HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

Methodology for conducting simple experiments in preschool educational organizations

Termez State Pedagogical Institute, Faculty of Preschool and Primary Education,
Teacher of the Department of Preschool Education
Mamatmo'minova Muhabbat Gaffarovna
doi:https://doi.org/10.5281/zenodo.24397805

Abstract: This article explores the methodology of conducting simple experiments in preschool educational organizations as an essential tool for developing children's cognitive activity, curiosity, and scientific thinking. It highlights the pedagogical significance of hands-on experimentation in early childhood, emphasizing how tactile experiences and observation help children understand basic natural phenomena and cause-and-effect relationships. Furthermore, the paper provides practical recommendations, structural stages, and age-appropriate approaches for educators to integrate interactive experiments safely and effectively into the daily curriculum, fostering critical thinking and problem-solving skills from an early age.

Keywords: Preschool education, simple experiments, experimental activity, cognitive development, pedagogical methodology, early childhood learning, practical skills, scientific curiosity.

Early childhood education is a foundational stage of human development where cognitive structures, curiosity, and an innate desire to explore the world are rapidly forming. Preschoolers are natural scientists; they touch, smell, taste, listen to, and manipulate everything in their environment. In recent years, modern pedagogical science has placed increasing emphasis on practical, activity-based learning approaches within preschool educational organizations (MTOs). Among these, conducting simple experiments and elementary research activities has emerged as one of the most effective methods for fostering cognitive development, critical thinking, and a lifelong interest in science.

The integration of experimental activities into the daily routine of preschool institutions transforms traditional passive learning into an active, discovery-driven process. Through experimentation, children transition from mere observers to active participants who pose questions, test hypotheses, observe changes, and draw conclusions. This article examines the theoretical foundations, structural methodology, pedagogical conditions, and practical examples of conducting simple experiments with preschool children.

According to prominent developmental psychologists such as Jean Piaget and Lev Vygotsky, young children learn best through direct physical interaction with their environment. Piaget's theory of cognitive development places preschoolers in the preoperational stage, where learning is heavily tied to sensory-motor experiences and concrete observations. Abstract scientific concepts cannot be effectively taught through rote memorization at this age; instead, they must be experienced.

Elementary experimentation offers several profound developmental benefits:

- **Stimulation of Cognitive Activity:** Experiments trigger children's natural curiosity. When a child observes an unexpected result—such as water changing color or an object floating versus sinking—it creates a cognitive conflict that motivates them to seek explanations.

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

- **Development of Analytical Thinking:** Children learn to compare, classify, analyze, and establish cause-and-effect relationships. They move from asking "What is this?" to asking "Why does this happen?" and "How does it work?"
- **Speech and Communication Enhancement:** Experimental activities require verbalization. Children describe what they see, discuss steps with peers, formulate hypotheses, and explain conclusions. This significantly enriches their active and passive vocabulary.
- **Sensory and Motor Skill Integration:** Handling laboratory tools (droppers, magnifying glasses, cups, spoons, water, sand) refines fine motor skills, hand-eye coordination, and sensory perception.
- **Fostering Perseverance and Independence:** Conducting an experiment teaches patience, attention to detail, adherence to safety rules, and the confidence that comes from solving a small practical problem on one's own.

To ensure that experimental activities are pedagogically sound and safe, educators must structure each session systematically. A well-designed experimental lesson or activity typically consists of five interconnected stages:

The educator introduces a problem or creates a puzzling scenario. For instance, instead of simply stating that air exists, the educator might ask: "Can we catch an invisible air bubble?" or present an empty plastic cup submerged upside down in water to show that water cannot enter because air is occupying the space. This captures children's attention and sets a clear purpose.

Children are encouraged to make guesses or hypotheses based on their prior experience. Questions like "What do you think will happen if we add salt to this water?" prompt children to think critically before the action takes place. It teaches them that science involves making predictions and testing them.

Under the careful guidance and supervision of the educator, children perform the practical actions. At the preschool level, the educator often demonstrates or guides small groups, ensuring that every child has an opportunity to touch, manipulate, or closely observe the process. Safety rules are strictly reinforced during this phase.

Children observe the changes, transformations, or reactions. Because preschoolers have developing memory spans, results should be recorded immediately. Teachers can use visual charts, pictograms, simple drawings, or color-coded cards to document what happened (e.g., drawing a sinking stone versus a floating leaf).

The final stage involves summarizing the findings. The educator guides the children through verbal discussion to help them connect their initial hypothesis with the actual result. The conclusion should be simple, clear, and age-appropriate (e.g., "Conclusion: Salt makes water denser, allowing objects to float more easily").

