

Developing Primary school learners' research skills by means of "Science" textbook



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We will discuss:

- what is research-based learning;
- what algorithm the research in the lesson should be based on;
- what are the features of textbooks based on the application of the research-based learning;
- what educational and playing resources help to implement the research-based learning in the classroom and at home.

Let's start!

What is research-based learning?

Как выглядит модель обучения через исследование?

10 reasons to apply research-based learning

- It is a propaedeutic of applying scientific knowledge methods
- It is means of forming scientific learning
- It increases child motivation and engagement

Исследования являются основой для формирования научного мировоззрения и культуры личности.

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Do mandarins float?



Share your opinion ...



Study cycle

ask

I formulate my question on the topic



I research, plan, read, collect information



I create, model, try, experiment, explain



create

explore

discuss

I discuss, share, report, present



reflect

I am reflecting, revising, evaluating, possibly making new decisions









What educational resources help teachers apply a research approach?



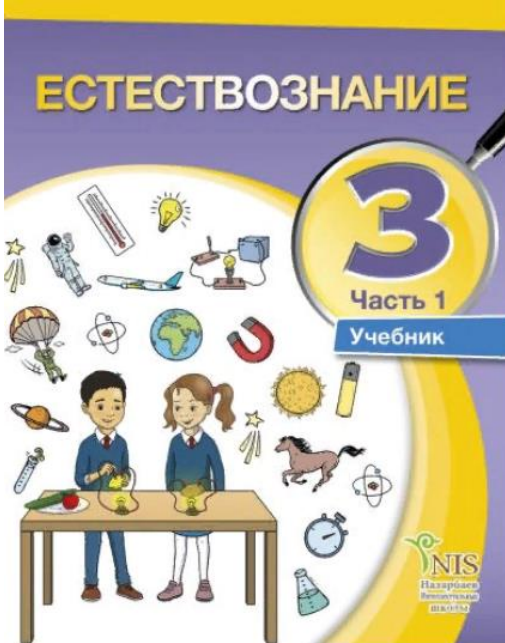
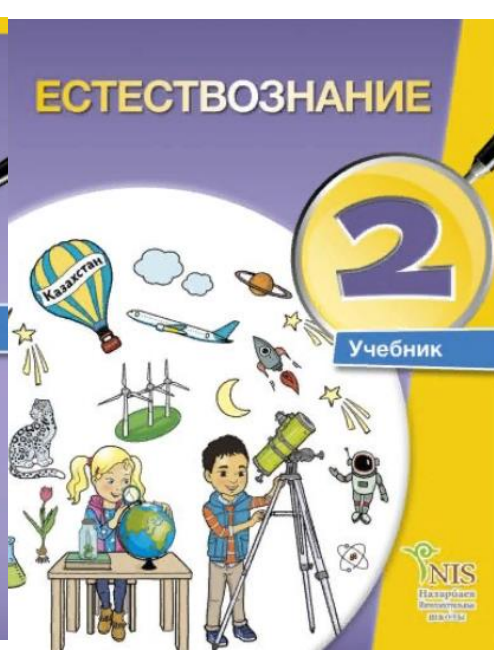
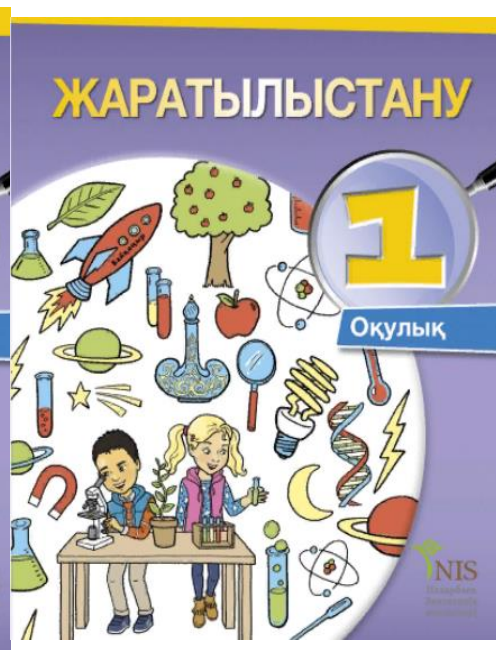
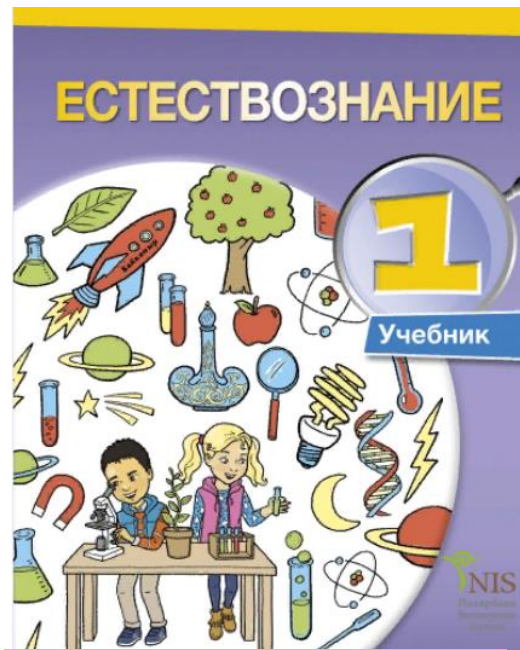
The Subject Programme for Grades 1-4 Science subject



