it needs to fully consider the differences between students in terms of gender, talent, interest, living environment, cultural background, region, etc., and encourage diversity and flexibility in curriculum, teaching materials, teaching, evaluation and the like.

Students are the subject of learning. Students have a strong curiosity and a positive desire to explore the world around them. Learning science should be the process of their active participation. Comprehensive science courses must be based on meeting the development needs of students and existing experience, providing a variety of scientific inquiry activities that they can directly participate in. Asking them to ask questions and solve problems is more effective than simply teaching them. Teachers are the organisers and guides of scientific learning activities. They should give full understanding and respect to students' performance in scientific learning activities, and have a positive impact on students with their own teaching behaviors.

Scientific learning should be based on inquiry. Inquiry is both the goal of scientific learning and the way of scientific learning. Experiential learning activities are the main way for students to learn science. The comprehensive science curriculum should provide students with sufficient scientific inquiry opportunities to experience the pleasure of learning science, enhance scientific inquiry ability, acquire scientific knowledge, and form a scientific attitude of respecting facts and being questionable in the process of scientific inquiry like scientists and to understand the history of scientific development. But teachers and students should also need to understand that inquiry is not the only learning model. In science teaching, flexible and comprehensive use of various pedagogical methods and strategies is necessary.

The content of the integrated science curriculum meets the needs of both society and students. Its content should be close to student's life, is in line with the development trend of modern science and technology. Content that meets the needs of social development and lays the foundation for their lifelong learning should be selected. These elements need to strengthen the organic links between the various fields of science, emphasising the integration of knowledge, abilities and emotional attitudes and values.

The integrated science curriculum should be open. This openness means that the curriculum should provide teachers and students with opportunities for choice and innovation in terms of learning content, activity organisation, homework and practice, evaluation, etc., so that the course can satisfy the different regions and different experience backgrounds to the greatest extent as students need to learn science.

Part II Course Objectives

The curriculum objectives of the Junior High School Integrated Science Curriculum Standard (hereinafter referred to as the "Curriculum standard") consist of the overall goals and four sub-goals, as well as the interrelationships between the various objectives. The four sub-goals are based on four areas: 1) scientific inquiry, 2) scientific attitudes, emotions and values, 3) scientific knowledge and skills, and 4) the relationship between science, technology and society.

1. The Overall Goal

Through this integrated science curriculum, students will obtain the simple scientific knowledge related to the common things around which are applicable to daily life. They can gradually develop scientific behavioural habits and living habits, understand the process and methods of scientific inquiry, dare to apply Scientific inquiry activities, and gradually learn to look at problems from a scientific point of view, as well as to think about problems and solve problems; maintain and develop curiosity and curiosity about their surroundings, form a scientific attitude of bold imagination, respect for evidence, and dare to innovate, get close to nature, appreciate nature, respect life, actively participate in the protection of resources and the environment, and care about the new development of science and technology.

2. The Sub-goal

(1) Scientific inquiry (process, method and ability)

Students should be able to:

1. Observe the natural phenomenon and ask questions;

2. Present hypotheses and design methods to validate hypotheses;

3. Conduct an experiment, draw conclusions based on the results obtained, and use the conclusions to explain the problem;

4. Collect and process information and data;

5. Analyse the data, obtain meaningful information, and infer reliable and untrustworthy data;

6. Use scientific terms and symbols correctly and use expressions to exchange ideas on issues related to science commonly;

7. Apply creative thinking strategies or use new methods to solve scientific problems; and

8. Apply scientific methods to solve problems in life.

(2) Scientific attitudes, affect and values

Students should be able to:

1. Be curious and curiosity about the surrounding and natural phenomena;

2. Discover the mystery of nature, respect and care for life and non-life world, and form a life attitude that is in harmony with nature;

3. Pay attention to and reflect on the impact of science on the environment, society and economy;

4. Know the urgency of environmental protection and be willing to participate in activities to protect the environment.

5. Respect the objective facts, maintain a skeptical and open attitude, respect different opinions, and dare to express their opinions; and

6. Understand the contributions and limitations of science, not superstitious towards authority.

(3) Scientific knowledge and skills

Students should be able to:

1. Master basic scientific knowledge, concepts, principles and laws;

2. Master some scientific vocabulary and terminology;

3. Recognise the application of science in daily life and society; and

4. Understand and accept the evolving nature of scientific knowledge.

(4) The relationship between science, technology and society

Students should be able to:

