Jockey Club STEAM Education Resources Sharing Scheme

Dive in Virtual World

Teachers' Guide

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Contents

Jockey Club STEAM Education Resources Sharing Scheme is a 4-year project (2019-2023) funded by The Hong Kong Jockey Club Charities Trust and operated by the School of Science and Technology, Hong Kong Metropolitan University.

Traditionally, knowledge is transferred to students through a teacher-centred approach. Teachers teach students based on a subject-based curriculum that aims at content acquisition. However, little attention is given to how students learn and apply the knowledge to tackle matters in and beyond classrooms. Moreover, the knowledge domains are covered in terms of individual subjects, such as Physics, Biology, Chemistry, and Mathematics. Students learn individual subjects separately without holistic integration. As a result, students may not be sufficiently equipped to solve authentic problems in the real world.

"While Hong Kong students perform well in science, technology and mathematics, they may focus on disciplinary studies and may not evenly participate in hands-on activities in schools. Therefore, it is necessary to strengthen the ability of students to integrate and apply their knowledge and skills across different subject disciplines through solving daily life problems with practical solutions and innovative designs." (Curriculum Development Council, 2015).

Under this Scheme, the operational team will create a set of STEAM modules for secondary schools to strengthen students' ability to integrate and apply their knowledge and skills across different subject disciplines with a special focus on the use of innovative teaching pedagogies for STEAM education, i.e.

Science
Technology
Engineering
Arts
Mathematics

At least 20 modules would be developed to target students of average ability in solving authentic problems in daily life. Each module would provide 4 to 40 contact hours of student activities. In addition, students would do preparation or follow-up activities during non-contact hours. The ratio between contact hours and non-contact hours is approximately 1:1.

This document provides a detailed module plan for learning, teaching and assessment activities. The module will provide an opportunity for students to learn STEAM through hands-on and minds-on activities that integrates knowledge and skills across Science, Technology, Engineering, Arts and Mathematics under real-world contexts.

1. Module Outline

1.1 Module Title: Dive in Virtual World

With the advancement of Virtual Reality (VR) technology, visual experience is vastly enhanced in many areas. Head-mounted devices (HMD) or VR goggles are the key gadgets to lead one to the virtual world. With increasing popularity in terms of usage and price of VR commodities, VR technology is empowered to be developed and its potential is going to be unleashed.

Yet looked mysterious, the scientific principles related to VR are neither difficult nor indigestible by secondary school students. Some of these are covered by senior secondary syllabi, for instance, human vision, formation of images on the retina in the Senior Secondary Biology syllabus, and the law of refraction for convex lenses, and drawing ray diagrams in the Senior Secondary Physics syllabus.

Knowledge beyond the syllabi mentioned above, for example, binocular vision and depth perception, development and trend of VR technology, etc. would also be covered in the four units in this module. Moreover, at the end of the module, students can enjoy "diving in the virtual world" with their handmade VR goggles.

1.2 Participants Recommended for this Module

- ☑ Junior Secondary School Students (S3)
- ☑ Senior Secondary School Students (S4)
- ☐ Others

1.3 Module Aims

The module "*Dive in Virtual World*" aims to:

- *Introduce* students to the subject knowledge and principles of virtual reality (VR)
- *Illustrate* how virtual reality enhances the audiences' experience
- *Provide* students with authentic experience in making their own VR goggles
- *Advance* students' application of subject knowledge and skills learned in the school curricula of the Senior Secondary Biology (Stimuli, receptors and responses - Light as stimulus: the human eye) and Senior Secondary Physics (Light - Reflection of Light and Formation of Images by Lenses)

1.4 Module Learning Outcomes

Upon the completion of the module, students should be able to:

- *Understand* the biological principles of human binocular vision
- *Understand* the physical principles of refraction of light of convex lens and a*pply* them to draw ray diagrams
- *Construct* their own VR goggles from cardboard
- *Outline* the current application and the trend of VR technology

1.5 Learning & Teaching Approach / Practice

STEAM education emphasises blending STEAM-related subject knowledge into applications so that students become the true owners of comprehensive knowledge. Therefore, activity-based learning is put forth, students are guided to learn the principles of science, technology and mathematics behind VR. Through a series of hands-on and minds-on activities, the application and integration of relevant knowledge are possible, thereby rendering learning and teaching solid.

