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Sukhomlinsky News

Intellectual education

In this issue we continue to translate extracts from the fifth chapter of *Pavlysh Secondary School*, on intellectual education.

Intellectual education and curriculum content

A proper intellectual education can only be realised when the most valuable intellectual achievements of humanity are passed on to students. The practical task facing schools is to ensure that in the intellectual development of their students appropriate time is allocated to fundamental studies about nature and work, about the human organism and thought, about society and people's spiritual lives, about art. Although geology and minerology, biochemistry, cosmogony, psychology, stylistics, and ethnography are not included in the school curriculum, a proper intellectual education is unthinkable without some knowledge of these subjects.

Among the foundations of science, mathematics takes pride of place. It is the only subject that is studied from the beginning of primary school to the end of secondary school. From the very first steps taken at school, concepts and laws from the field of mathematics are an important means for studying and understanding the world, for developing consciousness. Mathematics plays an exceptional role in intellectual development. Mathematics is a subject that affects one's outlook on life. It pervades both the natural and social sciences. Mathematical thought is not only understanding quantitative, spatial and functional relationships between numbers, measurements and geometrical shapes, but also a special approach to understanding reality, a method for investigating the facts and phenomena of nature, social life, work and economics, a way of analysing causal links between phenomena.

[Continued on the following page]

The curriculum and education

Dear readers,

For this month's newsletter I have continued to translate material from 'Pavlysh Secondary School' and Sukhomlinsky's 'Ethics Anthology'.

The extract from Pavlysh Secondary School examines the role of mathematics and natural sciences in the school curriculum, and also the value of providing an 'intellectual background' for the curriculum.

Sukhomlinsky sometimes lamented the absence of certain elements from the compulsory curriculum (for example the absence of any preparation for parenthood). He also often recommends exposing students to material that is not covered in the curriculum, so as to provide an 'intellectual background' that makes it easier to assimilate the curriculum. There were over 40 clubs and societies at Sukhomlinsky's school that facilitated the exposure to extra-curricular knowledge and experiences.

Another feature of the approach at Sukhomlinsky's school was the degree to which students were given opportunities to apply knowledge in practical work situations. This also served the assimilation and consolidation of the curriculum.

Best wishes,

Alan Cockerill

Intellectual education (continued)

From grade one, our teachers teach children to see behind numbers their relationship to reality. In the primary school, children solve problems they have set themselves in the process of observation, in the process of investigating spatial, functional and causal relationships between objects and phenomena. Until students understand the source, the origin of a mathematical problem, they are not given textbook problems. In the middle and senior classes students prepare geometrical problems on the basis of figures they have created themselves. Algebraic equations are constructed on the basis of relationships established in the process of work. It is not possible to plan this in detail in the curriculum. Here a decisive role is played by a teacher's creativity.

Mathematical thought is essential for successful study in all subjects. Mathematical ability is a clear manifestation of qualities of mind that play a major role in investigative and creative work. A school needs to take care to develop the mathematical abilities of every student. Mathematics teachers teach students how to express thought in a scientific way, how to draw conclusions from data. The thinking skills that children develop in the process of studying mathematics leave an impression on all their intellectual work, on the way they observe natural phenomena when studying biology, physics, chemistry, and astronomy. The ideas of functional dependence and variables, that play such an important role in mathematics, develop dialectical thought, facilitating the understanding of causal relationships in other subjects.

Our students apply mathematical methods of proof when analysing the phenomena of nature, including during the process of making observations connected with the study of mechanics. The application of mathematical thought when investigating the world, and in work, is one of the main ways of linking theory and practice when studying mathematics. Mathematical methods of proof are applied when studying chemistry, during laboratory experiments. Some laboratory work involves problem solving. We have developed a system of creative written work in mathematics, physics, and chemistry. The main thing is a student's ability to apply theoretical knowledge when completing work connected with modelling, horticulture, soil science, agrometeorology. We assign a lot of significance to the application of mathematical methods when selecting the best way to achieve a work goal, by comparing the advantages and disadvantages of alternative approaches. For example, students compile tables and graphs to determine the best fertiliser for various soils.

We give a lot of significance to mathematics in the education of initiative, a love of work, precision, and critical thinking. For example, every mathematics teacher has a collection of problems that may be solved in multiple ways. The choice of method is the educational stimulus.

