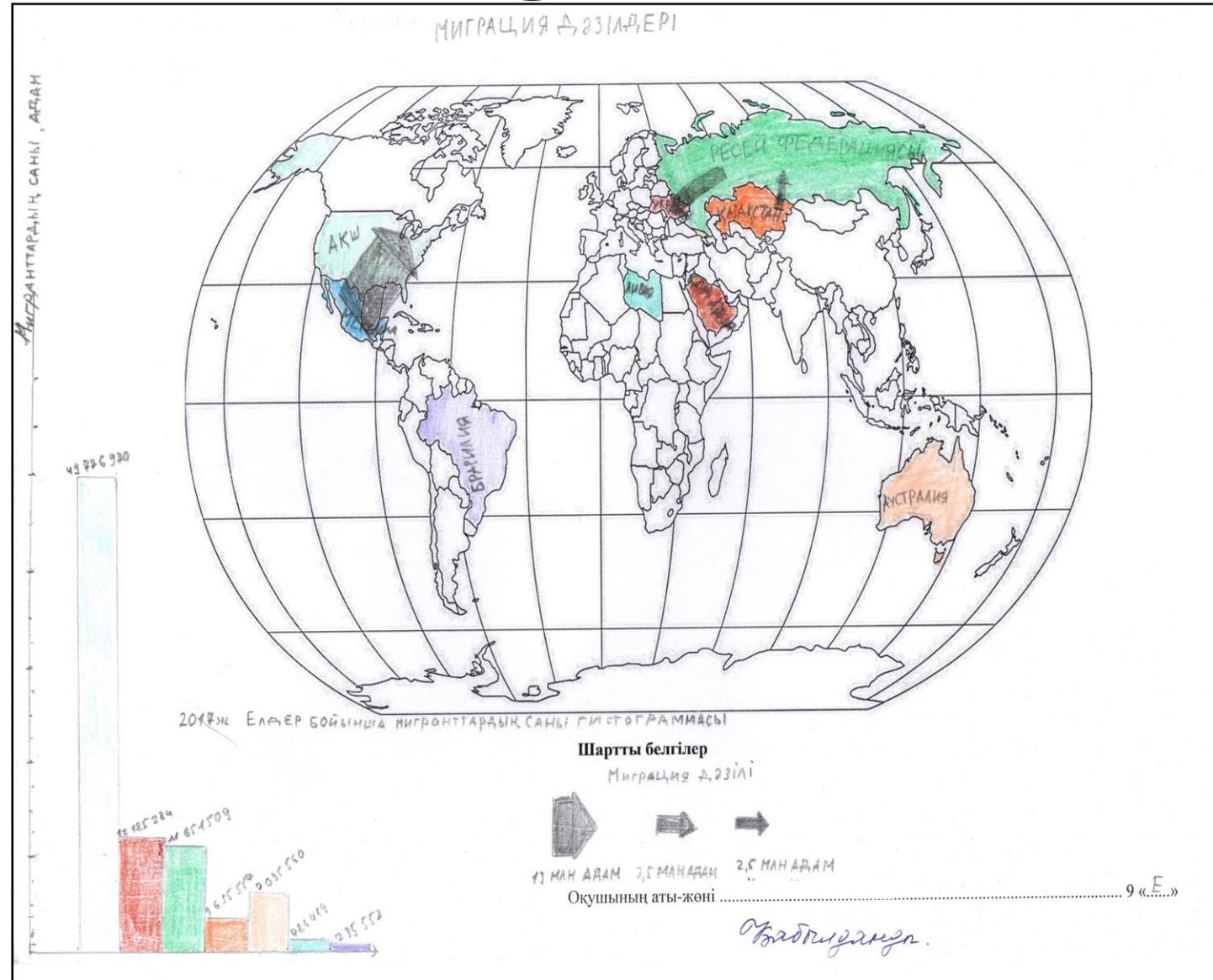
1. What are the advantages of the location of the planet Earth?
2. Why is San Pedro volcano one of the most formidable volcanoes in the world?
3. Under what conditions are coal deposits formed?