After all, technology is ever-changing and knowledge is unbounded. Parallel to the information delivered to students by teachers, students can share the information about the development and trends of VR they found on the internet when they are assigned the internet-search homework in *Unit 3*. While the "design and make" approach is adopted in *Units 3 and 4*, students will make their own VR goggles from raw materials and decorate the cases of VR goggles. Thus, students' engagement would be enhanced.

At the end of the module, not only does the understanding of STEAM-related subject matter increase but also students' skills in communication, design-thinking, independent learning and entrepreneurial spirit, are nurtured.

1.6 Nature of STEAM Activity

Element	Description	Composition
Science	Blend VR-related knowledge in SS Biology and SS Physics	✪✪✪✪✪
Technology	Explore the development and trend of VR technology and construct VR goggles	✪✪✪
Engineering	Taste the reverse-engineering of VR goggles	✪✪
Arts	Design the cases of VR goggles	✪✪
Mathematics	Measure and calculate the size of the image formed and the magnification	✪

1.7 Mapping of Key Learning Area (KLA)

Unit	Science Education	Technology Education	Arts Education	Mathematics Education	Others *(please specify)*
1	◆ Major parts of the eye, eye accommodation, eye defects and their corrections (SB3.4) ◆ Binocular vision and depth perception				
2	◆ Refraction of light (SP3.2.3) ◆ Formation of images by convex lenses (SP3.2.5)				
3		◆ Virtual Reality			◆ Reverse-engineering of VR goggles
4	◆ Magnification of lens from lens formula (SP3.2.5)	◆ Construction of VR goggles from raw materials (TK3.4) ◆ Current application and trend of VR technology	◆ Design of cases of VR goggles	◆ Solve problems involving linear equations in one unknown (MJ8.3)	

Remark: Mapping the skill sets in this module with the respective KLAs in the school curriculum that would be covered.

1.8 Module Structure

	Units	Contact Hours
1	Knowing about Human Vision	110 min.
2	Knowing about the Refraction of Light	80 min.
3	Knowing about Virtual Reality (VR) and its Technology	80 min.
4	Producing VR Goggles	115 min.
	Total	**6 hr. 25 min.**

*Remark: A total of **1.5** non-contact hours of the module is recommended.*

1.9 Thematic Area

- ☐ Environment and Health
- ☐ Food and Biotechnology
- ☐ Biochemistry
- ☑ Digital Transformation
- ☐ S.M.A.R.T.

2. Module Design

At the beginning of this module, students are expected to equip the background knowledge related to VR progressively. In *Unit 1*, students will learn the biological principles of human vision. Followed by *Unit 2* where students will learn the physics principles of the refraction of light for convex lenses, students will be well prepared to unveil the mask of VR and its technology.

In *Unit 3*, the working principle of VR goggles will be more easily understood by students with prior knowledge. They can even reverse-engineer commercial HMDs or VR goggles to devise a way of making VR goggles from raw materials. Also, room for further exploration of VR technology and its trend is unlimited on the internet.

When it comes to *Unit 4*, students will make their own VR goggles. This experiential learning process turns ideas into authentic products. Decoration of the cases makes VR goggles unique and artistic. Appreciation and comments among peers are nutritious to students' self-improvement and development.

2.1 Unit 1: Knowing about Human Vision

As one of the five sense organs in humans, the eyes play a vital role in detecting light in the environment. Different parts of the eyeball work very cooperatively and promptly to facilitate the production of vision in our brains.
When it comes to looking at objects which are very close to our eyes (<25cm), even the eyes of healthy people fail to focus on them. Just like the near "object" is placed inside a VR goggle, it is worth thinking about how to overcome this limitation. Students may get some ideas from the corrections of eye defects after gaining an understanding of them.

In this unit, students will learn the biological principle of human binocular vision and how the two eyes help perceive depth. This unit paves the road for learning virtual reality (VR) and its technology in *Units 3 and 4*.

2.1.1 Objectives

Upon completion of *Unit 1*, students should be able to:

- *Identify* the structures and functions of human eyes
- *Understand* the biological principles of human vision
- *Unfold* the causes of some eye defects and their correction
- *Relate* binocular vision with depth perception

2.1.2 Pre-requisite (if appropriate)

Nil.

