



## ***Stereo Microscope Lesson***

School year:	2006/2007
Developed for:	Lord Selkirk Annex Elementary School, Vancouver School District
Developed by:	Elaine Humphrey (Scientist), Gwynne Thompson (teacher)
Grade level:	Presented to grade 2; appropriate for grades 1-7 with age appropriate modifications
Duration of lesson:	1.5 hours for the class; follow-up for short periods of time over several days
Notes:	Teaching the students how to use a microscope can be done in very small groups. Real learning only occurs when the student gets hands on. Confidence only comes with experience.

### **Objectives**

1. .Learn how to use a stereo microscope properly and look after it responsibly.
2. Students will learn how to switch on the microscope, focus the specimen, magnify the specimen, and how to leave the microscope.

### **Background Information**

Microscopes are an exciting instrument that all students in the classroom can learn how to use effectively. The teacher needs to be confident that the student can be left alone on the microscope and the student needs to be comfortable using the microscope alone.

### **Vocabulary**

<u>stage</u>	Where the specimen is put.
<u>illumination</u>	The lighting system: three systems: above light, underneath light, both above and underneath together.
<u>magnification</u>	Make an object appear larger than it really is.
<u>focus</u>	An adjustment to make the object appear at its sharpest.
<u>eyepieces</u>	Where you look through. These need to be adjusted for your eyes
<u>power cable</u>	Electric cable for the light system

### **Materials**

- Zeiss Stereo microscope
- Petri dishes or flat dishes for specimens
- Specimens: insects make good specimens, flowers, sand, leaves
- toothpicks or spatula to manipulate specimen
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### **Introductory Discussion**

- Microscopes are delicate instruments and the Zeiss Stereo microscopes are particularly expensive and excellent microscopes. Students should never be allowed free access to the microscope unless they have been taught to use it properly and the teacher is comfortable they will not abuse it. Students respond well to the responsibility. Students who have shown they can



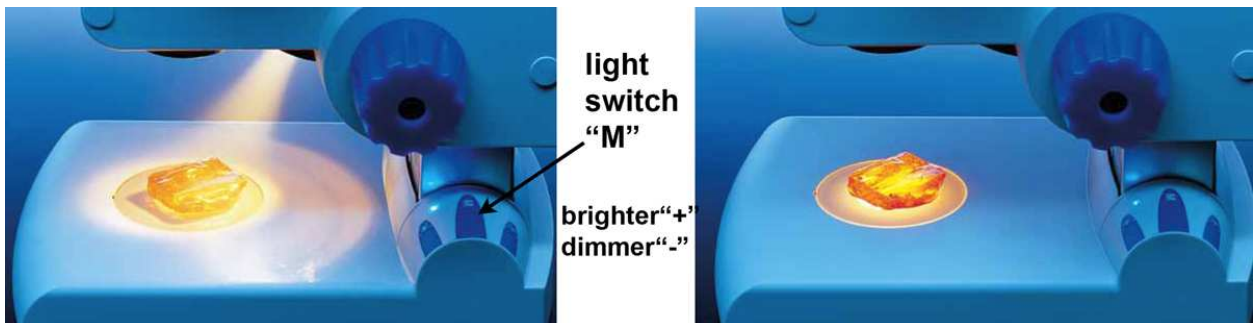
use the microscope are awarded the “microscope license” This award means they can use it effectively and independently.

### Science Activity

Teaching the students, especially grade 2s, to use the microscopes, can be done in very small groups to ensure they understand the instructions. Testing for the microscope license should be accomplished one-on-one.

#### Method:

- To teach the students to use the microscope, a suitable specimen should be found which does not move. It can be anything the students are particularly interested in. Flowers or dead insects make good specimens, or anything that will fit on the stage conveniently. Later when the students are confident, they can use moving specimens such as live insects. The moving specimens need to be in a container which stops them moving out of the field of view.
- The light switch is on the base on the right hand side at the back. It is labeled with an “M.” Press it once for the overhead light (good for most objects), once more to get the underneath light (good for transparent objects), and once more for both the overhead and the underneath light. Press it once more to switch off the light. To the front and back next to the “M” is a + and a – label. These two adjust the light brighter (+) or dimmer (-). Press the “M” once more to see the overhead light.



- The next adjustment to make is to the eyepieces. These move in and out to fit the distance between the student’s own eyes. It is important that the students are able to look with both eyes comfortably through the eyepieces. That way they get the 3D effect of the specimen and it cuts down on eyestrain.
- Make sure the magnification knob is at its smallest number, i.e. the lowest magnification.
- Use the focus knob to focus the specimen while looking through the eyepieces.
- Ask a question about the specimen the student is looking at. For example, if the specimen is a bumble bee ask if the body is smooth or hairy. Are the wings smooth or hairy? This allows the student to gain confidence they can use the microscope to answer a question.
- Ask the student to magnify the specimen and ask another question about what they can see. When they magnify the specimen, they will have to refocus. Look to see if the stinger is visible, or the shape of the eyes and if the eyes are hairy. See if they can see the hooks on the hind wings. The hind wings hook into the front wings so they flap together.
- When the student leaves the microscope, they should remove their specimen and make sure the stage is left clean. The lights should be switched off.