*8th grade students, 2019-2020
admission year*

Application of the modeling method

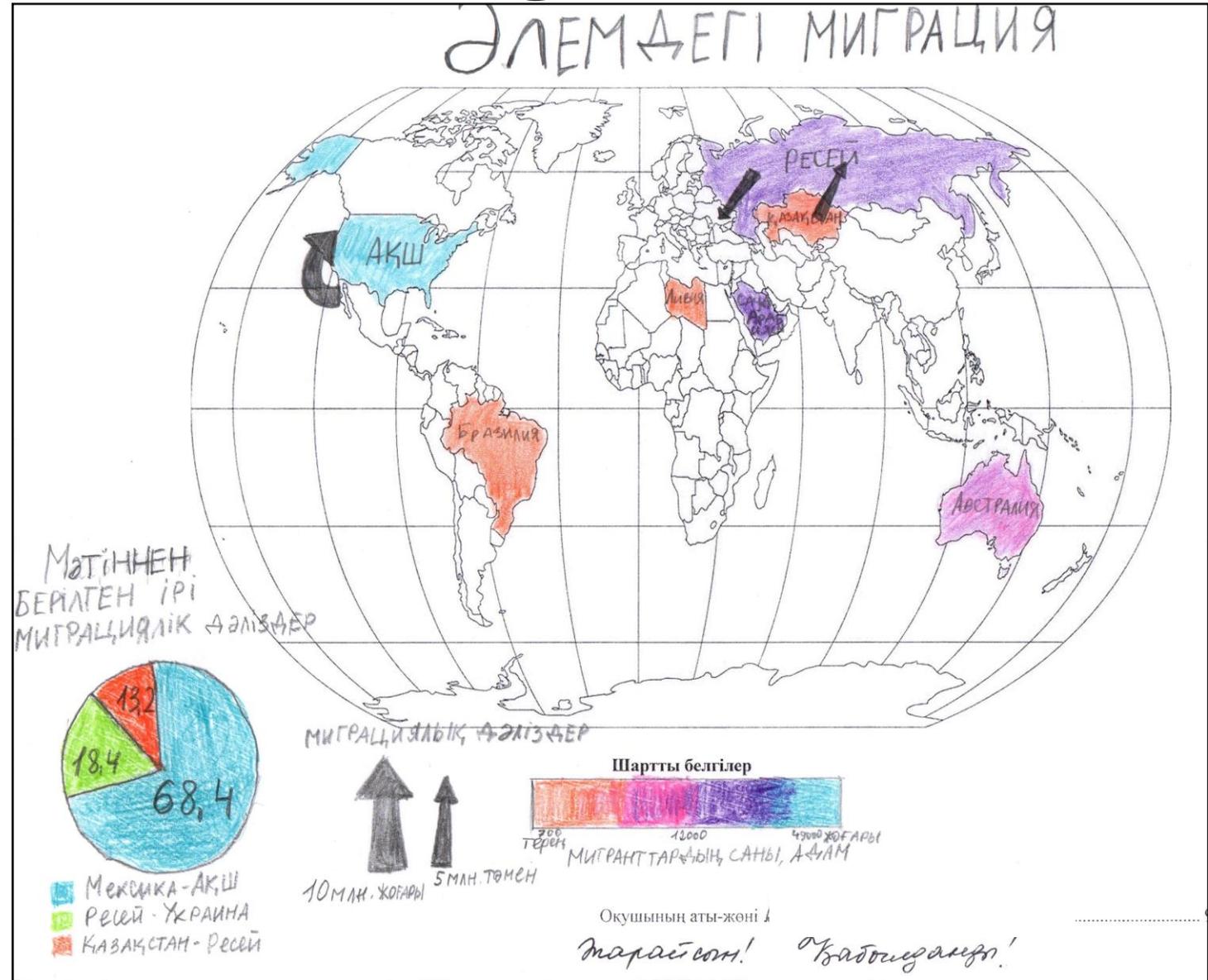
- The type of **information model** is figurative-sign: work with maps, thematic drawings and **drawing up** maps.
- Students applied the skills and knowledge of mathematics, the development of spatial thinking.

*9th grade students,
2019-2020 admissions*



Application of the modeling method

- The type of **information model** is figurative-sign: work with maps, thematic drawings and drawing up maps.
- Students applied the skills and knowledge of mathematics, the development of spatial thinking.