2.1.3 Description of Activity

Description	Duration (hr/min)	Resources
(1) Introduction ◆ The teacher assesses students' prior knowledge ◆ The teacher explains the learning objectives of this lesson	5 min.	
(2) Identifying the structures of a human eye ◆ The teacher introduces the structures and functions of major parts of a human eye ◆ Students assemble a model of a human eye ***(Activity 1.1)***	30 min.	◆ PowerPoint slides ◆ Game ◆ Worksheet (MCQ)
(3) Exploring human eye accommodation ◆ The teacher demonstrates how the eyes focus light on the retina ◆ The teacher defines eye defects (long sight, short sight, presbyopia, astigmatism) ◆ Students are guided to outline the corrections of eye defects	30 min.	◆ PowerPoint slides ◆ Videos
(4) Relating binocular vision with depth perception ◆ The teacher explains how binocular vision helps perceive depth ***(Activity 1.2)*** ◆ Students examine the lens of a VR goggle ***(Activity 1.3)***	35 min.	◆ PowerPoint ◆ Game
(5) Debriefing ◆ The teacher reviews the knowledge covered in this lesson ◆ The teacher briefly introduces the next lesson	10 min.	◆ Worksheet
Total	**110 min.**	

2.1.4 Assessment

- Student's knowledge of the structures of the human eye will be assessed through online multiple-choice mini-competition
- Student's knowledge on biological knowledge of eye accommodation and binocular vision will be assessed through a student worksheet with short questions
- Overall students' participation would be reviewed

2.2 Unit 2: Knowing about Refraction of Light

Not until the light from an object exactly focused on the retina by the lens of our eyes could we see it clearly. This involves one of the properties of light – the refraction of light by lenses. However, this property is abstract unless it is visualised by drawing respective light rays, which are commonly shown in ray diagrams.

Moreover, with the understanding of the rules and the skills of drawing ray diagrams, students can figure out how virtual images can be produced by the lenses in VR goggles and are perceived by human eyes.

In this unit, students will learn the law of refraction of convex lenses and how to draw the respective ray diagrams, in order to recognise the role of convex lenses in VR goggles. This unit paves the road for learning virtual reality (VR) and its technology in Units 3 and 4.

2.2.1 Objectives

Upon completion of *Unit 2*, students should be able to:

- *Apply* the law of refraction to convex lenses to draw ray diagrams
- *Solve* problems concerning images formed by convex lenses
- *Calculate* the magnification of lenses and the sizes of virtual images using the lens formula

2.2.2 Pre-requisite (if appropriate)

Nil.

2.2.3 Description of Activity

Description	Duration (hr/min)	Resources
(1) Introduction ◆ The teacher recaps major ideas from the previous lessons ◆ The teacher assesses students' prior knowledge ◆ The teacher explains the learning objectives of this lesson	10 min.	

Description	Duration (hr/min)	Resources
(2) Discovering refraction of light of convex lenses: ◆ The teacher introduces the law of refraction of convex lenses by demonstration ◆ Students apply the 3 rules of refraction to draw ray diagrams ***(Activity 2)*** ◆ Students find out the nature of images formed by convex lenses ◆ The teacher guides students to calculate the magnification of lenses and the sizes of virtual images using the lens formula	60 min.	◆ PowerPoint slides ◆ Worksheet
(3) Debriefing: ◆ The teacher reviews the knowledge covered in this lesson ◆ The teacher briefly introduces the next lesson	10 min.	◆ Worksheet
Total	**80 min.**	

2.2.4 Assessment

- Students' knowledge of the refraction of light from a convex lens will be assessed through a student worksheet with short questions and drawings of ray diagrams

2.3 Unit 3: Knowing about Virtual Reality (VR) and its Technology

With sophisticated computer calculations and graphical constructions, virtual 3-dimensional spaces are created which is known as virtual reality. Nowadays, three main types of virtual reality are used, including non-immersive, semi-immersive, and fully-immersive simulations. With the proper equipment, like head-mounted devices (HMD) or VR goggles, users can fully experience the environment simulated in the real world, or differ completely from the real world.

Besides, VR hardware is such a crucial tool that allows users to immerse themselves in the virtual world. Along with the detection of body movement, the sense of ambiance can be impressive. In this unit, students are allowed to open up HMD / VR goggles to examine their parts. They can gain a deeper understanding of the arrangement of these parts and also the working principle of HMD / VR goggles. This sparks students' ideas on the construction of their own VR goggles from raw materials in unit 4.

2.3.1 Objectives

Upon completion of *Unit 3*, students should be able to:

- *Describe* briefly what virtual reality (VR) is and its technology
- *Recognise* the three types of VR
- *Handle* and *examine* head-mounted devices (HMD) / VR goggles

2.3.2 Pre-requisite (if appropriate)

Nil.

