

## Subject - Based Teaching In Manufacturing Business Involving Physics Field In The High Schools Enhancing The Quality Of Training Capacity In Dealing With Real Problems As Well As Developing Career Orientation Of Students

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**ABSTRACT:** Many different activities are proposed out in the teaching process, in which organizing the activities for students in making creative experiences to lead into the new knowledge or to exploit the lessons from the school to the real manufacturing business is consisted of. The exploitation of elements of production and business activities in the high school as a source of knowledge as well as a mean of teaching; however, education is rarely concerned or if it is often spontaneous. Physics is in the field of natural science. It is not only closely associated with Technology, Chemistry and Biology but also related to STEM educational development. High school educational programs must contribute to help students to form knowledge, skills, attitudes, qualities and capabilities. It also helps students to acquire knowledge and develop abilities to choose right careers in many technical fields. With these characteristics, when teaching physics, it should be associated with practical business production in the localities. The teachers need to focus on exploiting this advantage of the subject, integrating and linking the subject content with practice. Subject-based teaching is closely related to production and business activities. The teachers can use different teaching methods and techniques to integrate into the teaching process, in which attention must be paid to rules of learners' cognitive and thinking process as well as organizing for students to creative experience through learning activities in the topic that meet the capacity development for students.

**Key words:** Subject-based teaching, production and business activities, real life experience activities

### I. INTRODUCTION

When the conditions of education and teaching are considered; in general, the documents of teaching methodology haven't had much to mention the conditions and teaching facilities related to production and business activities in the locality. With the trend in orientation for developing students' abilities, teachers stimulate the students to apply their knowledge and competence from the school into the real life and teaching must associate with the exploitation of elements of production and business activities in the local area. This is considered as the source of knowledge as well as a teaching tool that is diverse and varied in the locality and tightly closed to students' life. Therefore, to meet the educational aims based on the development of the general education syllabus, the educational goals of the school levels; the goal of students' creative and career-oriented experiences; the needs of students, students' parents and local human resource needs; the conditions for organizing and implementing learning contents in the locality, the characteristics of production situation, the characteristics of local economic and cultural life; the coordination between teaching activities with production and business activities; the conditions for organizing the school such as: facilities, equipment, teachers ...

When organizing teaching physics associated with production and business doings, students can participate in small activities such as: repairing bicycles, motorcycles, household electrical gadgets, computers,... Students can do the activities individually or working in their team. Thanks to this, the students can figure out some measures to come up with problems in real life such as environment, traffic [5] ... It not only reflects the quality of learning and teaching but presents a gap that needs to be filled by teachers, school administrators as well as learners to improve the educational quality. In the framework of this article, we focus on organizing physics

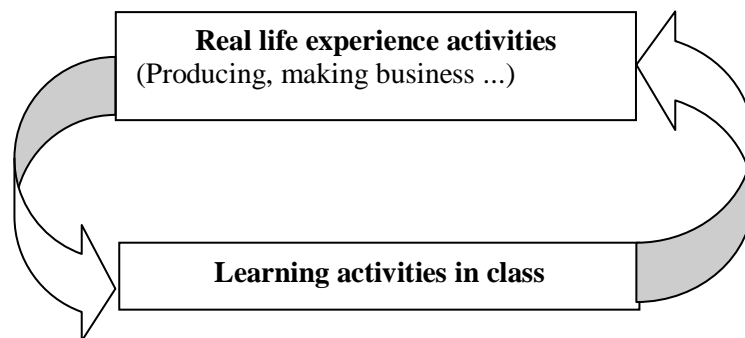
teaching with subject - based form in the high schools associated with production and business activities in the locality.

## II. CONTENT

### 2.1. The relationship between business production activities with teaching activities in the high schools

Production and business activities described for the process of carrying out the stages from the exploitation and use of available resources in the economy to produce goods and services to supply market demand and to get profit are to be taken into full consideration. In practice, business production activities are in many fields such as agriculture, industry, services, financial and monetary. In the process of teaching the content of the subject, together with instructing to acquire the knowledge gained in textbooks, either teachers or students have many activities to get a relaxed approach to search and to apply knowledge associated with production and business activities because this is the environment and public tools, practical sources of materials to supplement the content of teaching in class. Teaching has included many activities, in which organize for students to do practical experiences, to continue improving skills for students who are able to get promotion easily in the future business production process.