9th grade students,
2019-2020 admissions

Application of the modeling method

The type of information model is figurative-sign: work with maps, thematic drawings and drawing up maps.

Verbal model

Visualization of a geographic database.

Academic language + working language.

Жамартаудың атқылауы

Атқылау белгілері:
жер сілкінісі, атмосфералық газдың шығарылуы және жер бетіндегі ісіктердің пайда болуы.

Ауызтамасы:
Жамартау – жер қыртысындағы арналар мен жароқтар үстінде пайда болатын төде, ол арқылы лава, күл, ыстық газдар, су булары және тау жыныстары жер бетіне атқылайды.

Себептері:
Литосфераның тақталардың бұзылуымен қатпарлар пайда болуы мүмкін. Егер сұйық масса жер бетіне атқылап кетсе, жамартау атқылайды.

Салдары:

Табиғи	Экономикалық	Инфраструктура
Жер сілкінісі	Үйлер мен қалалардың қиынып кетіруіне ақша бөлу	Үйлердің, елді мекендердің, тіпті қалалардың орттері
Лава ағандары	Тұр. жұмысты. авиациялық қолма қолма құрылыстарына зиян.	Жолдардың ағандардың қайтыс болуы, ағандардың қоршауына баспана сүз қиыны.
Орман орттері		
Су объектілерінің құрғауы		

9E 3-ші топ

Application of the modeling method

The type of **information model** is figurative-sign: work with maps, thematic drawings and drawing up maps.

Verbal model

Visualization of a geographic database.
Academic language + working language.

Жақында келе жатқан цунамидің белгілері

- 1 Цунами бірнеше биік толқындан тұратыны белгілі. Бірінші толқым құрлыққа соқпатай бұрын су жазадан тартылады. Су жазадан қашамызды алыс кетсе, толқымда соқпалықты жойқым болақ.
- 2 Құстар мен жануарлардың қорқынышты өзи өзі ұстауы.
- 3 Күн ашық, бұлтсыз кезде алыстан Күн күркірелендей дауыс естіледі.

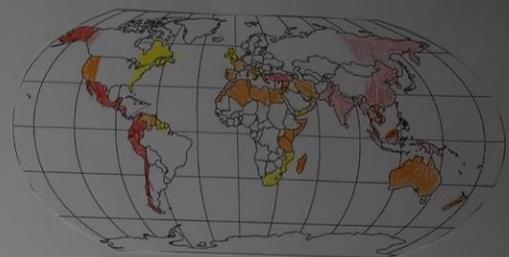
ЦУНАМИ

Пайда болу себебі

- 1 Жер сілкінісі мұхит тереңдігін қоздырады.
- 2 Су көлемі бөлініп бір бетін шығады.
- 3 Толқым жазаға тақпалыдан сайым өседі.

Жер сілкінісі
Цунамидің болу себебін қысқартып түрі

Таралу аймақтары



- Цунами қаупі жоғары аудандар
- Цунами қаупі төмен аудандар
- Цунами қаупі орташа аудандар

Цунами салдары

Экономикалық

- Қаланың инфрақұрылымы бұзылады

Табиғи

- Табиғи экотүзімдердің бұзылуы
- Ландшафтың өзгеруі

Әлеуметтік

- Адамдардың қайтыс болуы және жоғалуы

19E 1-топ №2



Results and analysis.

An overview of the application of models for the development of research skills

7th grade	
Difficulties	Different levels of language proficiency, different levels of language skills, psychological barrier
Model type	Verbal model, informational: tabular view
SLIL strategy	"Key words" and the use of language clichés, sample responses, vocabulary
Form of organization of educational activities	In pairs and in small groups, teacher accompaniment
Result, skills	Conducting a simple analysis through the use of a language cliché or pattern, the analysis of statistical data, allows students to operate with digital symbols, which creates a comfort zone. Vocabulary expansion.

Results and analysis.

An overview of the application of models for the development of research skills

8th grade	
Difficulties	Complication of the content and the content of the curriculum in the subject, different levels of language proficiency, different levels of language skills are preserved
Model type	Material, graphic, verbal (oral speech)
SLIL strategy	Gradual complication of the content, that is, the presentation of the results of research activities in the academic language (presentation of results in a system of complex sentences), vocabulary
Form of organization of educational activities	In pairs and in small groups, accompanying the teacher, presenting the results to the audience of the whole class
Result, skills	Independent search for knowledge, development of elements of complex analysis (primary conclusions,) understanding of cause-and-effect relationships, generalization skill, communication, vocabulary expansion

Results and analysis.