2.3.3 Description of Activity

Description	Duration (hr/min)	Resources
(1) Introduction ◆ The teacher recaps major ideas from the previous lessons ◆ The teacher explains the learning objectives of this lesson	10 min.	
(2) Offering a glimpse of virtual reality and its technology ◆ The teacher describes the general information about VR ◆ The teacher showcases the current applications of VR ◆ Students are taught to differentiate the three types of VR ◆ Students finish the web-search activity at home	30 min.	◆ PowerPoint slides ◆ Video
(3) Examining head-mounted devices (HMD) / VR goggles ◆ Students examine the internal structures of HMD /VR goggles by opening them up ***(Activity 3)*** ◆ Students reverse-engineer VR goggles by brainstorming the essential parts for HMD / VR goggles ***(Activity 3)***	30 min.	◆ Worksheet
(4) Debriefing ◆ The teacher reviews the knowledge covered in this lesson ◆ The teacher briefly introduces the next lesson	10 min.	◆ Worksheet
Total	**80 min.**	

*Remark: (*) Around **1.5** non-contact hours are expected.*

- Notes sharing for effective construction of VR goggles for instant sharing via an online platform in *Unit 4*.

2.3.4 Assessment

- Student's discovery of the essential parts (lenses, gyroscope and magnetic sensors) of HMD / VR goggles will be reviewed through a student worksheet with short questions

2.4 Unit 4: Production of Own VR Goggles

After getting hold of the information about virtual reality and the structural characteristics of VR goggles in *Unit 3*, it is nothing better than encouraging students to create their own unique, authentic products. In this unit, students would gain hands-on experience in constructing VR goggles using some raw materials provided. On top of the practicability, the products can be infused with elements of art when students put effort to make decorations on their products and give consideration to user-friendliness.

Last but not least, with problem-solving skills, self-confidence and capability for evaluating their own works developed, students who stay curious about the trend of VR technology would like to unveil the many possibilities of the development of VR in the future. Their innovation, as well as entrepreneurial spirit, which are required in the 21st century, would be fostered.

2.4.1 Objectives

Upon completion of *Unit 4*, students should be able to:

- *Construct* VR goggles from cardboard
- *Design* and *decorate* the cases of own VR goggles
- *Explore* the applications of VR and the trend in VR technology

2.4.2 Pre-requisite (if appropriate)

Nil.

2.4.3 Description of Activity

Description	Duration (hr/min)	Resources
(1) Introduction ◆ The teacher recaps major ideas of the previous lessons ◆ The teacher explains the learning objectives of this lesson	10 min.	

Description	Duration (hr/min)	Resources
(2) Constructing VR goggles ◆ Students construct VR goggles from raw materials ***(Activity 4.1)*** ◆ Students perform product tests ***(Activity 4.1)***	70 min.	◆ PowerPoint slides ◆ Manual of VR goggles ◆ Worksheet ◆ VR goggle material pack
(3) Refining VR goggles ◆ Students paint and decorate the VR goggles ***(Activity 4.2)*** ◆ Students present their ideas of decoration (3 mins x number of students) ◆ Students comment on and appreciate other's works	20 min. (+ time for presentation)	◆ Worksheet
(4) Applications and the trend in VR technology ◆ The teacher recaps the current applications of VR ◆ Students are asked to imagine and search for the current applications of VR on the internet at home ◆ Students explore the trend of VR technology	10 min.	◆ PowerPoint slides ◆ Worksheet
(5) Debriefing ◆ The teacher reviews the knowledge covered in all units	15 min.	◆ Worksheet
Total	**115 min.**	

2.4.4 Assessment

- Students' participation will be assessed by their presentation, experience sharing and comments to other students
- Student's knowledge covered in *Units 1-4* will be assessed through answer-checking in student worksheets with students by teachers

3. Workshop (Activity)

3.1 Activity 1.1 – Assembly of a human eye model

3.1.1 Introduction

In this activity, students in groups will assemble a model of a human eye from its parts and finish the worksheet provided.

3.1.2 Duration

About 20 minutes.

3.1.3 Objective

To consolidate knowledge learnt about the structures and functions of human eyes.

