USER GUIDE

Opt-Sim (Mozilla Science Lab)

Basic Optical Instruments' Experiment

Group 2S

A.Thuvaragan

S.Jathurshan

MD Sabbir Hossain

Dhanesh Kumar

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1. Scope and Purpose of the Project

We are developing a project for optical lenses, mirrors, prism and optical-fibre experiments simulation. It will be like getting image and ray diagram for object's position from lenses (biconvex, biconcave, Plano-Convex, Convex-Concave, Meniscus, Plano-Concave), mirrors (concave, convex, plane), prism and optical-fibre. We made that dynamic like we can drag the object towards or backward from lenses, mirrors, prism and optical-fibre. We used Html5, kineticjs (JavaScript library) and CSS3 to develop this. We are contributing this project for Mozilla Science Lab

2. Process Overview Project

There will be four categories of experiments. Lenses, Mirror, Prism and Optical-fibre. In lens experiment, there are six categories with biconvex, biconcave, Plano-Convex, Convex-Concave, Meniscus, Plano-Concave lenses. In two lenses experiment, there are numerous categories with the pairs like (biconvex, biconvex), (biconcave, biconcave), (biconvex, biconcave), (biconcave, biconvex) and etc. In mirror experiment, there are three categories with convex, concave and plane. In prism experiments, there are two types of experiments. One is for finding angle of deviation. And another is for finding deviation of colours. Optical-fibre experiment is also there. This is for finding the reflection inside the optical-fibre. Lens and mirror are working as five different cases such as object beyond 2F, object between F and 2F, object at 2F, object at F, object within F

3. How you can use

3.1. Introduction the Structure of Interface

This application consist Experimental area, Lenses, Mirror, Prism and Optical-fibre Toolbar, Objects Toolbar and Help button. We can perform simulation in this Experimental Area. In the lenses toolbar types of lenses are shown such as biconvex, biconcave, Plano-Convex, Convex-Concave, Meniscus, Plano-Concave. In the mirror toolbar, types of mirror are shown such as convex, concave, plane. In prism toolbar prism and in the mirror toolbar optical-fibre are shown. In the object toolbar there are three objects, they are Arrow, Triangle and Polygon. To get Help, there is an icon with question mark.

3.2. How to insert Lens and Object to the experimental area

There is horizontal line placed in the experimental area and that is centre axis of lens. We can drag and drop lens, mirror, prism and optical-fibre from lens, mirror, prism and optical-fibre toolbar. We can have maximum of two lenses in experimental area. You can add them by drag and drop wherever you want and which order you want. You can replace these lenses by drag and drop the wanted lens over or near to the existing lens. After you added lens the 'F' and '2F' will be added in both side of the lens. If you add second lens, F and 2F of each lens's colour will be different. So, you can easily identify F, 2F for corresponding lens. In objects tool bar three objects are placed. You can select one of these objects by clicking the corresponding icon to get the object in experimental area. You can add only one object at a time. If you click on the other object, the existing object will be replaced by new object. Mirrors are also working like lenses. For prism there are one object. You can drag and drop the prism from prism toolbar and click the object. If you move the object the ray diagram will be shown for prism. You can find the angle of deviation and in spectrum you can find the deviation the colour. For optical-fibre you have to do the same and you can see the reflection inside optical-fibre.

3.3. How to adjust the Object

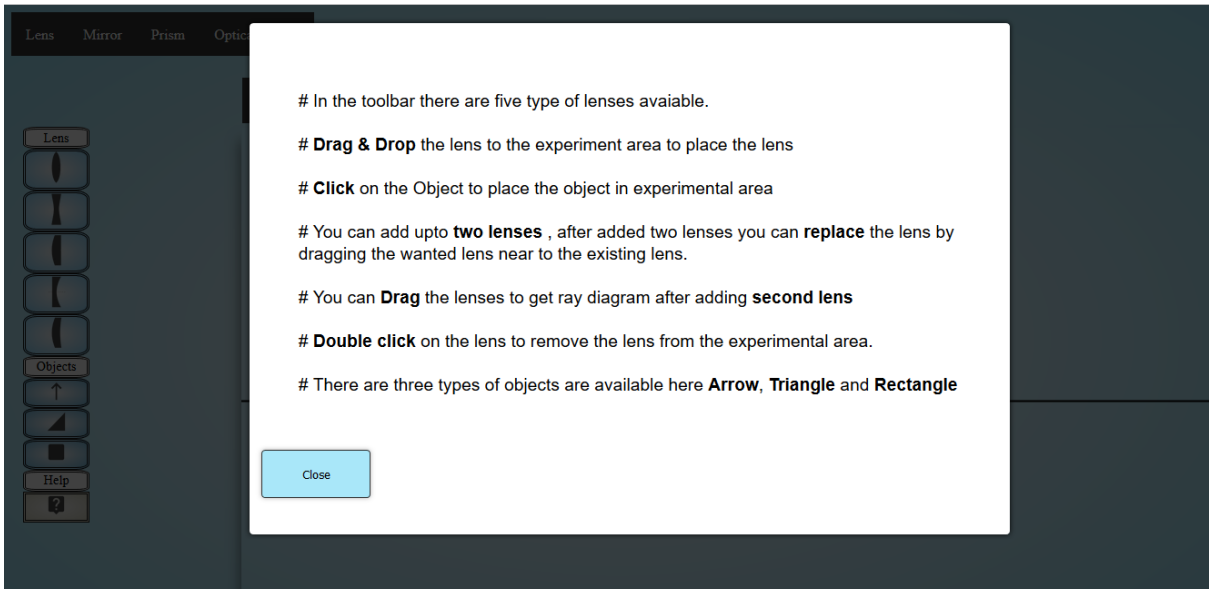
Optics will be placed in centre of the experimental area and they can drag only in horizontal axis. You can drag the optics within the range of between object and end of the experimental area. If there are two lenses, first lens can move between object and second lens's position. Second lens can move between first lens's position and end of the experimental area. So we can change the distance between the lenses. Object can be move between starting of the experimental area and lens's position. So, we can change the distance from the lens. And you can identify the object's position such as beyond 2F, between 2F and F, within F by looking at theF,2F marks. While you drag lens or object you can see the ray diagram and the image generated by lens for corresponding object will appear dynamically. For mirror also the same. You can see the ray diagram and the image generated by mirrors for corresponding object will appear dynamically. For prism you can drag the prism and click the object. The object will move in up sight and down sight. You can see the ray diagram and colours in spectrum. For optical fibre, object will be in same place. You have to click the object and you can see the reflection.