Teachers need to look back carefully the contents of current programs and textbooks to remove old and outdated information and supplement and update appropriate new information. The meaning and role of the components of production and business activities can be analyzed in the following strong points: Contributing to promoting and guiding awareness activities for students; helping students develop learning skills, self-control knowledge; stimulating students' cognitive excitement; fulfilling intellectual development of students; educating students' personality; contributing to developing some soft skills in students such as: Communication competence, positive listening skill, abilities to present thought ideas, cooperative skills, critical thinking skills, taking responsibility ability, goal-setting skills, time management, skills of searching and processing information. Therefore, it is necessary to transfer from learning in major classes to organizing various forms of learning with paying attention to experience activities. This requires students to apply and combine knowledge system with skills to solve the problems in real life such as: researching, studying, and applying to business production activities as the following diagram:



### 2.2. Subject - based teaching in physics associated with production and business activities at the high school.

#### 2.2.1. Characteristics and objectives when teaching physics in the high school associated with production and business activities

Physics belongs to one of the subjects of natural science, describing natural phenomena as well as properties of matter. The contents of physics are included from the structure of basic particle to cosmic structure, which is the basis of many important engineering and technology branches. The knowledge which is selected for inclusion in the program is primarily the knowledge of classical physics. Besides that, Physics is always closely associated with Technology, Chemistry and Biology; relating to STEM education development (Mathematics, Engineering, Natural Science and Technology) ..., teachers need to focus on exploiting this advantage of the subject, integrating and relating the course content but have to ensure the objectives of physics in the high school.

+ Knowledge aim: Concepts of things, phenomena and physical processes in real life and production activities; quantities, laws and basic physics principles; the main contents of some of the most important physics theory; common applications of physics in real life and in production; general methods of scientific awareness and specific methods of physics such as: empirical methods and model methods.

For example: Some contents of physics knowledge in the high school associated with production and business activities.

Theme	Applying subject knowledge	Production and business establishments	Some craft techniques
<b>Friction force (grade 10)</b>	The benefits and harms of friction force: Wearing the surface; warming the surface when carrying out friction; having friction coefficient of small materials to reduce friction; having strong friction force to increase the ability to transfer into motion; getting brake systems worn due to friction.	Mechanic factory; woodshop; Construction working; Health care facility services; Bicycle and motorbike repair shops ... some technical business service centers.	Smoothing wood surfaces and walls, massaging body, changing engine oil; adjusting the drive system of scooters, replacing the brake pads.
<b>Principles of thermodynamics (grade 10)</b>	Explaining energy transformation in vehicles and air conditioners	Stores, purchasing and repairing refrigeration items	Working mechanism of air conditioners, heat engines
<b>Electric current in metal (class 11)</b>	Features and characteristics of the electric current in metals.	Civil electronic stores, metal and electrical business shops	Checking fuse, soldering tin wire
<b>Electric current in electrolyte (grade 11)</b>	Features and characteristics of the electric current in electrolyte	Electroplating and casting workshops, precious metal production companies	plating gold, plating silver, ...
<b>Electric current in gases (grade 11)</b>	Features and characteristics of the electric current in gases	Welding arc workshops, repairing motorcycle workshops, production and equipment repair factories	Welding arc
<b>Electric current in semiconductor (grade 11)</b>	Features and characteristics of the electric current in semiconductor	Electronics, electronics repair and business establishments	Checking diodes and transistors
<b>Transformer (grade 12)</b>	Characteristics, applications of transformers and power transmission systems	Manufacturing factories and Lioa repair factories, survolter, voltage stabilizers, battery charging machines, power grid operation stations...	How to manufacture and Lioa repair, voltage stabilizers, survolter, battery charger, operation process, power grid design, power transmission systems.