1. Understand the impact of the development of science and technology on the natural environment, human life and society;

2. Identify the pros and cons of science and technology applications to make objective and informed decisions;

3. Understand the importance of science and technology in social and economic development;

4. Know that the initial understanding of social needs is a powerful driving force for the development of science and technology; and

5. Know primarily the significance of implementing sustainable development.

Part III Content Standard

The content standard is the core of the "curriculum standard", which is the further embodiment of the overall goal and sub-goal. The Curriculum Standard covers four areas , namely scientific inquiry, scientific attitudes, emotions and values, scientific knowledge and skills, and the relationship between science, technology, and society through four aspects as follows: going into the scientific world, life sciences, physical sciences and Earth, Universe and Space Science.

1. Course Summary

(A) Going into the scientific world

"Going into the scientific world" is mainly to cultivate students' interest and curiosity in learning and exploring natural sciences, so that students can actively acquire scientific knowledge, and at the same time, it lets students understand scientific processes and scientific methods thus to form certain scientific inquiry ability and science attitudes and values, and cultivate students' innovative spirit.

The basic processes of scientific inquiry include asking questions, guessing results, making plans, observing, experimenting, producing, collecting evidence, explaining, expressing and communicating. Scientific inquiry ability is formed and developed through the completion of inquiry activities, and students should be personally involved in scientific inquiry activities and inquiry learning. The content of this part of the course is as follows:

1 What is science?

2 Science Laboratory

3 Scientific Inquiry Steps

4 Basic Units and Measurements

(1) Physical Quantity and Basic Unit

(2) International Unit

(3) Use of Measuring Tools

(B) Life Sciences

Through the study of “life sciences”, students will understand the basic facts, laws and basic concepts and principles of life sciences, and be able to apply relevant knowledge to explain some phenomena and solve related problems in life. At the same time, students can enjoy the beauty and harmony of the world of life through the observation and exploration of the world of life, thus stimulating the love of life and understanding the significance of the harmonious development of man and nature. The content of this part of the course is as follows:

1 Phenomenon of Life

2 Composition of Organisms

(1) The Unit of the Organism

(2) The Basic Structure of the Cell

(3) Differences between Animal and Plant Cells

(4) Significance of Cell Division and Differentiation

(5) The Concept of Single Cell and Multicellular Organisms

(6) Structure of the Human Body

3 Life Activities

3.1 Nutrition and Transportation

(1) Nutrition and Health

(2) Photosynthesis

(3) Digestion and Absorption

(4) Breathing

(5) Transportation of Substances

3.2 Coordination and Constant

(1) Stimulation of Reception and Neuromodulation

(2) Endocrine Regulation

(3) Excretion

(4) Support and Movement of Living Organisms

3.3 Reproduction and Development

(1) Sexual Reproduction and Asexual Reproduction

(2) Human Reproduction

(3) Plant Reproduction

(4) Growth and Development

3.4 Genetics and Evolution

(1) Biological Inheritance

(2) Biological Evolution

4 Biology and the Environment

4.1 Ecosystem

(1) What is an ecosystem?

(2) Relationship between Living things and the Environment

(3) The Relationship between Living Things

(4) Energy Flow in the Ecosystem

(5) Material Circulation of Ecosystems

(6) The Importance of Ecological Balance

(7) The Role of Human Beings in Maintaining Ecological Balance

5 Biological Diversity

(1) Biological Diversity

(2) Biological Classification Methods and Classification Systems

(C) Material Science

Through the study of “material science”, students will be able to understand the subtleties of the material world, understand the basic properties of matter, understand the most basic principles of the movement of matter and their interactions, understand the meaning of energy transformation and conservation, and learn that the knowledge gained is linked to natural phenomena and daily life. The content of this part of the course is as follows:

1 Objects and Matters

(1) What is a matter?