3.4. How to remove Lens, Mirror, Prism and Optical-Fibre

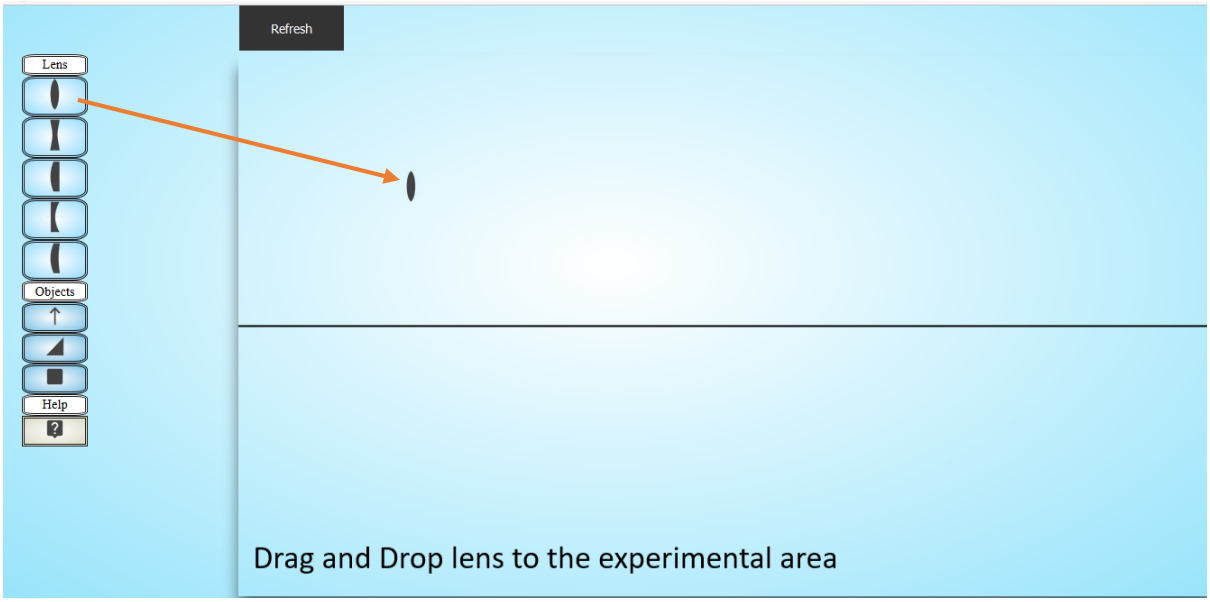
To remove a lens, mirror, prism and optical-fibre from the experimental area just double click on the lens.