\* Skills aim: Knowing phenomena and physical processes in nature, in daily life or in experiments; knowing how to investigate, collect, search documents from different sources in order to collect the necessary information for studying physics; using common physics instruments, having the skills to assemble and conduct simple physics experiments; knowing to analyze, synthesize and process the information obtained to draw conclusions, make simple predictions about good relationships or the nature of phenomena or physical processes, as well as suggesting experimental plans to test the prediction; applying knowledge to describe and explain phenomena and physical processes; solving physical exercises and solving simple problems in life and production at a universal level; using physical terms, tables, graphs to present exactly the knowledge, as well as the results obtained through updating and processing information.

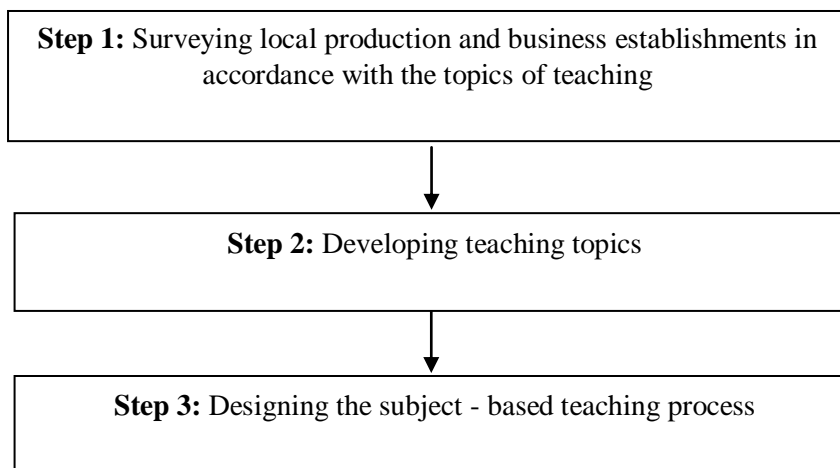
\* Attitude: Being interested in studying physics, loving to explore science; respecting for the contributions of physics to the advancement of society and the merits of scientists; having an objective and honest attitude; having meticulous, careful, precise and cooperative spirit in studying physics, as well as in applying the gained knowledge; being conscious of using physical knowledge with life to improve living and learning condition as well as to protect natural environment.

\* Capacity: In addition to understanding the knowledge of specific cognitive methods of physics such as experimental methods, model methods, similar methods ...; training and capacity development for the

students in the high school, contributing to the development of all of the general competencies, key qualities set out in the overall program; especially, the ability to solve problems, creativeness and quick calculating ability...

### 2.2.2. Designing the teaching process according to the theme associated with production and business activities

The design of the subject - based teaching process is closely linked to production and business, teachers can use different teaching methods and techniques to bring into the teaching process, in which pay attention to the rules of the cognitive and thinking process of learners. The instructors are willing to organize for the students to experience through activities in the topics that meet the capacity development for students including the following steps:



**Step 1:** This is the first step playing an important role because of through the survey results, teachers can build the particular content to teach. They can choose the teaching techniques being suitable to local conditions. There are the three following techniques: Exploiting and using production and business documents to conduct lessons in the high school; conducting lessons at production and business establishments; organizing study tours at production and business establishments.

**Step 2:** Basing on the survey results, basing on the content of the current teaching program of the subject, the teachers can build learning topics so as to meet the teaching objectives, to be suitable to the techniques organized in step 1.

**Step 3:** Subject-based teaching progress with the combination of the traditional and modern teaching, in which learning activities are designed in the following notes:

(1) **Experimental activities:** It is a practical activity with a system of pre-topic exercises with new knowledge in the current educational program that students can learn through activities associated with business production.

(2) **Finding out and addressing problems:** This is the stage where students must mobilize their knowledge, skills, experiences to identify (the sides) of the problem through the students' creative experience report in order to show their understanding of the topic of learning.

(3) **Establishing and standardizing knowledge:** Being active connections existing knowledge and new knowledge of the topic of learning under the current program, this activity helps students student systematize knowledge to form new thing to solve problems raised from the beginning that students themselves cannot solve.

(4) **Applying knowledge:** Being a personal activity of students or of groups to demonstrate their ability in solving various problems in order to inculcate and systematize knowledge.

(5) **Expanding knowledge into practice:** Being an activity to help students promote their ability to solve problems and to form creativeness. Students continue to expand their acquired knowledge into practical experiences at the higher level.