An overview of the application of models for the development of research skills

9 класс	
Difficulties	Some students still have a language barrier
Model type	Mental, informational: figurative-sign type (work with maps, thematic drawings, photos, etc.)
SLIL strategy	Cummins quadrants and introductory information, vocabulary
Form of organization of educational activities	Individual, in pairs and in small groups, teacher accompaniment only for students who experience a language barrier
Result, skills	Forms reflections, conclusions, promotes conscious activity, reading and drawing up maps of high complexity, visualization of data from various fields (economics, sociology, geography, politics, etc.)

Conclusions and results

- The development of students' research activities can be ensured, when applying models, it is *necessary to clearly and clearly prescribe the algorithm of research activities* (question, object of study, cause-and-effect relationships, etc.), *the expected result, the criteria for formative assessment and the criterion for using the academic language.*
- *Expansion of the language vocabulary of students* (by the end of the school year, students freely / appropriately / correctly use the academic language), individual growth of students over the years.
- In the feedback of students, it is shown that the student "*has the right to choose*", "*his own pace of work*", "*sometimes it is difficult, because you need to understand the object of study and for this it is necessary to acquire new knowledge.*"
- Gradual *increase in the quality of knowledge* (average for the academic year from 68 to 95%).

Thank you for attention!!!

List of used literature and sources

1. Исследовательская деятельность учащихся <https://obuchonok.ru/node/5822> (23.08.2022)
2. Особенности организации исследовательской деятельности учащихся в инновационной школе <https://articlekz.com/article/5744> (25.08.2022)
3. Шарипов Ф.В. Технология исследовательского обучения <https://expeducation.ru/ru/article/view?id=10060> (25.08.2022)
4. «Назарбаев Зияткерлік мектептері» ДББҰ Білім беру бағдарламасы. NIS-Programme «География» пәні бойынша оқу бағдарламасы Негізгі мектеп (7-10 сыныптар).
5. Грудкова Г.В. Исследовательская деятельность как метод проблемного обучения <https://www.prodlenka.org/metodicheskie-razrabotki/59529-issledovatelskaja-deyatelnost-kak-metod-probl> (26.08.2022)
6. Методы обучения критическому мышлению https://spravochnick.ru/pedagogika/teoriya_obucheniya/metody_obucheniya_kriticheskomu_myshleniyu/ (26.08.2022)
7. Классификация методов обучения по степени усложнения самостоятельной работы учащихся (И.Я. Лернер, М.Н. Скаткин). <https://students-library.com/library/read/56449-klassifikacia-metodov-obucenia-po-stepeni-usloznenia-samostoatelnoj-deatelnosti-ucasihsa-ia-lerner-mn-skatkin>
8. Результаты учеников по диагностике мотивационного типа (М. Битянова) Психологическая служба школы.
9. Метод моделирования на уроках географии в рамках реализации ФГОС <https://infourok.ru/metod-modelirovaniya-na-urokah-geografii-v-ramkah-realizacii-fgos-ooo-3168969.html> (10.08.2022)
10. С. В. Прилуцкая. Моделирование как активный метод обучения и развития учащихся на уроках географии <https://elib.gsu.by/bitstream/123456789/27764/1/%D0%9F%D1%80%D0%B8%D0%BB%D1%83%D1%86%D0%BA%D0%B0%D1%8F%D0%9C%D0%BE%D0%B4%D0%B5%D0%BB%D0%B8%D1%80%D0%BE%D0%B2%D0%B0%D0%BD%D0%B8%D0%B5.pdf>
11. Xabier San Isidro, Do Coyle, Sulushah Kerimkulova Назарбаев Университет. Практика использования CLIL в полиязычном образовании Казахстана: Рекомендации и примеры. https://gse.nu.edu.kz/wp-content/uploads/2021/02/BOOK_CLIL.pdf
12. Лиз Дейл, Вибо ван дер Эс, Роза Таннер. Навыки ПЯИО ISBN 978 90 81518413, опубликовано 2010 г в Лейдене.