4. Screen Shots and explanation

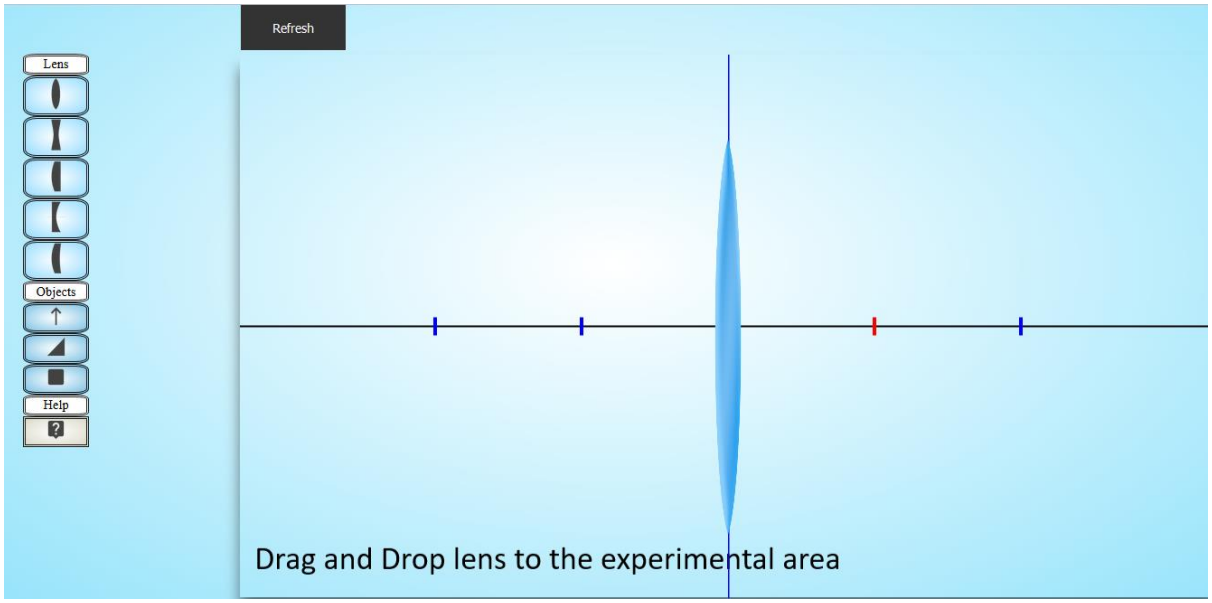
Screen Shot for Lens



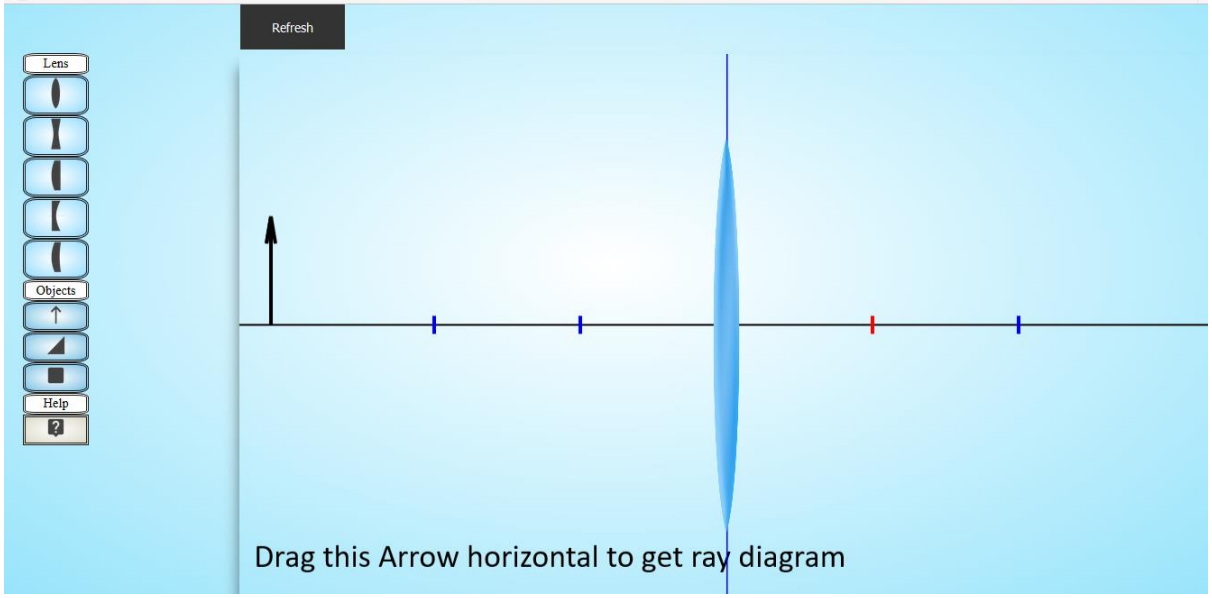
If we load the application, first it will show the instruction for, How to use the simulator.



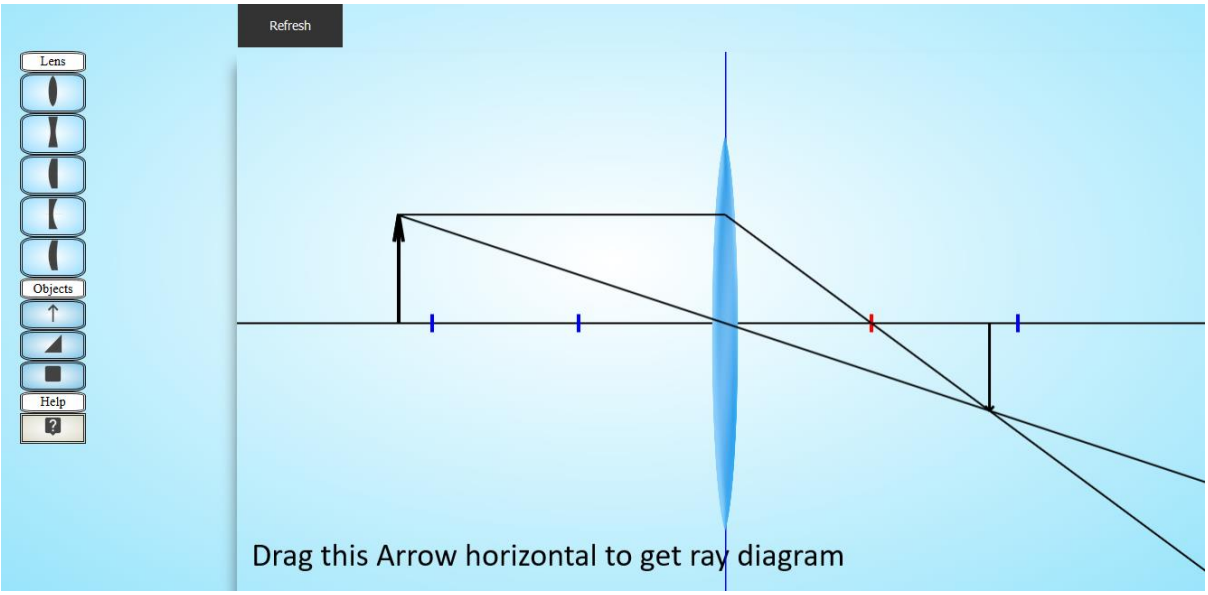
We can drag any of the lens in the group of lens items



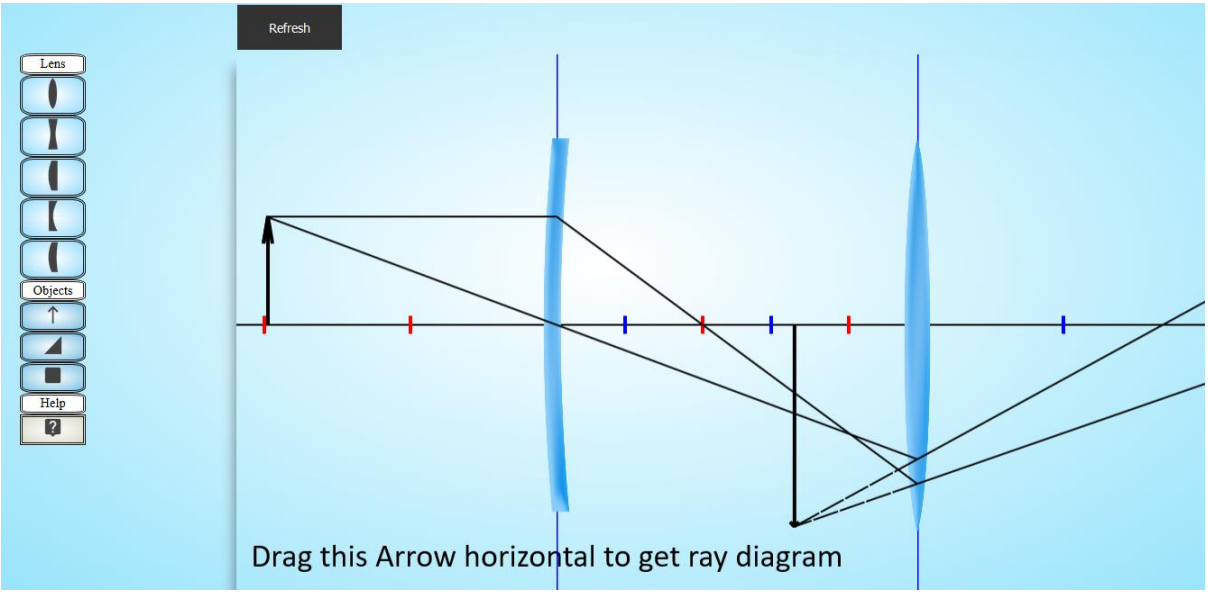
We can drop any of the lens in the experimental area