### 2.3. Checking and evaluating teaching as well as learning in association with production and business activities

Teaching in association with production and business activities help students apply their knowledge in real life, raise their awareness and action capacity, promote positive qualities, form active attitude, have future career orientation suitable to the trends of society after graduating the high school ... Therefore, the schools have focused on evaluating the process, appreciating the creativity of students, evaluating for the progress of each student, for each student's activity, teachers have developed criteria and appropriate assessment.

### III. ILLUSTRATIVE EXAMPLE OF TEACHING ASSOCIATED WITH PRODUCTION AND BUSINESS ACTIVITIES

#### THEME

Electric current in semiconductors (Grade 11)

#### 3.1. Determining the problems to be solved

Through the topic "Electric current in semiconductors", students have been enriched knowledge and found out some applications through the lessons to apply the acquired knowledge to solve practical problems to develop capacity for the students. Teachers need to organize for the students to practical experiences. Particularly, the students can learn and explain why the technology devices work such as LEDs, transistors, semiconductor components, electronic circuits, diodes used as electronic switches...

Thanks to the surveys from advertising establishments, LED lamp manufacturing factories, semiconductor components, electronic circuits, electrical and electronics repair shops ... The surveys help the students know some applications related to electric current knowledge in semiconductors. This help students orient easily career such as: working in manufacturing plants, being an employee in a construction working or shipbuilding and engineering industries related to producing semiconductors and electronic technology devices

...

#### 3.2. Preparation for teaching plan

\* Teachers: Surveying production and business establishments related to semiconductors, electronic components; choosing the content, teaching methods and teaching techniques; making teaching plans: Paying attention to students; facilitating to ensure materials, facilities during the teaching process; helping the students build a suitable learning schedule set into learning sheets of lessons related to production and business activities to learn at production and business establishments; making video clips, taking photos related to the learning topic. Learning sheets, test and assessment questions, product evaluation cards, reports are given for students by the own facilitators.

\* Students: Writing books, textbooks, Internet, materials which the teachers provide; reporting the results of the study according to the study card.

#### 3.3. Teaching plan

##### \* Aims

a. Knowledge aim: Describing the nature of electric current in semiconductors; understanding the application of semiconductors and knowing the operating principles of some semiconductors or electronic components such as led lights, diodes, transistors...

b. Skills aim: Explaining the problems by the requirement of semiconductor lessons; answering questions in the study cards; knowing how to install some simple electronic circuits using semiconductor components.

c. Attitude: Being concerned about the problems of creating LEDs and semiconductor devices and ICs; being excited, proactively receiving learning tasks to find out at LED lamp production factories and semi-conductor components factories, sharing and cooperating in the process of group activities; complying with regulations on occupational safety at the place where visitors experience activities.

d. Improved abilities: Having the ability to solve problems related to knowledge, phenomena, applications of electric current in semiconductors such as: advertising design, - LED lighting production, semiconductor components, semiconductor diodes, transistors, electronics repair shops such as televisions, computers, radios, sound amplifiers; being self-learning and autonomy; communicating and cooperating actively; developing language competence and calculation ability.

##### \* Organizing learning activities

The process of subject - based teaching	Content	Activities	Time
1. Practical experience	Studying practical applications	Taking part in group activities, educational trips and practical studying at business production establishments.	1 week
2. Finding out and addressing problems	Studying about electric current in semiconductors	+ The representative of the group reports the practical experience. + The students discuss with together to find out the issues solved.	10 minutes 10 minutes

<b>3. Establishing and standardizing knowledge</b>	Suggesting the solutions to study theoretical knowledge of electric current in semiconductors Implementing the specific solutions to determine the nature and characteristics of electric current in semiconductors + Analyzing documents + Making experiments	Taking part in group activities	20 minutes
<b>4. Applying knowledge</b>	Systematizing knowledge and doing practice	Making individual activities	10 minutes
<b>5. Expanding into practice</b>	Designing your own advertising circuit for class names Studying more about the applications of semiconductors with household applications such as: kitchen, phone, television, safety knife, camera ...	Studying abroad in a project, working in team	5 minutes in class 1 week at home