(2) Particles that make up the Matter

(3) Physical Properties of the Matter

(4) Density of Matter

(5) Use of the Matter

(6) Elements

(7) Atoms and Molecules

(8) Chemical Formula

(9) Classification of Substances

(10) Ways of Changing Substances

(11) Chemical Reaction

2 Law of Conservation of Mass

3 Energy

3.1 Energy Sources and Energy

(1) Types of Energy and Energy Sources

(2) Conversion of Energy

(3) Conservation of Energy

3.2 Renewable and Non-renewable Energy

3.3 Protection and Energy Conservation

3.4 Heat

(1) Thermal energy

(2) Heat Transfer and Effect

3.5 Sound

(1) Wave

(2) Generation of Sound Waves

(3) Propagation of Sound Waves

(4) Reflection and Absorption of Sound Waves

(5) Electromagnetic Waves

(6) Music and Noise

3.6 Light and Colour

(1) Propagation of Light

(2) Reflection of Light

(3) Refraction of Light

(4) Dispersion of Light

3.7 Electricity and Magnetic

(1) Static Electricity

(2) Current

(3) Current, Voltage and Resistance

(4) Ohm's Law

(5) Magnetic

(6) Current Effect and Electromagnetic Induction

(7) Power Generation

(8) Wiring and Components of the Home Circuit

(9) Electrical Work and Electric Power

(10) Ground Wire and Fuse

(11) Safe Use of Electricity

(12) Saving Electricity

4 Force and Movement

(1) Force

(2) Motion

(3) Work

(4) Simple Machinery

(5) Center of Gravity, Balance and Stability

(D) Earth, Universe and Space Science

The purpose of this part of the course is to enable students to understand the relationship between the Earth, the Earth and the Sun and the Moon, the galaxies and the universe, and the history and significance of human exploration of space. The content of this part of the course is as follows:

1 Earth Movement and Effects

(1) Earth's Movement

(2) The Cause of Day and Night and the Four Seasons

(3) The Movement of the Moon

(4) Moon Phase

(5) Causes of Tides

2 Overview of the Earth

(1) Earth’s Surface and Interior

(2) Earth’s Circle

(3) Changes in the Nature of the Layers and Their Importance

3 Earth Resources

3.1 Soil

(1) Soil

(2) Effects of Human Activities on Soil

3.2 Rock

3.3 Minerals

(1) The Relationship between the Main Mineral Resources and Characteristics of the Earth and Human Life

3.4 Water

(1) Physical Properties of Water

(2) Water Inspection Method

(3) Composition of Water

(4) Evaporation and Boiling

(5) Solution

(6) Acids and Bases

(7) Water Purification and Water Supply

(8) Sewage and Sewage Treatment

3.5 Atmosphere

(1) Composition of Air

(2) Oxygen, Carbon Dioxide and Other Gases

(3) Burning

(4) Pressure and Pressure

(5) Air Pollution

3.6 Living Things

4 Solar System, the Galaxy and the Universe

4.1 Solar System

(1) Solar System

(2) The Sun

(3) Structure of the Solar Atmosphere

(4) The Phenomenon of the Surface of the Sun

(5) How does the Sun produce energy?

(6) Planet

4.2 Stars and Galaxies

(1) Star

(2) The Nature of Each Star and the Birth and Death of the Star

(3) Galaxy

(4) The Milky Way

(5) Light Years

4.3 Universe

4.4 Development of Astronomy and Space Exploration

(1) History and Development of Astronomy and Space Exploration

2. Course Content

This science course content is designed as 6 lessons per week and 40 minutes per class. The course content is organised around four themes. Each topic contains several problem centers, each of which contains a number of learning objectives as well as corresponding learning outcomes. The activity proposal provides some guidance on how to achieve the learning outcomes.

The learning outcomes cover knowledge, skills and emotions. The target verbs for knowledge and skills are as follows:

Knowledge

1. Level of Understanding

Tell, give examples, list, describe, identify, know, identify

2. Level of Understanding

State, explain, compare, recognise, understand, distinguish, contrast, understand

3. Application Level

Use, classification, mastery, inference

Skills

1. Imitation Level

2. Individual Operation Level

1. Imitation Level

2. Independent Operation Level

Drawing, measuring, determining, reviewing, learning, calculating, mastering

3. Lateral Transfer Level

Connection

The target verbs for contacting the experiential requirements are as follows:

1. Experience (Feeling) Level

Feel, experience, realise, perceive

2. Reaction (Identification) Level

Follow with interest, pay attention to

3. Comprehension (Internalisation) Level

Form, establish, build, comprehend

Part IV Implementation Recommendations

1. Teaching Advice

(1) Based on Inquiry Teaching

The junior high school science curriculum emphasises the development of students' scientific inquiry ability and understanding of scientific inquiry, and through these processes to improve students' scientific literacy. Therefore, in the teaching process, we should provide more opportunities for scientific inquiry, and link the practical experience with the acquisition of scientific knowledge to cultivate and improve students' practical ability and innovative spirit.