Click one of the object in object area



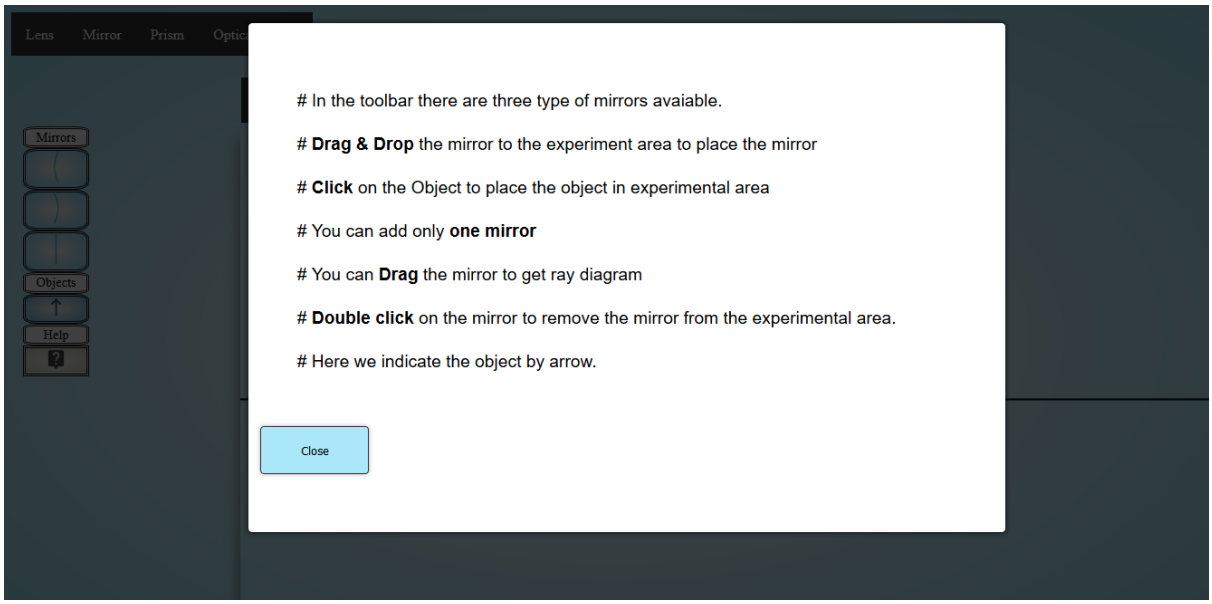
Move the object, and we will get the ray diagram