**\* Activity 1: Self-studying applications of electric current in semiconductors**

<b>Aims</b>	- Studying about electric circuits, electronic components such as diodes, transistors, solar cells,... - Doing practice to collect information, organizing information and asking pre-researched questions. - Ensuring safety in the process of taking part in the practical experience - Studying some other applications in the daily life of students.
<b>Contents</b>	- Taking part in the practical experiences at the business establishments (if anything) such as electronic repair factories, advertising companies and lamp production factories, electronic shops... analyzing documents to collect information. - Developing the reports based on the tasks of the study card 1 (about 4 days to 1 week in advance) and the experience results. - Suggesting and selecting related questions.
<b>Expected results</b>	Studying records consist of the products about the practical researches and pre-researched questions of groups.
<b>Preparation</b>	- Studying through the different channels of practical information such as how to measure electronic components, how to design a specific electric circuit, the use of electronic components ... recording the observed information and updating receive specific information from the internet, videos, textbooks, and other materials + Videos, images of electronic components, circuit boards, some practical applications such as magnetic stove, camera, LED, TV control, Solar battery .. + Notebooks, study card 1
<b>Activities of teacher and students</b>	- Teacher: Dividing into the group from 6 to 8 students. Making educational plans, visiting business establishments, preparing reference materials; assigning tasks to students of study cards 1. - Students: Studying and developing the product experience report. Safety note: - Complying with the regulations from the establishment, from the instructor. - When visiting a factory, not approach or touch the devices without any permission.

**STUDY CARD 1**

**STUDYING APPLICATIONS OF THE ELECTRIC CURRENT IN SEMICONDUCTORS**

High school:..... Class.....

Full name:..... Group.....

**Question 1: Studying about diodes, LEDs through understanding semiconductor devices at production and business establishments of electric equipments, circuits, and on the internet and answering the following questions:**

1. What is the structure and use of diodes semiconductor ? Which applications are used to produce electronic devices?
2. To check the operation process of diodes, what tools are used? How do you keep checking them?
3. How many types of diodes are there? What is the application of each type?

**Question 2: Studying about transistors through understanding semiconductor devices at the production and business establishments of electric equipments, circuits, and on the internet and answering the**

following questions:

1. What is the structure and the use of transistor? Which applications are used to produce electronic devices?
2. What are the types of transistors? What is the application of each type?
3. Using multimeter transistor and resistance resistor of transistor? Where is the B pole ? Does the transistor conduct electricity? Recording the results of resistance of transistor and reverse resistance and what kind of transistor is it?

Question 4: What are the unresolved issues?

Students should note:

- Complying with the regulations of the establishments and the instructors.
- When coming to factories, students are not allowed to approach or touch the devices without permission.
- Completing the personal coupon after the experience, and then working in team at home to develop the product reports of groups. On the above issues, to present the electric current in the environment in front of the class, each group has to present from 7 to 10 minutes, the products are video clips, power points, images,...

**\* Activity 2: Reporting the results of understanding the electric current in the gas**

<b>Aims</b>	<ul style="list-style-type: none"> <li>- Displaying the report, sharing discussions about the things gained from the experience of some applications of electric current in semiconductors</li> <li>- Speaking of some characteristics of electric current in semiconductors</li> <li>- Presenting the nature of electric current in semiconductors</li> </ul>
<b>Contents</b>	<ul style="list-style-type: none"> <li>- Presenting reports, exchanging experience results.</li> <li>- Presenting, discussing to agree on research questions: studying about the nature of electric current in semiconductors and some applications.</li> </ul>
<b>Expected results</b>	<ul style="list-style-type: none"> <li>- Students conduct presentations which are discussed as well as planned.</li> </ul> <p>Expected questions:</p> <ol style="list-style-type: none"> <li>1. In practice, to manufacture solar cells, displaying devices with light-emitting diodes have they applied the characteristics of semiconductors to produce technical devices and to manufacture solar cells as well as displaying devices with light-emitting diodes?</li> <li>2. What are the conditions of occurrence of charged particles in semiconductors? Which elements do carriers depend on?</li> <li>3. Why do semiconductors lead into electricity? What are the differences between the other dielectric and metal semiconductors?</li> <li>4. What are the general characteristics of applications of semiconductor devices in production?</li> </ol>
<b>Preparation</b>	<ul style="list-style-type: none"> <li>+ Studying a group report with the teacher and preparing a individual report before class.</li> <li>+ Teaching facilities (rooms, desks, projectors ...)</li> </ul>
<b>Activities of teachers and students</b>	<ul style="list-style-type: none"> <li>- Students' representatives of 1 to 2 groups report to the class about experience results. The other groups listen and exchange information.</li> <li>- Students' representatives can ask many questions during discussion process to find out the reasonable answers.</li> <li>- Students: participating in an assessment for contributions of each member of the group.</li> <li>- Teachers: Evaluating group discussions, evaluating products, evaluating students 'recorded results and presenting students' discussion before class.</li> <li>- Student: Addressing the problem to continue theoretical and experimental research on electric current in semiconductors (may be true or false).</li> </ul>