The design of the inquiry activity should be in line with the psychological characteristics of the students, try to cut in from the familiar things of the students, design the activities that the students love, and make the students happy to participate. Self-made teaching aids and low-cost experiments can be used for inquiry activities, focusing on combining in-class and co-curricular, intra- and out-of-school inquiry activities.

Scientific inquiry activities can be whole-process or partial. For example, some classes focus on asking questions, conducting training on conjectures, assumptions, and predictions while other classes focus on training in planning and gathering information. It is not necessary to be constrained that each activity must follow the entire process of scientific inquiry step by step and from the beginning to the end or must be flexible according to the content of the teaching.

Although the junior high school science curriculum emphasises the significance of scientific inquiry to student development, it should also be recognised that inquiry is not the only way to learn. In science teaching, various teaching methods and strategies are required to form an optimised teaching mode.

(2) Using Teaching Materials Flexibly

Textbooks are an important resource for scientific learning, but they are not the only curriculum resources. The teaching materials cannot be fully applied to every region, every school and every student. Teachers should flexibly handle the content according to the actual situation, and continuously expand, supplement and innovate. The curriculum implementation should be the way to better use the textbooks rather than simply "teaching textbooks".

In order to use the teaching materials effectively and to correctly understand and accurately grasp the teaching materials, it is necessary to thoroughly analyse the learning characteristics of students and understand their real situation. No matter how good the teaching materials are, they usually only provide a way of thinking and a design scheme for teaching and learning according to the general situation. Therefore, the teacher cannot stay in the knowledge framework presented by the textbook itself, and is not subject to the design of the textbook, but can make flexible adjustments according to the specific situation of the students.

(3) Combining Classroom Teaching with Cocurricular Activities

Cocurricular activities here mainly refer to activities that are organised by the school in addition to classroom teaching, to supplement classroom teaching and to achieve an educational activity required by the educational policy.

Combining cocurricular activities with classroom teaching can deepen students' understanding of knowledge, enable them to learn and use what they have learned, and achieve the purpose of associating theory with practice. Through cocurricular activities, students can also enrich their experience, broaden their horizons, and give full play to their respective strengths, including foster innovative spirit and improve their practical ability.

Teachers should carry out various cocurricular activities according to the teaching, students and the actual situation inside and outside the school, and closely combine classroom teaching with cocurricular activities. For example, conducting research group activities and visiting museums, science museums, zoology and botanical gardens, farms, factories, garbage disposal sites, etc.

(4) Learning by Doing

In the teaching of science courses, we must create a variety of opportunities for students to conduct scientific inquiry. In the process of personal participation in scientific activities, students will discover problems, feel scientific processes, obtain factual evidence, test their own ideas and scientific theories, and gradually form scientific attitude, emotions and values.

In science teaching, we should focus on guiding students to think about the relationship between factual evidence and scientific conclusions, help students establish scientific models, and thus cultivate students' analytical, general and logical thinking abilities, and gradually form a scientific thinking habit of questioning and reflection.

Teachers should arrange students to do experiments for different course contents to improve their practical ability in this way.

(5) Focus on Student Participation

Students should be encouraged to participate actively in the teaching process, so that they can truly understand and master basic scientific knowledge and skills, scientific attitudes and methods, and gain extensive experience in scientific activities through their own hand-on experience.

Teachers should respect students' diverse insights, skills and experiences, protect students' creativity and curiosity, provide students with multiple opportunities to express their ideas, and allow students to come up with different perspectives, including ideas that may be wrong.

Teachers should help and guide students who have difficulty in learning science and ensure that every step of their progress will be given prompt encouragement so as to build their confidence in learning science.

(6) Encouragement on Exchanges and Cooperation

Teachers should create various conditions and forms according to different teaching contents, and carry out exchanges between students. Students should form mutual respect and trust in the process of interactions. These interactions aim to foster students' ability to present arguments and answer questions. In addition, teachers should encourage students to conduct open discussions and critic and question one another's scientific explanations. They will be guided to discard incorrect views and accept a more reasonable scientific explanation.

Teachers should encourage students to cooperate and learn, use collaborative group forms to conduct inquiry activities, so that everyone can participate in group work to cultivate their cooperative spirit.