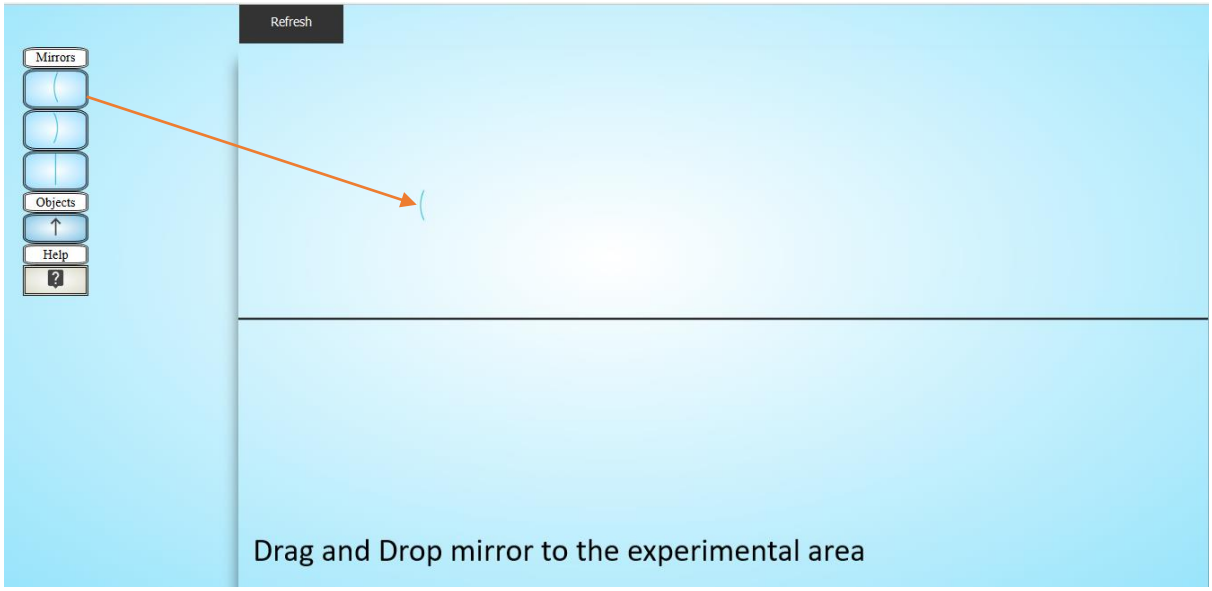


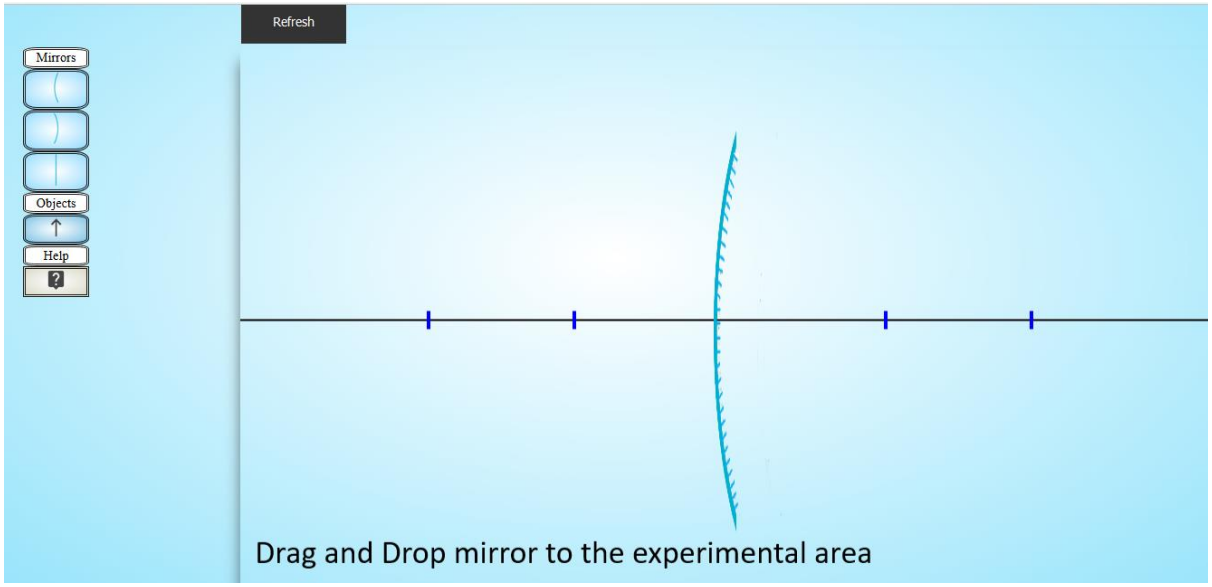
We can add two lens in the experimental area

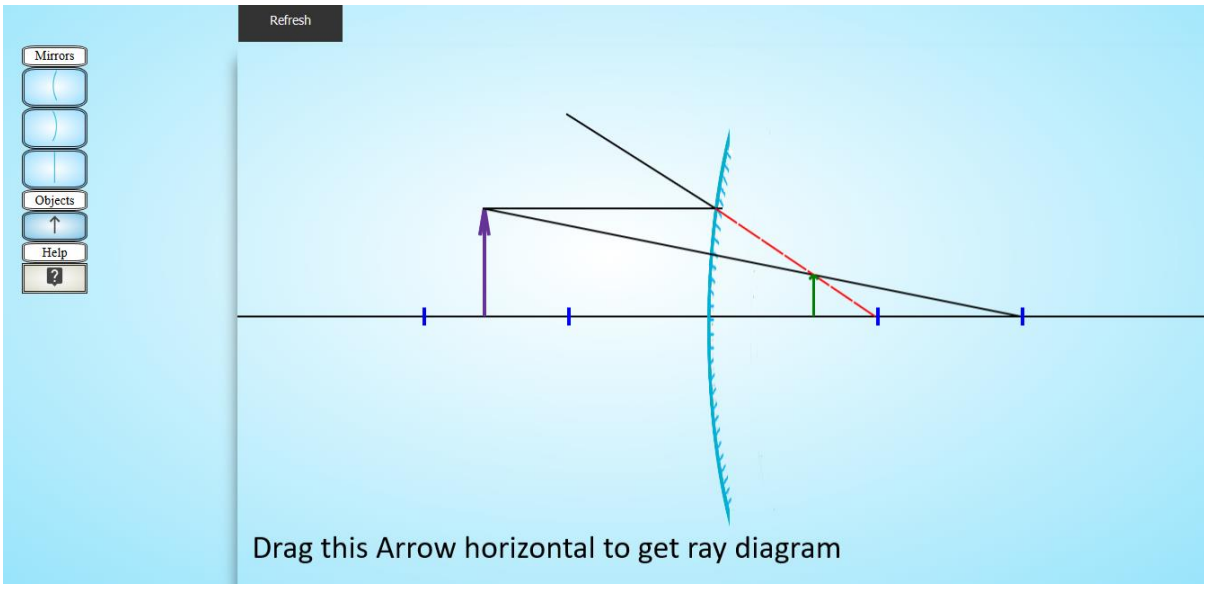
Here the Mirror, Prism and Optical_Fiber instruments also have the same Drag and Drop function that are shown above in the Lens Part. Because of that we have only illustrate the screenshots.