research skills

-  **Research planning**
-  **Putting forward hypotheses**
-  **Processing information**
-  **Conducting experiments and experiments**
-  **Presenting research results**
-  **Evaluating results**

Science Textbooks



Elaborated system of learning activities

**Research in
every lesson**



Creating models



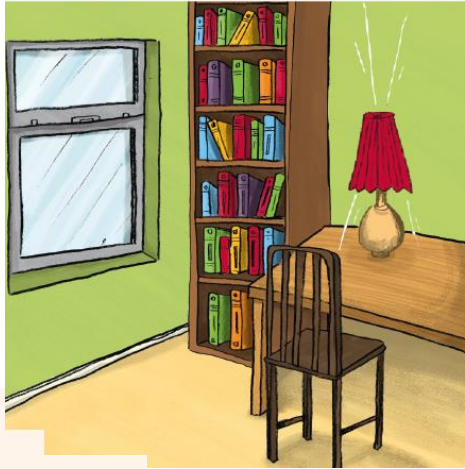
**Developing
critical thinking**



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'Explore' rubric

Grade 1



Explore

how to make darkness in a bright room

Grade 3

Explore

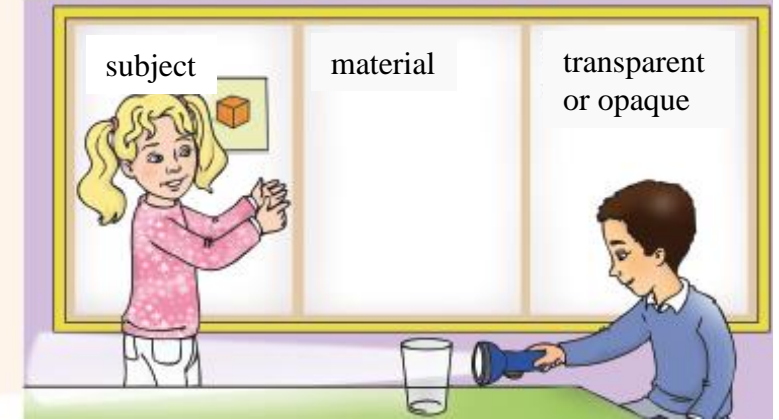
how does light spread?



Grade 2

Explore

what materials are transparent objects made of, and of which opaque ones?



Grade 4

Explore

What determines the size of the shadow?

You will need:

- table lamp,
- little cardboard figure,
- ruler or measuring tape.



Research types

Supporting study

Explore

How is white light formed?

You will need:

- color pencils,
- scissors
- cardboard.



Students are given a question, an answer to it, and a way to come to this answer.

Purpose: to build a research, checking how this method works.

Structured study

Explore

What kind of seeds there are? Present the study results in a table.

Use the sample table.