3.1.4 Equipment

- Models of a human eye

3.1.5 Materials

N/A

3.1.6 Procedures

1. For each group of students, a model of a human eye (with the part disassembled) is provided for examination.

2. Students are asked to assemble the models correctly as quickly as they can. At the same time, finish the MCQ worksheet as accurately as they can.

3. Students are provided with answers for evaluating their performance.

3.1.7 Result and Discussion:

- Worksheet related to the structures and functions of human eyes
- Performance evaluation

3.2 Activity 1.2 – A taste of depth perception without binocular vision

3.2.1 Introduction

In this activity, students in pairs will taste the failure of depth perception without binocular vision.

3.2.2 Duration

About 10 minutes.

3.2.3 Objective

To explain how binocular vision helps perceive depth after students' experience.

3.2.4 Equipment

- Pens

3.2.5 Materials

N/A

3.2.6 Procedures

1. For each pair of students, one of them is asked to close one of his/her eyes, another student holds a pen with the tip upwards at an arm-distance from him/her.

2. The eye-closed student tries to reach the tip of the pen using his/her fingertip. He/She may not be able to do this in the first trial.

3. The student repeats steps 1-2 but opens both eyes this time.

3.2.7 Result and Discussion:

- Discussion on the difference between monocular vision and binocular vision
- Discussion on the importance of binocular vision in humans

3.3 Activity 1.3 – Brief examination of the lens of a VR goggle

3.3.1 Introduction

It is a showcase of the internal structure of a simple VR goggle, an emphasis is put on the light refractive properties of convex lenses found in the VR goggle.

3.3.2 Duration

About 20 minutes.

3.3.3 Objective

To pinpoint the properties of the essential part of VR goggles- convex lenses.

3.3.4 Equipment

- A simple VR goggle
- A laser pointer (or 3-beam laser box)

3.3.5 Materials

- A piece of paper/graph paper

3.3.6 Procedures

1. The demonstrator opens the case of the VR goggle and shows its internal structures.

2. The demonstrator takes out the convex lens and holds it perpendicularly on a piece of paper/graph paper.

3. The demonstrator uses a laser pointer to let the laser beam pass through the lens at different angles (or uses a 3-beam laser box to produce three parallel laser beams).

4. Students are asked to observe the change of direction of the laser beams after they are passing through the lens.

5. A student is invited to be the assistant to draw the traces of light beams on the workbook/paper/graph paper as a record.

3.3.7 Result and Discussion:

- A record of the refraction of convex lenses of the VR goggle

3.4 Activity 2 – Discover the rules of refraction of light of convex lenses

3.4.1 Introduction

In this activity, students are guided to discover the three rules of refraction of convex lenses. Besides, students are going to learn the conventional way of drawing ray diagrams.

3.4.2 Duration

About 45 minutes.

3.4.3 Objective

- To find out the focal lengths of two convex lenses.
- To locate the images formed by convex lenses by drawing corresponding ray diagrams.

3.4.4 Equipment

- 2 convex lenses of different focal lengths
- A laser pointer

3.4.5 Materials

- 6 graph papers

3.4.6 Procedures

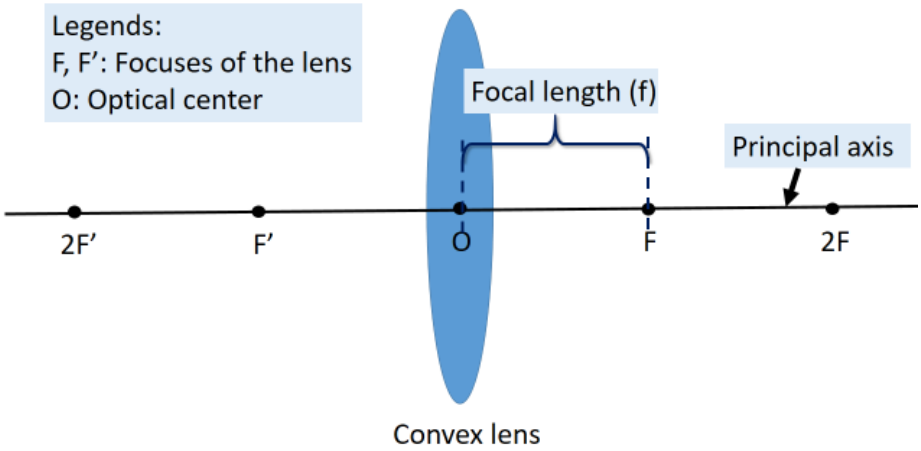


Diagram 1: Typical notations of a convex lens

1. On graph paper, the demonstrator uses a laser pointer to let several laser beams (which are parallel to the principal axis) pass through lens A.