Evenings of mathematical creativity, competitions and quizzes are conducted from grade three onwards. Students in senior classes give presentations to the mathematics clubs attended by junior and middle school students and publish a mathematical journal. Students who have a natural gift for mathematical thought are given extension work through consultations and lessons. Over the past eighteen years 59 of

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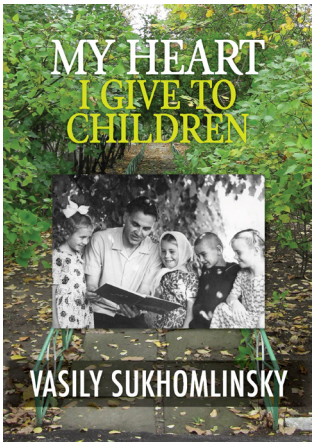

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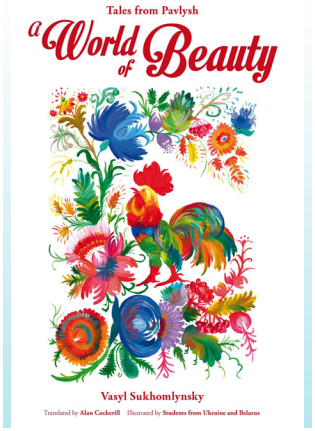

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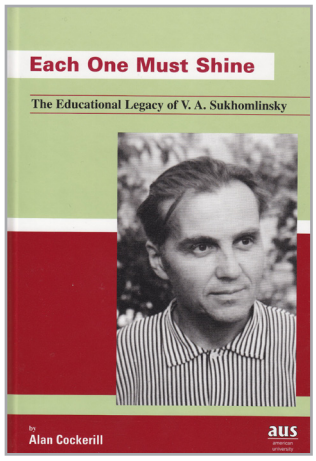

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our students have received higher mathematical education. Of these, eight have become designers, six are enrolled in post-graduate studies, five have post-graduate degrees, 26 are working in research institutes, and fourteen are teaching mathematics in secondary schools.

The educational role of knowledge in physics, chemistry, and astronomy depends on how much teachers emphasise the creative, transformative power of the intellect when studying the properties and laws of matter, energy and motion. The assimilation of these ideas, especially when studying issues such as the structure of matter, radioactivity, atomic energy, elementary particles, thermonuclear reactions, polymers, the artificial synthesis of protein, the origins of stars and planetary systems, in relationship between the microcosm and the macrocosm etc., arouses in students a thirst for knowledge. The more a person strives to penetrate the ultimate source of knowledge—the structure of matter, the origin of life, biochemical processes in living organisms—the deeper their interest in knowledge. Experience has convinced us that if, when studying physics, astronomy and chemistry, the powers of the mind are directed to understanding the mysteries of matter, students will leave the walls of our school curious and inquisitive, their self-education will never cease, and they will strive to elevate the intellectual level of their work and at the same time to enrich their spiritual life.

Our experienced teachers of physics, astronomy and chemistry, A.A. Filippov, E.E. Kolomiichenko and O.I. Stepanova have two programs in mind: one made up of the compulsory curriculum, the other directed at the gradual familiarisation of students with broader issues of science and technology. This is especially important when considering the natural sciences. Here knowledge is essential not only for an understanding of the surrounding world. It is an instrument to be applied in creative work, and in creative work the knowledge acquired in school at every step comes in contact with knowledge that has not been studied.

For every topic in the compulsory curriculum we create an intellectual background made up of material that is not compulsory. For example, before, during and after studying the laws governing electrical currents, we conduct evening activities at the school that involve practical electronics activities and competitions, so as to expose the students as much as possible to the achievements of science in utilising the electrical properties of matter. While studying the chemical and physical properties of the elements, we conduct a series of discussions entitled 'Stories about the elements'. In an entertaining way we explain to students the structure of matter. Since geology and minerology are not covered in the curriculum, we organise evenings, discussions and readings devoted to these branches of science. Students in the senior and middle years learn about hypotheses and theories concerning the origins minerals, about how we make use of natural resources. The more facts, phenomena and laws a student assimilates, the keener their interest in acquiring new knowledge. Material that engages a student because it is intrinsically interesting facilitates the involuntary memorisation of the compulsory material. Experienced teachers strive to take students beyond the curriculum, in order to facilitate the mastery of the curriculum. When they go beyond the curriculum, students gain a deeper understanding of the world. For example, the more they are exposed to modern cosmogonic theories, the more clearly they understand the idea of relativity.