**\* Activity 3: Learning the knowledge in textbooks about electric current in semiconductors and some electronic components**

<b>Aims</b>	<b>Studying and presenting new knowledge from textbooks.</b>
<b>Contents</b>	<ul style="list-style-type: none"> <li>- Reading textbooks, selecting and recording knowledge of electric current in semiconductors at the levels of textbooks according to skillful knowledge standards.</li> <li>- Arranging knowledge into the products of groups to report.</li> </ul>
<b>Expected results</b>	<ul style="list-style-type: none"> <li>- Reporting and recording the sufficient knowledge contents of the student group which meet the requirements:             <ol style="list-style-type: none"> <li>1. Comparing resistivity of semiconductors with resistivity of metals and dielectric</li> <li>2. Comparing the resistivity dependence of the metals on the temperature with the</li> </ol> </li> </ul>

	<p>resistivity dependence of the semiconductors on the temperature?</p> <p>3. How does the resistivity of the semiconductors change when a small amount of impurity is added?</p> <p>4. Conductivity of pure semiconductors (Si)</p> <p>+ How many electrons in Silicon atoms at the outer layer when linking with together? Which silicon atoms are connected by what kind of bond?</p> <p>+ How to evaluate the bonding sustainability between Si atoms in the crystals lattice at the low temperature and the high temperature.</p> <p>+ If there is an applied electric field, how does the electron and the hole move? What happens to the pure of the semiconductors conductivity at the high temperature?</p> <p>5. Semiconductors conductivity with the impurities</p> <p>+ What is the difference between N-type and P-type semiconductor materials?</p> <p>+ What impurities give the impregnated impurities? What impurities give the received impurities (Axcepto impurities)?</p> <p>+ Why is N-type and P-type forwarding layer called poor carrier layer? What are the characteristics of electric current through N-type and P-type layer?</p> <p>+ How to apply P-type layers in manufacturing diodes, Solar cells, light-emitting diodes, Zener Diode, Transistors.</p> <p>+ How to measure some electronic components.</p> <p>+ Making reports and exchanging knowledge from group activities to confirm correct and sufficient knowledge (study card 2)</p>
<b>Preparation</b>	<p>Teacher: Giving reference materials for students, worksheet No. 2</p> <p>Students: Pre-reading the textbook, studying some practical experiments to carry out in real life.</p>
<b>Activities of teachers and students</b>	<p>- Teachers assign tasks to groups.</p> <p>+ Asking students work in small groups, read textbooks, do experiments, and combine with reference materials studied from the past practical experiences to understand electric currents in the gas to answer questions.</p> <p>+ Asking students discuss in groups, select important knowledge to build group products to report to class.</p> <p>- Representative of a group reports on the acquired knowledge, the students in a small group discuss with other groups to improve theoretical knowledge of electric current flow in semiconductors</p> <p>- Teacher evaluates the process, products and results.</p> <p>- How do students evaluate with each other (if necessary)?</p> <p>- Teacher systematizes knowledge.</p>

**STUDY CARD 2**

**STUDYING ELECTRIC CURRENT IN SEMICONDUCTORS**

High school:..... Class.....

Full name:..... Group.....