2. Students are asked to observe the change of direction of the laser beams after the laser beams have passed through lens A.

3. As all rays should pass through the focus (F) of lens A on another side (see Diagram 2). F can be located on graph paper. Its focal length can be found.

4. On graph paper, the demonstrator uses a laser pointer to let several laser beams pass through F' of lens A at different angles.

5. Students are asked to observe the change of direction of the laser beams after the laser beams have passed through lens A. All rays should be parallel to the principal axis on another side (see Diagram 3).

6. On graph paper, the demonstrator points a laser pointer towards the optical center of lens A at different angles.

7. Students are asked to observe if there is any change of direction of the laser beams after the laser beams have passed through lens A. Rays passing through the optical centre should emerge without deviation. (see Diagram 4)

8. A summary of the above observation is made. Students should have gained an understanding of the 3 rules of refraction of light of convex lens for drawing ray diagrams.

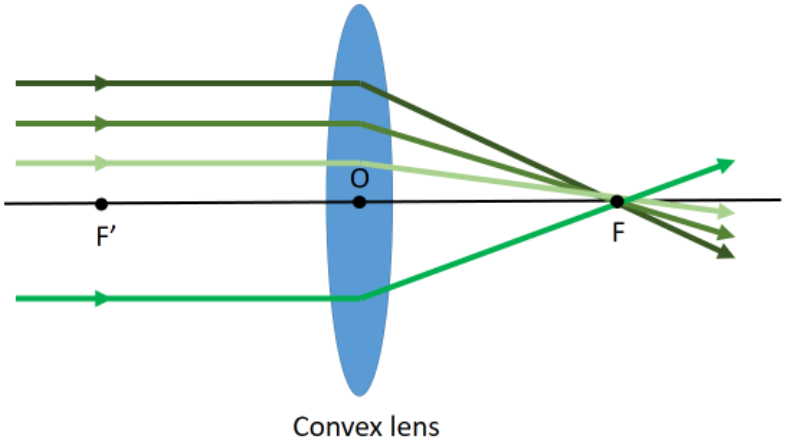
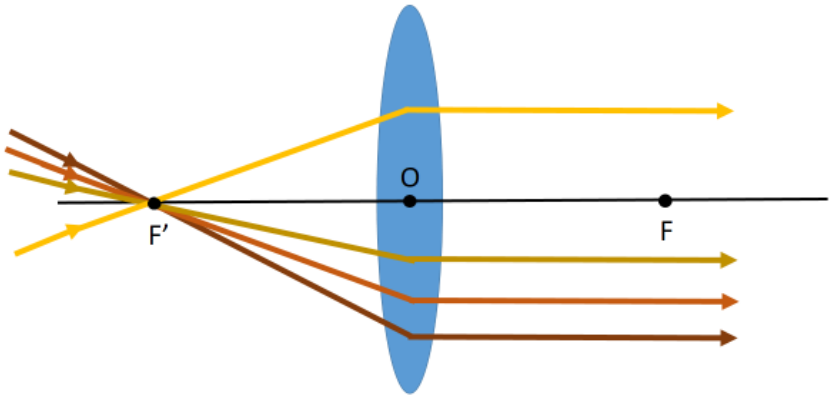
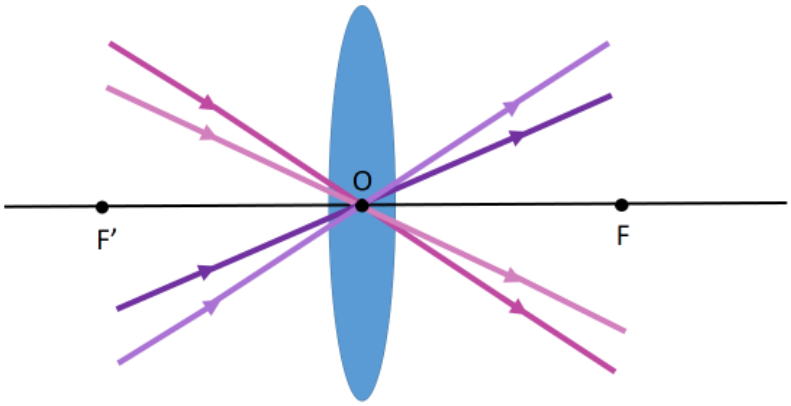