Sticky	
Hooked	
Hairy	
With wings	
With air cavity	



feather grass



alder



reeds



burdock



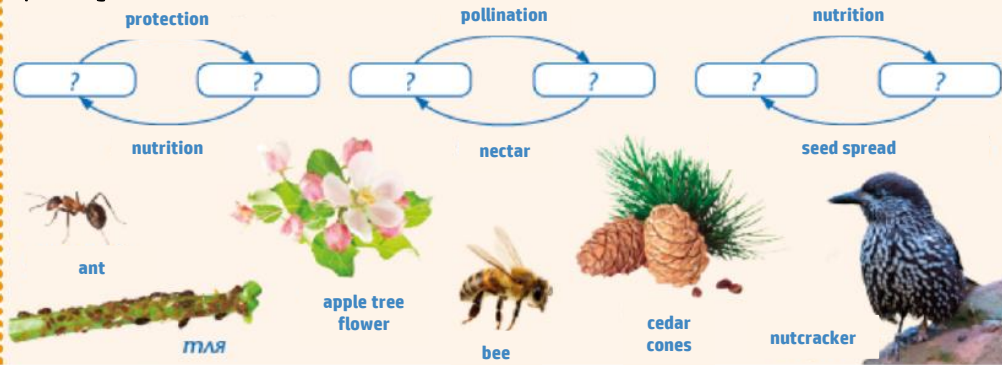
maple

The teacher gives students an open-ended question and research method. Using this method, students make their own conclusions

Controlled study

Explore

What are the relationships between living organisms represented in photographs?



Students are given a question, while working in groups they choose a research method to come to a conclusion

Open study

This is a type of long-term study. Students individually formulate an original question on a topic of their interest. They study it using their own methods and provide results for discussion and refinement.



'Reflect' rubric

How to do this in a lesson?



- ask open questions requiring an explanation of ongoing processes or phenomena;
- create conditions for discussion;
- listen to any children's assumptions;
- learn to match and compare;
- stimulate creative thinking

What is critical thinking?

This is the ability to reason, resolve doubts and make informed decisions.



Reflect

Why do our voices sound different in audio recordings?



Practical Comparison Task

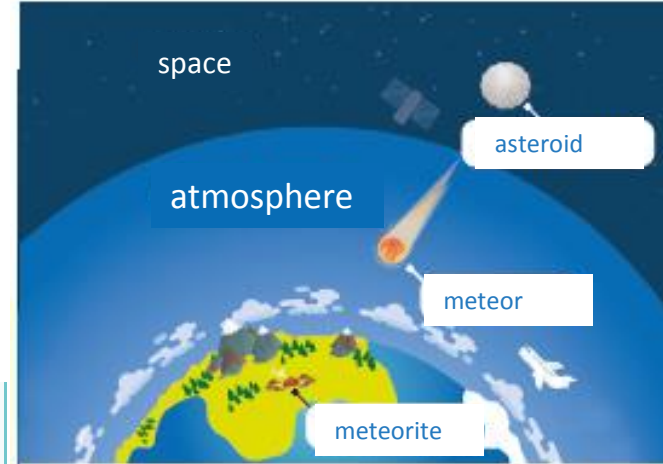
Reflect

Once during a flight, pilot Mikhail Surgutanov noticed that a magnetic needle on the device had deviated. In your opinion, what discovery was made based on the pilot's observation?

Historical fact-based task

Reflect

Which asteroids are more likely to enter the atmosphere and land on Earth: rocky or iron? Why?



The task on applying creative thinking

Scientific fact-based task



Reflect

Is it possible to use an air-balloon as an aerial device on the Moon? Why?

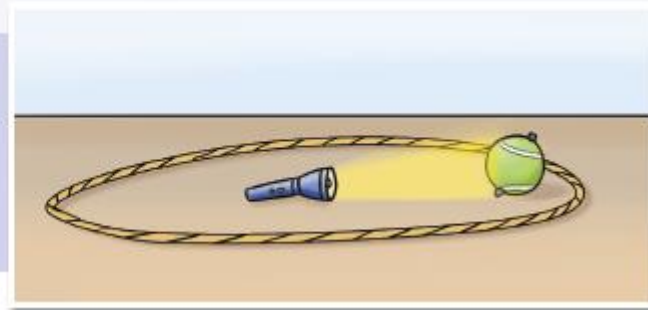
'Create a model' rubric

The Earth rotation model



Modeling is a type of research based on the creation of models. Students gain knowledge in the process of constructing and studying models of objects, processes, or phenomena.