The role of botany, zoology, anatomy and physiology in intellectual education depends on how deeply students acquire scientific convictions concerning the essence of life as the highest form of development of matter, the material nature of living processes, and, most importantly, the possibility for humans to actively influence these processes. Such convictions prompt adolescents and young men and women to have a deeply personal attitude towards scientific truth, knowledge, and creative work, and stimulate curiosity, inquisitiveness and faith in the power of reason. We are convinced that a person's attitude to work, including to agricultural production, depends to a great extent on the attitude towards the material basis of life processes that was formed during the school years.

Each student who falls in love with biology conducts a biological experiment during their school years, not just to convince themselves of what is already well know to science, but also to take at least one small step on a path which is at the frontiers of science. Each student who takes a special interest in biology is allocated an area in our school plot for experimentation. Young biologists investigate the dependence of living processes in the soil and in plants upon the physical and chemical conditions in an environment that is created and regulated by humans. Understanding this idea is a stimulus that arouses interest in problems that go beyond the limits of the curriculum. Many students conduct experiments to intensify living processes at various stages in the development of a plant (for example to hasten the maturation of fruit or vegetables).

Stories

Who tells a story to Grandma?

Two brothers, three-year-old Petrik and five-year-old Nikolai, have got used to the way that Grandma Maria gives them supper, makes their beds, and puts them to bed. Then she sits on a chair and tells them a story.
Grandma's story lulls the boys to sleep.

In the morning, as soon as they wake up, they see that Grandma is already busy in the kitchen, getting their breakfast ready.

One day Nikolai asks, 'Grandma, when do you go to bed?'

'After I put you to bed.'

'And when do you get up?'

'When you still have three more hours to sleep.'

'And who tells you a story, Grandma?'

Grandma Maria smiles, but does not answer. And Nikolai keeps wondering, who can it be who tells Grandma a story?

On Grandma's bed

Little Svetlanka's very best friend was her grandmother. Nobody knew how to understand and feel sorry for the little girl like her grandmother.

Mum and dad loved Svetlanka, but they sometimes did not let her do things that she really wanted to. Sometimes Svetlanka would do something wrong, and her mum would not get angry, but she would get sad. It was painful for the little girl to see how she had made her mother sad, and then she would go and get into bed with grandma. She would snuggle up to grandma's cheek, and grandma would stroke her head, and her heart would feel so warm and calm that she wanted to go up to mum and say, 'Mum, I will never do it again…'

But now, Svetlanka did not have a grandmother. Her grandmother had died. Only grandma's bed remained, with its dark blue blanket and snow-white pillow. Mum said, 'Grandma's bed can stay there forever.' From time to time she hung grandma's bedding out in the sun and washed and ironed her sheets.

One day Svetlanka went into the garden and picked some green apples and ate them. Mum saw her, and did not say anything, but shook her head and became sad. For a whole day she was sad and silent. And Svetlanka thought, 'It would be better if you got angry with me, mum, instead of getting sad'. She wanted someone to feel sorry for her. She lay on grandma's bed and snuggled her face up to the pillow. And it seemed to her that the pillow was still warm and had kept the warmth of grandma's cheek.

Svetlanka felt more at ease, and went to her mother. 'Mum, I will never do anything to make you feel sad again.'

An apple in autumn

In late autumn, the little sisters Olya and Nina were walking in the apple orchard. It was a quiet, sunny day. Nearly all the leaves had fallen from the apple trees, and they rustled under their feet. Only here and there a few yellow leaves remained on the trees.

The girls walked up to a big apple tree. Next to a yellow leaf they saw a big, red apple.

Olya and Nina squealed with joy.

'How did it last so long?' asked Olya in amazement.

'Let's pick it', said Nina.

The girls picked the apple. Olya wanted to keep it, but she restrained herself and said, 'You can have the apple, Nina'.

Nina also wanted the apple, but she said, 'You can have the apple, Olya'.

The apple passed from one to the other, but then they suddenly had the same thought.

'Let's give the apple to mum.'

They ran to their mother, joyful and excited, and gave her the apple.

Joy shone in the mother's eyes.

Mum cut up the apple and gave the girls half each.

Mum smells of bread

One day two new boys came to the kindergarten: Tolya and Kolya. Their mothers brought them.
The boys got to know each other.
Tolya asked Kolya, 'Where does your mum work?'
'Can't you guess?' asked Kolya. 'She smells of medicines. My mum is a doctor. If someone gets sick, mum helps them get better. People can't live without doctors. Where does your mum work?'
'Haven't you worked it out? She smells of bread. My mum's a baker. She feeds people. No-one can live without bread.'
'Not even a doctor?' asked Kolya in surprise.
'Not even a doctor', said Tolya with pride.