Diagram 2: Rule 1 of the refraction of light of a convex lens



Convex lens

Diagram 3: Rule 2 of the refraction of light of a convex lens



Convex lens

Diagram 4: Rule 3 of the refraction of light of a convex lens

9. With reference to Steps 1-3, a student is invited to find out the focus (F) of lens B.

10. Students are divided into groups and are responsible for finding out the image formed by the convex lens for the following cases:
    i) when the object is placed beyond 2F';
    ii) when the object is placed at 2F';
    iii) when the object is placed between F and 2F';
    iv) when the object is placed at F';
    v) when the object is placed between F and O'.

11. The positions, sizes and the nature of images for each case are recorded in the workbook and discussed.

12. With reference to the cases above, how the images are formed in VR goggles, magnifications and the lens Formula are discussed.

3.4.7 Result and Discussion:

- Discussion on and a worksheet for the 3 rules of the refraction of light of a convex lens
- A worksheet for the positions, sizes and the nature of images for different cases
- Discussion on the formation of images in VR goggles, magnification and the lens Formula

3.5 Activity 3 – Examination of head-mounted devices (HMD) / VR goggles

3.5.1 Introduction

In this activity, students in groups will dissemble head-mounted devices (HMD) or VR goggles (or look at the teardown pictures of several HMD and VR goggles) in order to gain a deeper understanding of the arrangement and positions of their parts. Moreover, the reverse-engineering process can enlighten students on how to construct their VR goggles from raw materials in Activity 4.

3.5.2 Duration

About 30 minutes.

3.5.3 Objective

- To examine the internal structures of HMD /VR goggles by opening them up (or looking at the teardown pictures).
- To form the basis for constructing VR goggles from simple raw materials through a minds-on reverse-engineering process.

3.5.4 Equipment

- HMD /VR goggles
- Screwdrivers

3.5.5 Materials

N/A

3.5.6 Procedures

1. Students in groups are given HMD or VR goggles. They open the devices up.

2. Students look for the parts, especially the convex lenses, gyroscopes, and magnetic sensors (if any), and answer the questions on the student worksheet.

3. Brainstorm and note down the essential elements of well-functioned VR devices during the examination of the opened devices.

4. Students are asked to return the devices to their original state.

3.5.7 Result and Discussion:

- A worksheet for the internal parts of HMD or VR goggles
- Discussion on and worksheet for the essential elements for well-functioned VR devices

3.6 Activity 4.1 – Construction of own VR goggles from cardboard

3.6.1 Introduction

In Activity 3, students should have ideas of the internal structure of a VR goggle. In this activity, students in groups are going to make this authentic and gain hands-on experience.

3.6.2 Duration

About 60 minutes.

3.6.3 Objective

To construct their authentic VR goggles using some raw materials provided.

3.6.4 Equipment

Nil.

3.6.5 Materials

- Cardboards or paper template* with convex lens (focal length = 45mm or 50 mm)
- Double-side adhesive tapes (width:1/2 inch)

** For the details of the cardboards and the paper template, please contact OUHK STEAM Centre.*

3.6.6 Procedures

1. Students in groups are allowed to construct VR goggles according to their layout of constructing VR goggles in Activity 3 with the given instructions.

2. Perform a product test using videos for VR goggles available on the web and/ or download an app (suggestion: Within VR) for trial.

3.6.7 Result and Discussion:

- Performance evaluation
- Worksheet for product test

3.7 Activity 4.2 – Decoration of own VR goggles

3.7.1 Introduction

In this activity, students will make their own VR goggles appealing and unique by painting and decorating the cases, probably on a designated theme.

3.7.2 Duration

About 20 minutes.

3.7.3 Objective

- To paint and decorate the cases of VR goggles.
- To present the ideas of decoration.
- To comment on other's design
-

3.7.4 Equipment

- Brushes
- Colour pens
- Glues

3.7.5 Materials

- Paints
- Materials for decorations, e.g. stickers

3.7.6 Procedures

1. Paint, decorate and draw on the cases of VR goggles.

2. Put some decorative materials on the cases.

3. By 3-min presentation, elaborate the design to other groups and invite comments.

4. Give comments on other's designs.

5. Vote for the best design.

3.7.7 Result and Discussion:

- Comment on and appreciate others' works.
- Presentation of ideas for decoration.
- Sharing of experience among groups.

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