Screen Shot for Mirrors

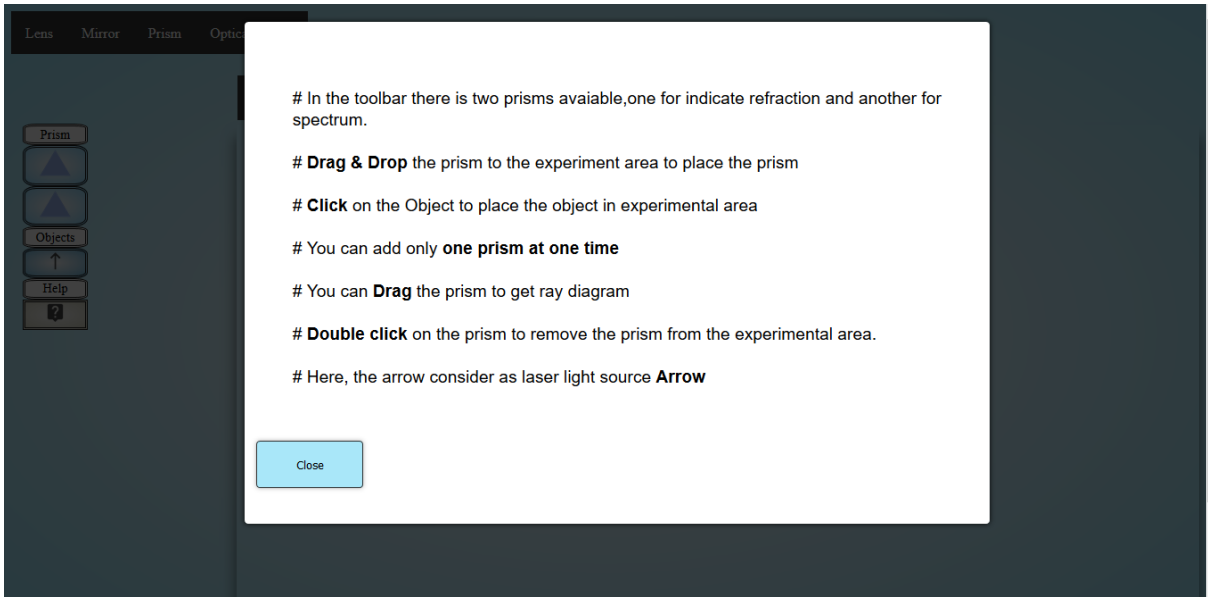


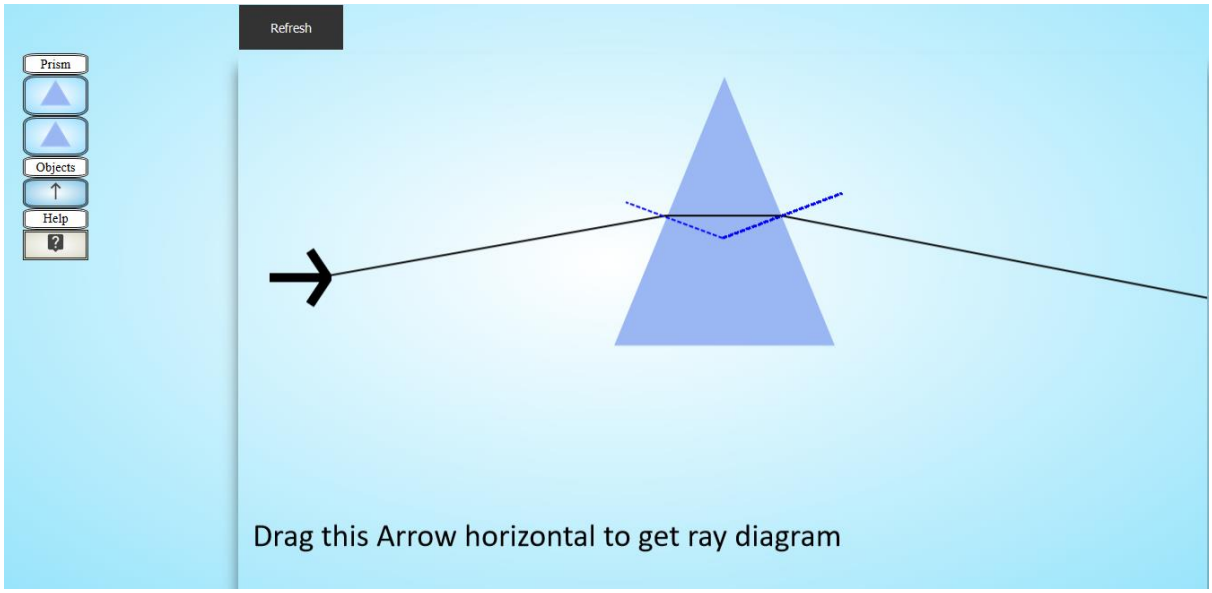


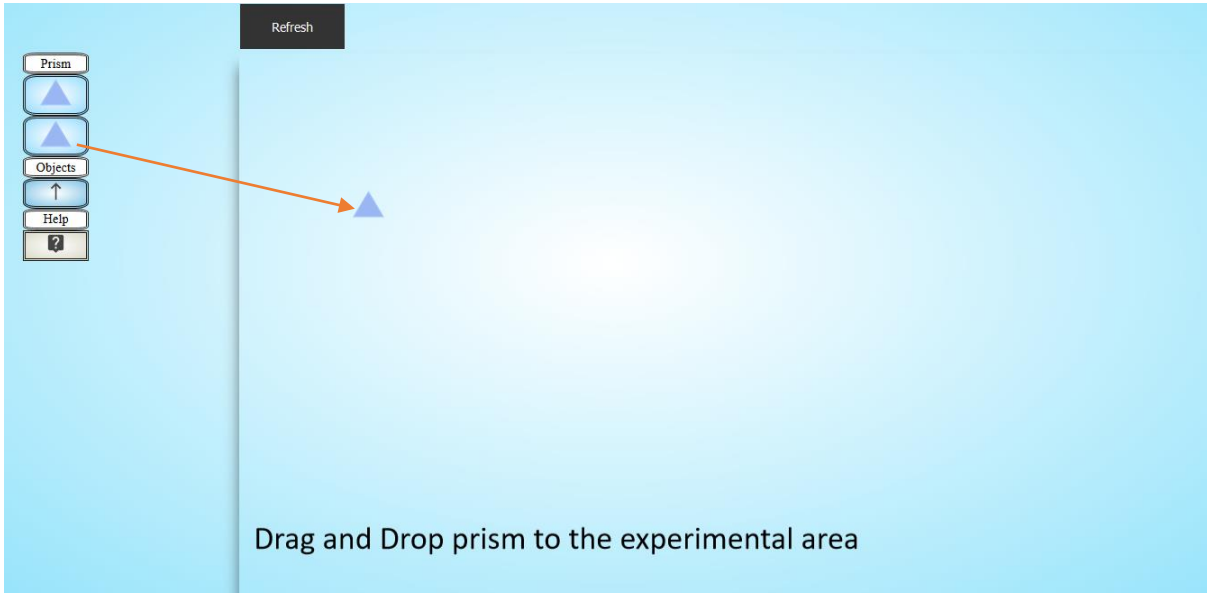

Refresh
Mirrors
Objects
Help
Drag and Drop mirror to the experimental area

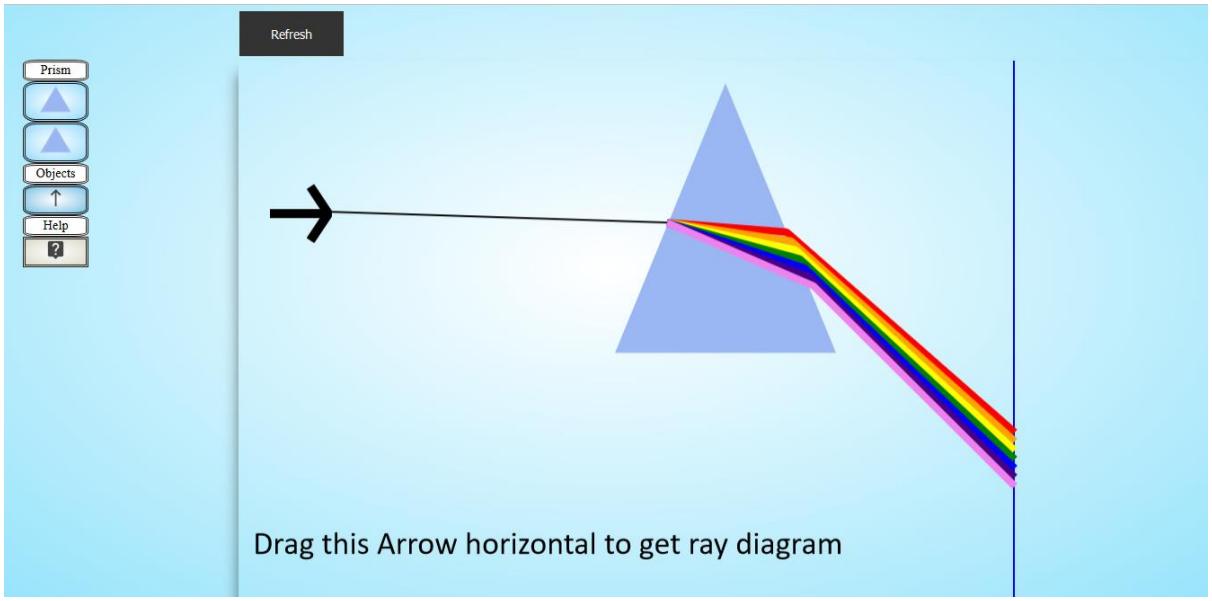

Refresh
Mirrors
Objects
Help