Experiments in preschool organizations can be categorized based on their content, the materials used, and the nature of the cognitive task:

1. **Water and Liquid Experiments:** These are among the most popular and accessible. Children explore properties such as density, buoyancy, solubility, and states of matter (melting ice, evaporating water, mixing colors).

2. **Air and Wind Experiments:** Since air is invisible, experiments focus on its presence, pressure, and movement. Examples include blowing bubbles, creating wind with fans or paper strips, and observing how air fills spaces.

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

3. **Plant and Nature Experiments:** Children observe seed germination, the absorption of colored water by celery stalks or white flowers through capillary action, and the impact of sunlight on plant growth.

4. **Light, Color, and Optics:** Using prisms, flashlights, mirrors, and magnifying glasses, children explore reflections, shadows, color mixing (primary and secondary colors), and refraction.

5. **Physical Forces and Magnetism:** Investigating magnets (which metals attract and which do not), friction (moving toys across different surfaces like carpet versus smooth tile), and gravity.

For experimental activities to yield optimal educational outcomes, educators must adhere to specific methodological guidelines:

- **Age Appropriateness:** The complexity of the experiment must match the psychological and physical development of the children. For younger preschoolers (3–4 years), experiments should be short, highly visual, and focused on sensory properties. For older preschoolers (5–7 years), experiments can involve more complex multi-step reasoning, measuring, and hypothesis testing.
- **Safety First:** All materials must be non-toxic, safe for children, and age-appropriate. Glass equipment should be avoided or replaced with sturdy, clear plastic alternatives. Educators must brief children on safety rules before every session.
- **Integration into Daily Life:** Experiments should not be isolated events. They should be woven naturally into themed weeks, storytelling, walk-and-observation sessions in the nature corner, and daily play activities.
- **Role of the Educator:** The educator should act not as an authoritative instructor who hands down answers, but as a facilitator, guide, and co-investigator who encourages independent thinking and inquiry-based dialogue.

The methodology of conducting simple experiments in preschool educational organizations serves as a powerful catalyst for comprehensive child development. By bridging theory and practice, experimental activities transform natural childhood curiosity into structured scientific inquiry. When educators implement these methods systematically, creatively, and safely, they lay a robust intellectual foundation for future academic success, fostering inquisitive, creative, and analytically minded individuals equipped to understand and respect the natural world around them.

References

1. Mamatmuminova M., Shermuhammadova H. TEACHING CHILDRENTOGAMES THROUGH PICTURE ACTIVITIES IN PRE-SCHOOLEDUCATIONAL ORGANIZATIONS //Академические исследования всовременной науке. – 2025. – Т. 4. – №. 31. – С. 129-133.
2. Mamatmuminova M. BOLALARNI TASVIRIY FAOLIYAT ORQALI O'YINLARGA O'RGATISH //ОБРАЗОВАНИЕ И НАУКА В XXI ВЕКЕ. –2025. – №. 60-2 (том 1).
3. Mamatmuminova, M. "BOLALARNI TASVIRIY FAOLIYAT ORQALI O'YINLARGA O'RGATISH." ОБРАЗОВАНИЕ И НАУКА В XXI ВЕКЕ60-2(том 1) (2025).
4. Mamatmuminova, M. (2025). BOLALARNI TASVIRIY FAOLIYAT ORQALI O'YINLARGA O'RGATISH. ОБРАЗОВАНИЕ И НАУКА В XXI ВЕКЕ, (60-2(том 1).
5. Choriyeva S. TALABALARNI TA'LIMIY QADRIYATLAR ASOSIDAPEDAGOGIK FAOLIYATGA TAYYORLASH TIZIMINI TAKOMILLASHTIRISHDA TA'LIM TEXNOLOGIYALARINING O'RN//Педагогика и психология в современном мире: теоретические ипрактические исследования. – 2025. – Т. 4. – №. 11. – С. 74-77. 6. Choriyevna

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

C. S. et al. A model for improving the system of preparing students for pedagogical activity on the base of educational values //MultidisciplinaryJournal of Science and Technology. – 2023. – Т. 3. – №. 6 (INTERNATIONALSCIENTIFIC RESEARCHER). – С. 283-285.

6. Чориева С. Ч. Умение учителя использовать современные образовательныетехнологии при подготовке учащихся к педагогической деятельностинаоснове образовательных ценностей //Экономика и социум. – 2024. – №. 10-2(125). – С. 998-1001I