(7) Flexible Arrangement of Teaching

Teachers should be flexible in their teaching according to the actual needs of the students. The formation of some important scientific concepts is a complicated process. Teachers should give students sufficient time to observe, experiment, analyse and discuss. Scientific inquiry is an activity that takes more time to be carried out. If a student is

particularly interested in an inquiry activity, or if the student discovers a new problem during the inquiry and needs further inquiry, he or she should be given time allowance to fully explore and discuss. At time when students have difficulties in understanding a certain concept or principle, teachers can increase related activities to help students understand.

(8) Make Full Use of Modern Educational Technology

Today's society has entered the era of high-speed informatisation, and all disciplines in primary and secondary schools are actively using modern educational technology to optimise classroom teaching and improve teaching effectiveness. Modern educational technology integrates sound, image, text, animation and other information into one image. The image is rich and intuitive, which makes students feel intimate and impressed.

The use of modern educational technology can also adjust the teaching progress according to the differences in students' learning ability, improve the learning efficiency; it also can cultivate students' self-learning ability and lay the foundation for lifelong learning.

2. Evaluation Recommendations

(1) Purpose of Evaluation

Evaluation is an indispensable part of teaching activities. It plays a multi-faceted role in the teaching process, and regulates and controls the teaching activities as a whole to ensure that the teaching activities can achieve the set goals.

The main purpose of the evaluation is to understand students' learning status as a reference for refining teaching and promoting learning. Therefore, the evaluation should reflect the true situation of the teaching in a comprehensive and objective manner and provide a real and reliable basis for improving the teaching.

(2) Evaluation Content

The content of the evaluation should be considered based on whether the course objectives are achieved. Teaching evaluation should be carried out abreast teaching activities, and its content should be consistent with the teaching objectives, viz., covering all aspects of the course objectives. It is necessary to examine the basic knowledge and basic skills of students, as well as to examine students' scientific attitudes, emotions and values, including the processes, methods and abilities of scientific inquiry, and the understanding of science, technology and social relations. Moreover, teachers should pay

attention to the results of learning as well as the changes and development of students in the learning process.

(3) Evaluation Method

Diverse evaluation methods are recommended. Teachers should use a variety of evaluation methods throughout the teaching process to assess the level of achievement of students in different learning objectives. It is necessary to select a variety of evaluation methods that match the evaluation content in addition to the written test and give equal attention to the formative and summative evaluation.

1. Formative Evaluation

Formative evaluation mainly refers to the measurement of students' learning process and results in order to improve and maximise teaching activities during the teaching process. Formative evaluation focuses on the testing of the learning process and the use of measurement results to improve teaching, so that the teaching can be improved in the process of continuous evaluation, feedback, correction or improvement, rather than emphasising students' results. Since formative evaluation is the main purpose of obtaining feedback and improving teaching, the number of such tests is relatively frequent. Generally, formative assessment is conducted after the initial teaching of any one unit or new concepts and new skills has been completed. As such, the scope of each test is comparatively small in scale.

2. Summative Evaluation

Summative evaluation generally refers to the assessment of student learning outcomes after the end of a course or a teaching phase. The main purpose of this type of evaluation is to assess the student's academic performance, determine the extent to which the student achieves the learning objectives, and determine the basis for the student's learning in the follow-up tutorial and the development of new learning objectives. The generalisation level of summative evaluation is generally high, and the scope of content included in the examination or test is also broad, and the number of evaluations is as many, usually two or three times a semester or one academic year. The mid-term exams, final exams, and graduation exams in the school are all such evaluations.

The evaluation should be based on daily teaching and make full use of all normal classroom teaching activities and cocurricular practice activities to fully reflect the actual learning and development of students. The main evaluation methods available are:

1. Written Test

The written test is the most common evaluation method. It should avoid test on knowledge and memory. It should pay attention to the understanding of knowledge and

the ability to solve problems and the ability to think at a higher order. The test is conducted aiming to strengthen comprehensiveness, inquiry and openness.

2. Experimental Examination

Teachers can use appropriate guidelines to examine students' understanding and application of scientific concepts and principles, including their ability to design experiments, apply experimental techniques, process and interpret data obtained, communicate and express, cooperate, innovate, and possess safety consciousness, etc. The experimental examination evaluates the performance and results of students during the experiments (such as the experimental report).

3. Teacher Observation

When students are completing learning activities, teachers can observe their interest and motivation to examine their learning attitudes (such as initiative, cooperation, creativity, etc.) and see how they solve problems and interact with others. Through a long-term, systematic observation of students' performance in daily learning and recording, a more comprehensive evaluation of students' learning outcomes can be obtained.