Drag this Arrow horizontal to get ray diagram

Screen Shot for Prism

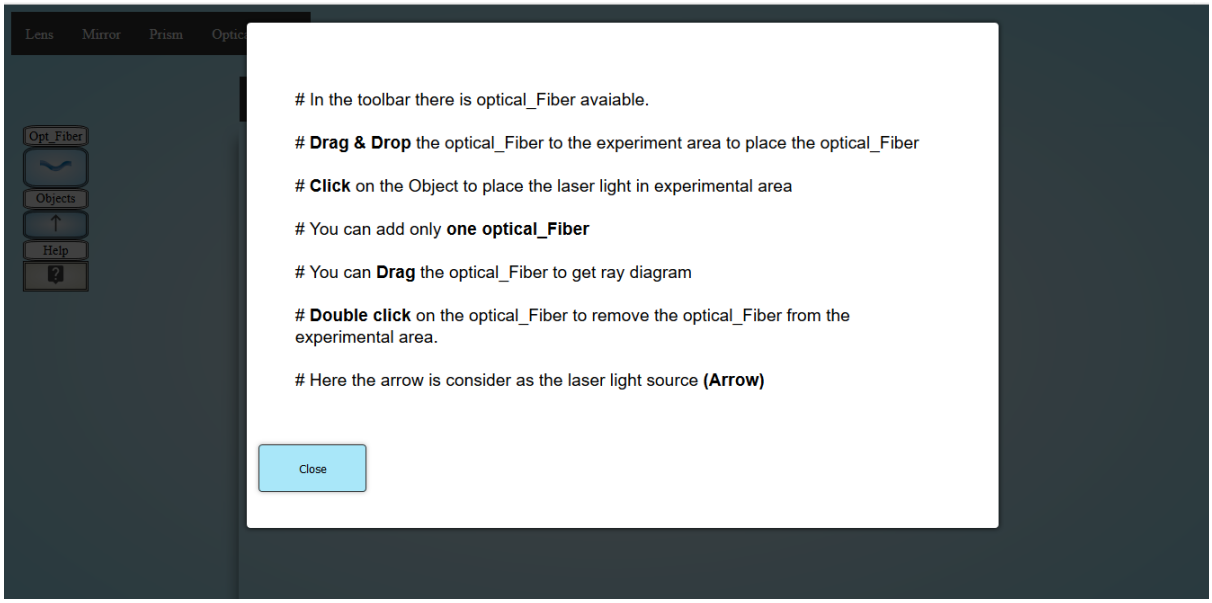


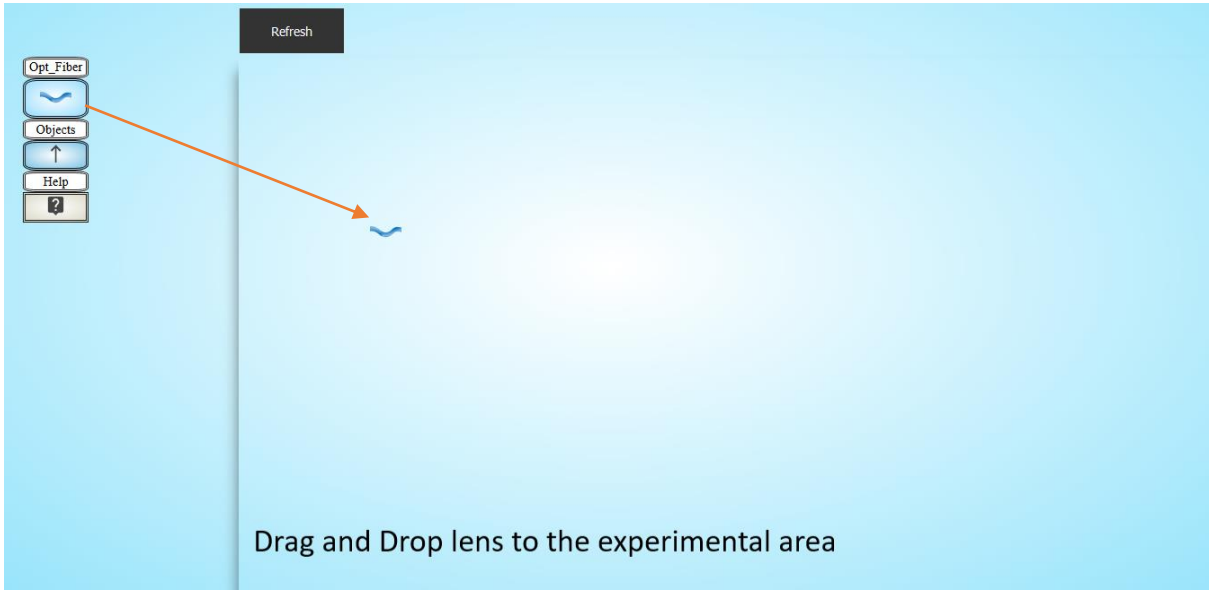

Refresh
Prism
Objects
Help
Drag this Arrow horizontal to get ray diagram

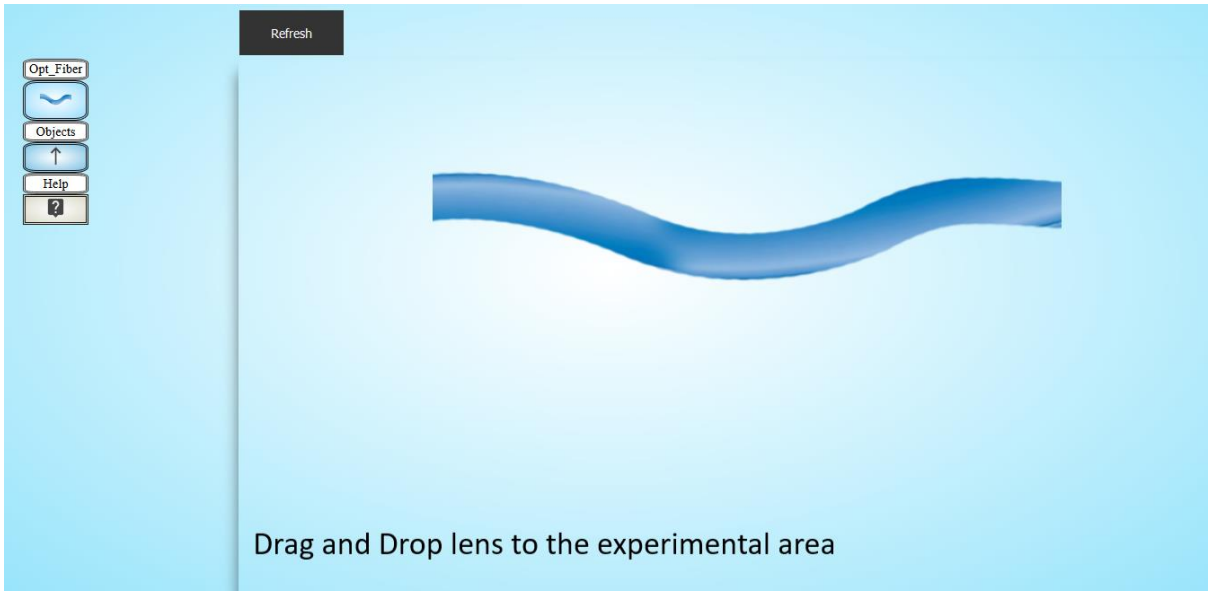

Refresh
Prism
Objects
Help
Drag and Drop prism to the experimental area