Create a model
Create a model of the Earth's rotation around the Sun.



Create a model
Make an asteroid belt model.



Create a model
Make an electroscope.
You will need:

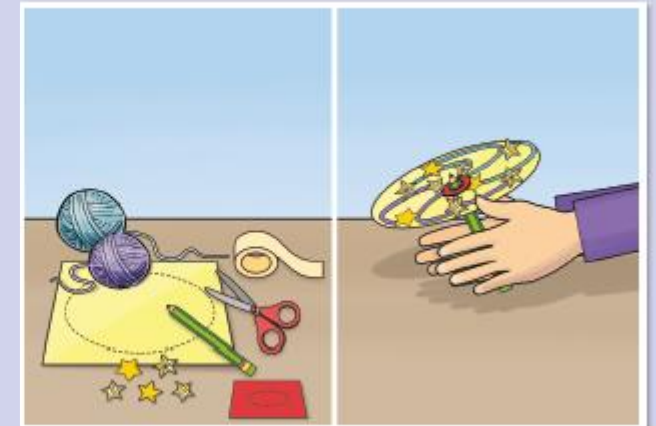
- foil,
- jar,
- cap,
- wire.



Create a model

Make a model of our Galaxy.
Determine the place of the Solar system on it.
You will need:

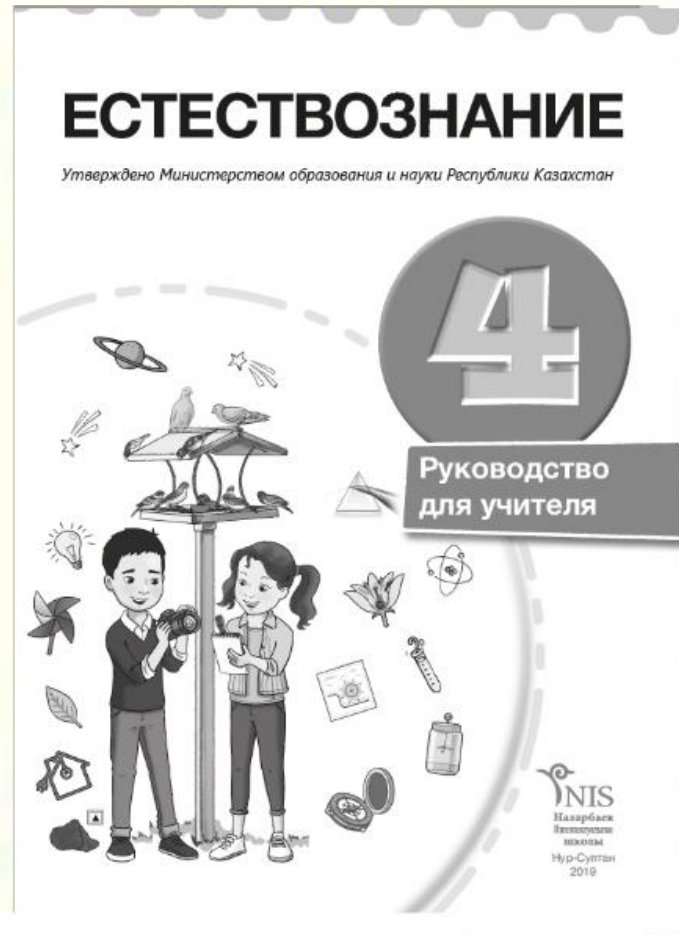
- colored paper,
- scissors,
- glue,
- pencil,
- threads.



