

## **Developing Students' Coding Capability: Simulation package for the Cat to Find the Mouse**

Key Stage: 3

Curriculum: Cross-KLAs

Emphasis: STEM education/Developing student's computational thinking

<b>KLA</b>	<b>Learning Content</b>
Technology Education	<ul style="list-style-type: none"><li>• Program coding</li><li>• Program debugging/testing</li></ul>
Science Education	<ul style="list-style-type: none"><li>• Law of reflection</li></ul>
Mathematics Education	<ul style="list-style-type: none"><li>• Rectangular co-ordinate system</li></ul>

In this activity, a plane mirror is used as an authentic context to develop students' computational thinking, including coding skills, testing, and debugging. Students need to apply their knowledge about light reflection acquired in Science lessons as well as rectangular co-ordinate system in Mathematics lessons so as to complete the task.

Teacher uses Scratch develops package to show how a cat can find a mouse through a plane mirror. Concept of light reflection will be involved to show how image is seen through the plane mirror.

### Activity 1

Students run the Scratch (Cat sees Mouse) program developed by teacher. The plane mirror is dragged to a defined position. Image is formed through the light ray reflected by the plane mirror. Through the path of the light ray as shown, the object (i.e. the mouse) can be seen by the cat (Figure 1 refers). After execution of the program, students are required to read and learn about the program codes. Teacher may lead students to experiment by changing different parts of the codes, including the position of the plane mirror, the inclination angle of the plane mirror so as to have different results. Hence, students experience program testing and debugging while at the same time learn about co-ordinate system as well as consolidate their learning about law of reflection.

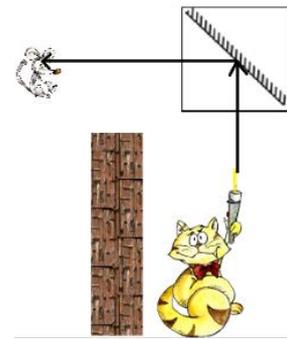


Fig. 1 Light ray shown

### Activity 2

Now, the position of the object (the mouse) is changed. The mouse stays behind the wall and additional plane mirrors are provided. Students are required to modify the Scratch program by selecting appropriate plane mirrors as well as moving the plane mirrors to the appropriate position so as to enable the mouse be seen by the cat again. With the experience from Activity 1, students can make reference to the law of reflection so as to position the plane mirrors at appropriate place by modifying the codes in the program. In this activity, students also need to apply knowledge of the rectangular co-ordinate system so as to move the plane mirrors to the positions correctly.

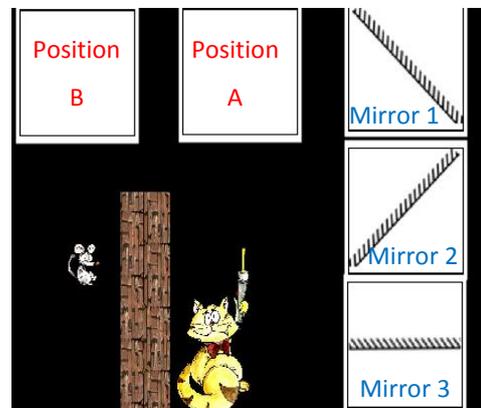


Fig.2 Light reflection with two mirrors