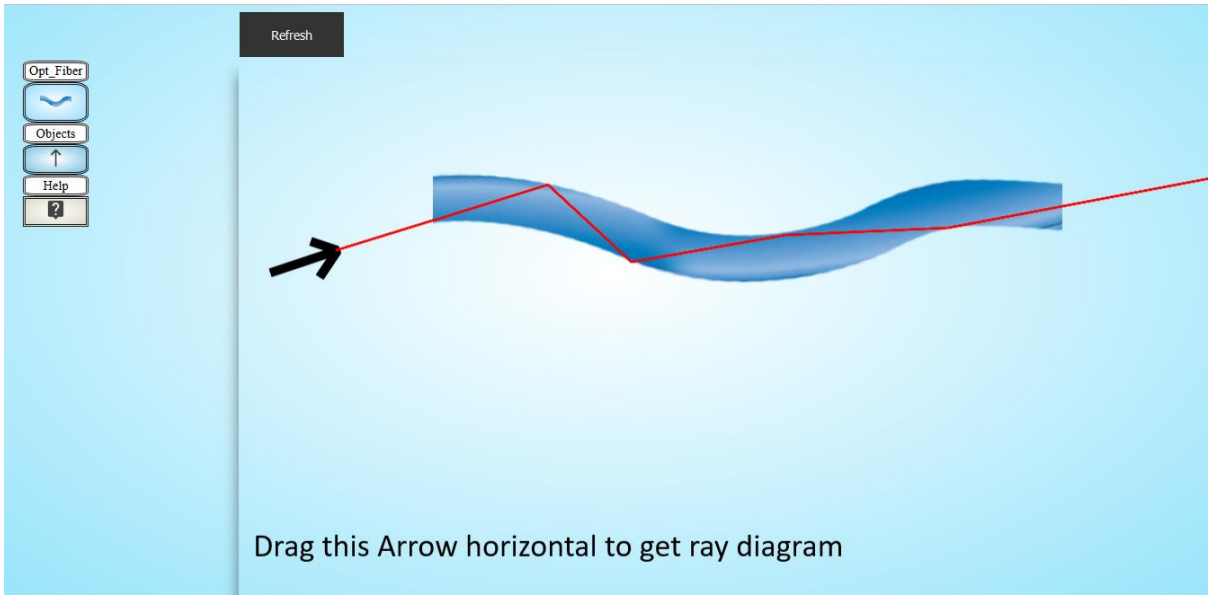

Refresh
Prism
Objects
Help
Drag this Arrow horizontal to get ray diagram

Screen Shot for Optical Fibre






Refresh
Opt_Fiber
Objects
Help
Drag and Drop lens to the experimental area


Refresh
Opt_Fiber
Objects
Help
Drag this Arrow horizontal to get ray diagram