4. Verbal Questions

By asking questions verbally, teachers can understand how students think in certain situations. Students' responses can reflect their strengths, weaknesses, fallacies, understanding, attitudes and abilities. Teachers should use different types of questions to stimulate students' thinking, such as asking students to provide facts, setting questions, finding evidence, and answering open questions that promote higher order thinking.

5. Personal Growth Record

Establishing a growth record is an important way for students to conduct self-evaluation. It can reflect the development and progress of students, and it also allows students to cultivate the habit of reflection and self-review. Students can record the growth experience of their scientific learning activities, including the learning content, academic performance, scientific observation diary, scientific and technological works, the process of participating in scientific practice activities inside and outside the school, experience, achievements and so forth.

6. Feature Report

The special report provides an opportunity for students to apply what they have learned. Teachers can use appropriate evaluation criteria to evaluate students' creativity, communication and presentation skills, problem-solving skills, and the ability to collect and process data.

The results of the evaluation should be presented in a combination of qualitative and quantitative methods. Quantitative evaluation can adopt the level system, percentage, etc.; qualitative evaluation can be conducted in the form of comments, filling activity records, etc. Teachers should pay more attention to what students have mastered, what progress they have gained, and what capabilities they have, so that the evaluation results are conducive to building students' self-confidence in learning science, improving their interest in learning science, and promoting their development.

3. The Development and Utilisation of Curriculum Resources

Science teachers should have the awareness of developing and utilising curriculum resources, and develop and utilise various scientific curriculum resources based on local conditions.

The curriculum resources for science education are everywhere, and exist anytime. It can be divided into three categories: school resources, family resources and community resources. In essence, it includes three major resources: people, things and environment. In order to improve students' scientific literacy, teachers can develop and utilise curriculum resources in various ways relevant to the environment in which the school is located.

1. Development and Utilisation of School Curriculum Resources

The school curriculum resources can be divided into two categories in the classroom and outside the classroom. Those inside classrooms are mainly laboratories, science rooms, libraries, reading rooms, computer rooms, etc. The main areas outside the school are the school buildings, the environment of the corridors, flowers and trees, biological corners, and scientific and technological attractions.

The ways to develop and utilise school curriculum resources are to:

1. Familiarise books in school library, enrich scientific collections and update science education equipment;

2. Make full use of the land in the school and open up science and technology education parks, such as herbal garden, weather station, small zoo, etc.;

3. Design and establish scientific and technological attractions such as solar clocks, wind turbines, and scientific sculptures on campus; and

4. Mobilise teachers with special skills in science and technology and actively develop school-based curriculum.

(3) Development and Utilisation of Family Resources

Every family has a wealth of scientific and educational resources, such as the professional background of the parents, the animals, the plants, the family science books and the like.

The methods of using the family curriculum resources are to:

1. Encourage students to conduct scientific inquiry activities on domesticated animals and planted plants; and

2. Encourage parents to bring their children to nature, encounter the society, and conduct social practice.

4. Development and Utilisation of Community Resources

The community curriculum resources mainly include professionals, factories, farms, orchards, botanical gardens, zoos, libraries, science museums, museums, natural parks, universities, and scientific research institutes.

The use of community curriculum resources is to:

1. Carry out activities to improve the community environment;

2. Visit community research units for on-site teaching; and

3. Invite professionals with specialisations to guide students in scientific activities or give scientific lectures.

4. Textbook Writing Recommendations

The textbook provides basic clues for students' learning activities, and is an important resource for achieving the objectives of the curriculum and implementing teaching. The preparation of junior high school science textbooks should be based on the "curriculum standard". Therefore, textbook writers need to fully understand and master the basic ideas and contents of the "curriculum standard" and reflect them in the textbook as a whole.

The selection, organisation and presentation of the content of the textbook are important issues to be considered in the preparation of the textbook. In this regard, the "curriculum standard" proposes the following principles and recommendations:

(1) Selection of Teaching Materials

1. In addition to considering the systemic nature of the subject, the selection of the contents of the textbook should also consider the development of the students and the needs of the society.

2. The content of the textbook should include the basic knowledge and skills of science, highlight the most basic scientific concepts and principles, and reflect the basic characteristics of scientific inquiry. It is designed to combine scientific inquiry with the acquisition of scientific knowledge, skills, and the formation of scientific attitudes, emotions, and values.