Methodological Support for teachers



Teacher Guide for Grade 4
Science textbook



Collection of practical works
for Grade 1-4 Science



Additional features of the modern textbooks

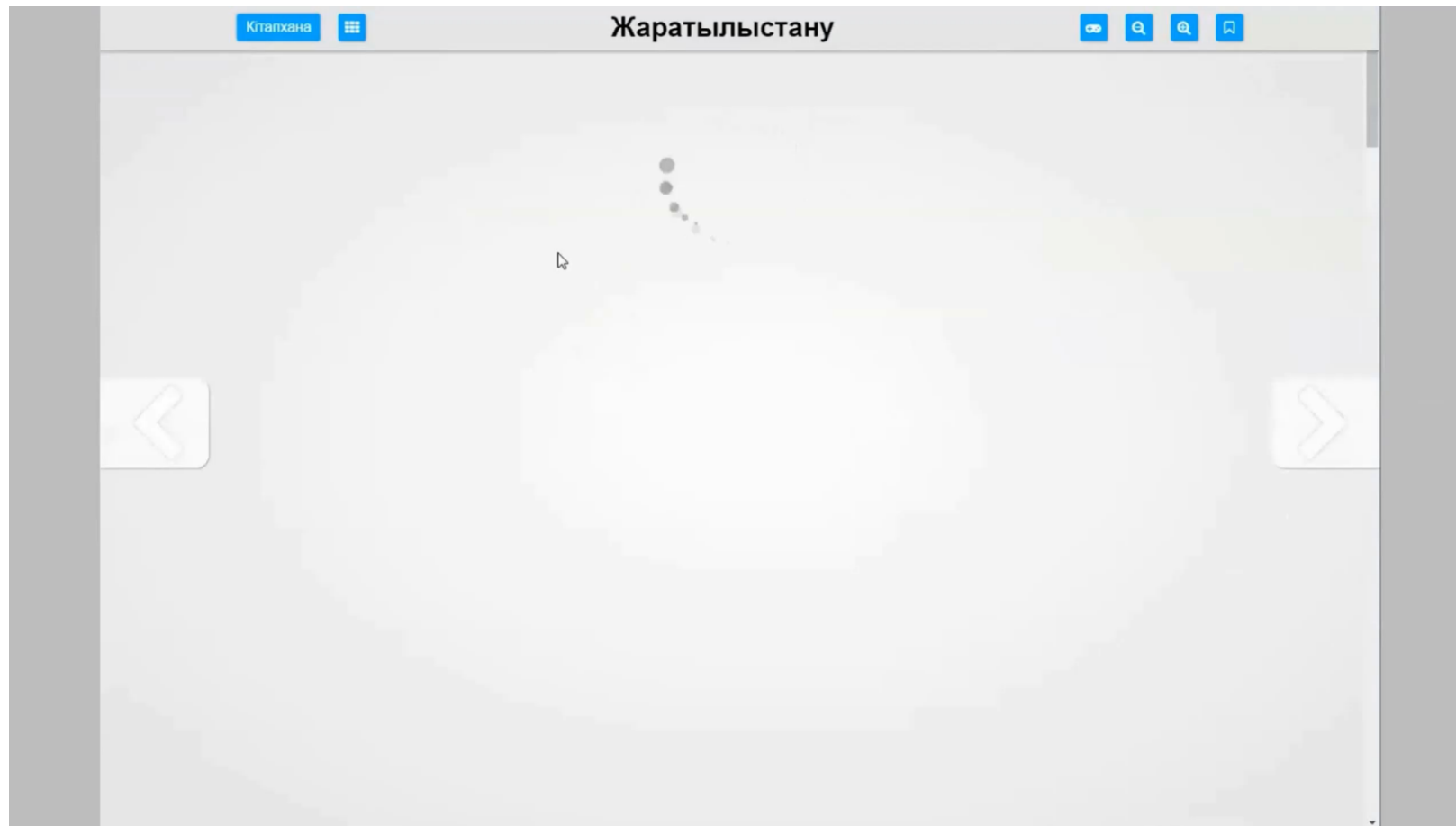
Digitalization of paper textbooks is implemented using Augmented Reality (AR) technology in elementary school textbooks for Science, World Understanding and Math.



Free access to the AR NIS app is available on Google Play Market and App Store.



Digital educational resources (DEC) provide resource support to students in conducting research and are aimed at solving educational goals and objectives.



10 reasons to apply research approach in teaching

@Trev_Mackenzie

@sylvia duckworth

1

Propaedeutics of students' further use of scientific learning methods.

2

Means of forming children's scientific mindset.

3

Means of increasing motivation and engagement.

4

Encouraging curiosity and the pursuit of knowledge.

10

Developing ability to ask questions, solve the problems of tomorrow starting today, while being a student.



5

Developing thinking and cognitive independence.

9

The ability to go beyond the facts and content.

8

The students' right to take responsibility for their education and achieve their goals.

7

Increasing the importance of student research and developing research skills.

6

The students' right to express their own point of view.

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