Conduct experiments, read documents, discuss groups and report experimental results including the following contents:

<p><b>What are the characteristics of pure semiconductors?</b></p> <p><b>N-type and P-type semiconductor materials?</b></p> <p><b>What is the nature of electric current in semiconductors?</b></p>	<p>P-type, N-type semiconductors, Forward Bias, Reverse Bias and their significance</p>	<p>P-type, N-type, P-typesemiconductors N-type, P-type, N-typesemiconductors</p>	<p>Structure of diodes and transistors</p>



**\* Activity 4: Systematizing knowledge and practicing**

<b>Aims</b>	- Giving feedback, rewarding and assigning research task for students. - Reinforcing the acquired knowledge
<b>Contents</b>	Presented and supplemented knowledge Applying the knowledge to solve some simple tasks and some common situations in real life.
<b>Expected results</b>	- Solving the raising issues in the study card - Writing into the student notebook.
<b>Preparation</b>	- Study card 3 - Reference materials (if anything).
<b>Activities of teachers and students</b>	- Teachers give feedback (comments, compliments, criticisms, sharing ...) about results, working spirit of groups or individuals - Teachers add incomplete knowledge (if necessary) - Students write their knowledge into their notebooks. - Students solve problems given by teachers or students. - Teachers assess the process, evaluate students products, evaluate the results - Students evaluate each other themselves (if necessary)

**STUDY CARD 3****APPLYING KNOWLEDGE OF THE ELECTRIC CURRENT IN SEMICONDUCTORS**

High school:..... Class:.....

Full name:..... Group:.....

Complete the following contents:

1. Using multi-purpose meter to measure resistance and reverse resistance of diodes? Where is the anode pole? Do diodes conduct electricity or not? record the results when measuring the positive resistance and reverse resistance of diodes?
2. Using transistor multimeter and resistance resistor of transistor? Where is the pole B? Does the transistor conduct electricity or not? Recording the results when measuring the resistor and reversed resistor of the transistor? What kind of the transistor is N-P-N or P-N-P type?
3. How to identify anode, cathode led light?

**\* Activity 5: Applying in real life**

<b>Aims</b>	+ Exploring and expanding knowledge in many fields related to "Electric currents in semiconductors and electronic components". + Designing advertisements; manufacturing sensor night lights
<b>Contents</b>	Knowledge about the fields applying electric current flow in semiconductors such as electronics, manufacturing LED lights, magnetic cookers, solar cells ...
<b>Expected results</b>	- Student writings, video clips, powerpoint, photos, etc. following the content. - Presenting the results in front of the class.
<b>Preparation</b>	- Teachers: Guide students to find materials, how to present reports, divide into small groups and assign tasks. - Prepare learning materials (textbooks, notebooks, materials...), teaching facilities (pictures, models, real / virtual experiments / simulations, videos, slides).. - Studying card (if anything). - Students: Prepare report.
<b>Activities of teachers and students</b>	+ Student groups do tasks at home, do warm-up activities in front of class or the whole school; get the help (if necessary); Report products by specified time. + Teachers' activities: - Request students to do tasks, guide them to work overtime, evaluate their activities.

References: Students search on some websites

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3. Conductors equipment: <https://vatlypt.com/linh-kien-ban-dan-ung-dung-vat-lieu-ban-dan.t133.html>
4. Applications of diodes and transistors: <https://www.bachkhoadientu.com/2017/08/diode-la-gi-ung-dung-cua-diode-trong-thuc-te.html>

#### IV. CONCLUSION

Subject - based teaching associated with production management and business activities is a key difficult direction. It requires the investment with great efforts of teachers. However, to achieve the goal of comprehensive development of capacity and quality of students, this is a general direction of innovation of teaching methods in Vietnam. It is the teaching process that needs to be designed according to the learning activities. In there, students' learning activities are not only learned by the traditional learning style but students also need to create the conditions to help them study multiple styles. Students deeply understand the phenomena, apply knowledge into practice through experience activities to study applications in real life and expand knowledge in the fields of production and business. Thanks to this, learning activities, students are self-reliant and active in learning process. From there, the teachers can help students solve problems with practical significance in physics teaching process and contribute to developing the capacity of students.

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