3. The choice of textbook content should reflect the needs of social, economic and technological development. Science, technology and society should be integrated to fully reflect the interaction between them, reflecting the development of science and its impact on social development and personal life.

4. The selection of the content of the teaching materials should reflect the connection and integration between the contents of each subject, and fully consider the combination of knowledge and skills beforehand and afterwards. Furthermore, familiar things and practical problems in the daily life of the students should be selected and engaged as the content of the teaching materials.

5. The content of the textbook should be based on student activities as an important part. The textbooks should arrange a variety of learning activities, so that students can develop their knowledge, abilities, emotions, attitudes and values through activities.

6. The selection of the content of the teaching materials should fully consider the existing knowledge and experience of the students. Teachers should pay attention to the connection within the relevant courses, and the level of difficulty should be moderated, so as to avoid excessive burden of learning for the students.

(2) Organisation of Textbook Content

The content standard of this “Curriculum Standard” is expressed and presented in four aspects. It does not represent the order of teaching content and the organisational structure of the teaching materials. It needs to be re-created and integrated when writing teaching materials.

The integration of scientific textbooks does not require the complete breaking of the boundaries of the branch field, but the content should focus on the comprehensive connection and mutual penetration of knowledge and skills in different subject areas in order to cultivate students’ awareness and ability to use knowledge comprehensively.

The integration of scientific textbooks should have a certain logical structure, but the form of logical structure can be diverse.

The following checklist describes several different forms that can be used as a reference when writing a textbook.

1. Scientific textbooks based on the development of inquiry ability

This kind of teaching materials is mainly based on scientific inquiry. The purpose is to develop students' inquiry ability and emphasise the continuity of inquiry activities.

2. Scientific textbooks based on the development of student life experience

This kind of teaching materials organises materials from the perspective of students, and gradually expands the teaching content according to the continuous expansion of their life experiences including the enhancement of students' understanding and recognisation of science.

3. Scientific textbooks based on students' knowledge background and cognitive development

This kind of teaching material is used to find the learning materials corresponding to the students' knowledge background and cognitive characteristics in life science, material science and earth, universe and space science content. These materials are arranged in order from basic to advanced, from simple to complex, and finally form a certain knowledge system.

4. Scientific textbook based on scientific concept system

This kind of teaching materials is used to introduce from the basic concepts of a certain scientific field to derive theorems, principles, rules, laws and so on according to the logical concept as the main clues to compose the content of the textbook.

5. Scientific textbook with unified concept and process

Such textbooks are organised with a number of basic, scientific, and unified concepts and processes, such as the transformation of materials and energy, systems, conservation, structure and function, and evolution, aiming to promote and strengthen the study of scientific concepts and principles.

(3) How the content of the textbook is presented

1. Science textbooks should match the age characteristics and cognitive rules of students, apply interesting things to stimulate students' interest and learning motivation, and pay attention to the relevancy of students' daily life.

2. Scientific textbooks should reflect the core of the subject, viz., inquiry, carefully arrange learning activities, create a situation and conditions conducive to students' independent inquiry and study, and guide students to draw conclusions through inquiry.

3. Science textbooks should be open, and guide students to broaden their horizons of knowledge through various channels as well as to guide students to pay attention to and participate in discussions about scientific issues and express their own opinions.

4. The presentation of teaching materials should be lively and diverse, and the text should be popular and fluent.

5. The content of the textbook should be arranged from easy to difficult, and the abstract content can be arranged later in the book.

5. Teacher Training Recommendation

Since the comprehensive science curriculum bears the heavy responsibility of cultivating students' scientific literacy, it is critical to improve the literacy and knowledge level of science teachers. Put simply, it is necessary to gradually build up a professional team of science teachers.

To set up a special training programme for teachers, the training courses shall be designed in accordance with the scientific literacy required by the "curriculum standard", and the training shall be conducted in stages and in batches. The training content should pay equal attention to subject areas and teaching areas to strengthen the use of information technology, including information acquisition, information processing and information processing training.

As such, teacher training courses should include the following three aspects:

1. Training courses include knowledge, methods, and experimental skills in Physics, Chemistry, Biology, Geography and their extension and application; the connection and integration between disciplines, such as the introduction to science, the history of science, or the general methodology of science.

2 Training courses should be based on the basic theory of education and teaching, including the theory and methods of comprehensive science curriculum theory, teaching method, teaching design and teaching evaluation.

3. Practical courses, including basic techniques and methods of comprehensive science education practice and modern educational technology.

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