Microscope Activity:



## SCIENTIST IN RESIDENCE PROGRAM

1. Print the picture below of the microscope.
2. Cut off the labels from the right hand side and cut them into individual labels.
3. Ask the students to put them into the right places.
4. Glue them down or ask the students to write in the labels on their own copy.

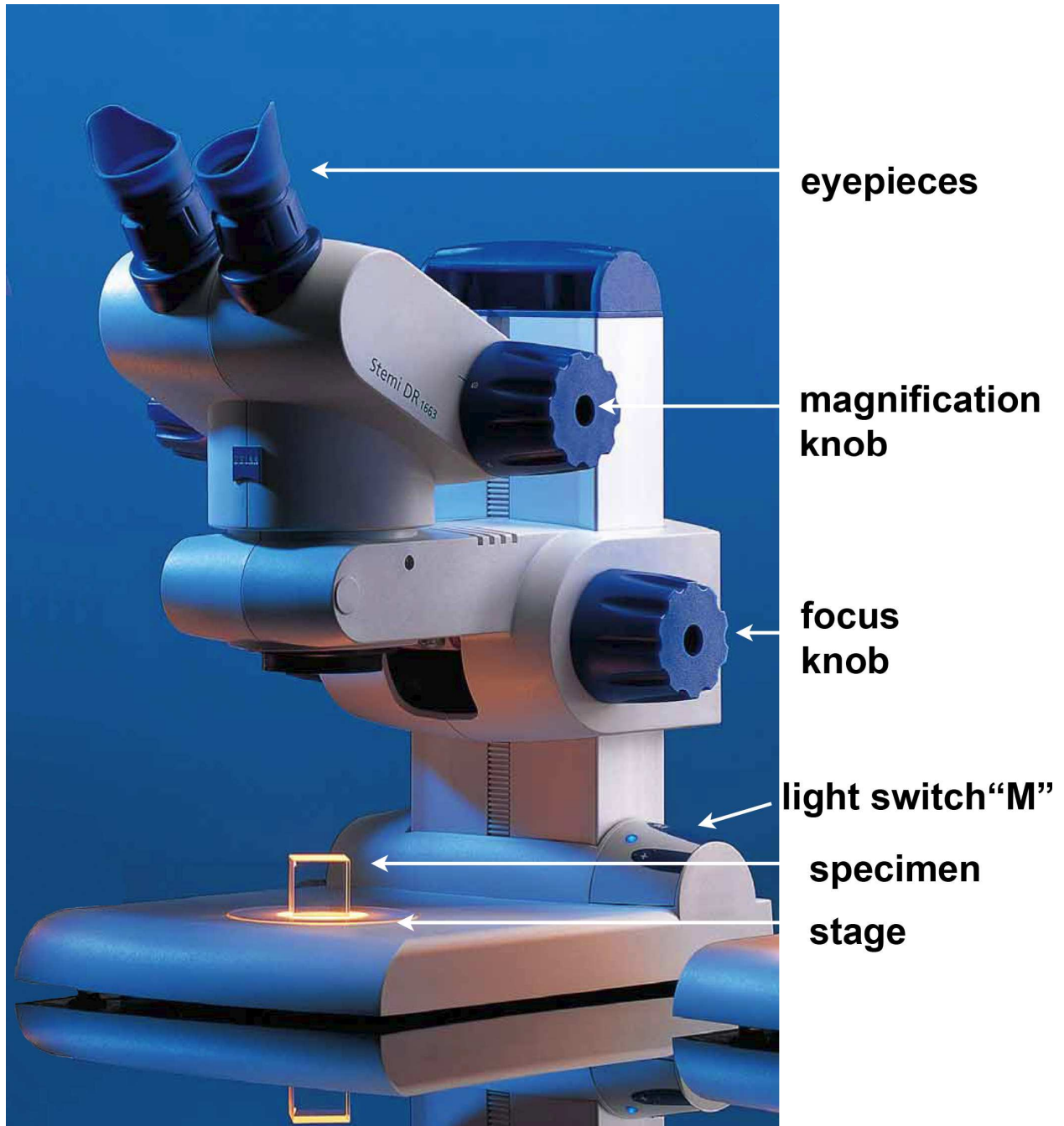
Microscope License:

Each student should be tested one-on-one orally.

Questions/requests to ask:

1. Where are the eyepieces?
2. How do you adjust their spacing for your eyes?
3. Where is the stage where the specimen goes?
4. Where do you switch the light on?
5. Switch on the overhead light
6. Switch on the underneath light
7. Switch on both lights
8. How do you switch off the lights?
9. How do adjust the lights brighter or dimmer?
10. Put the light back on and show me how you set the magnification to the lowest level.
11. Focus the specimen.
12. Show me how you magnify the specimen and focus the image.
13. How do you leave the microscope?

The last page of this lesson contains blank microscope licenses. Print copies of this page, fill out the information on the licenses, laminate, cut out licenses, and give a license to each student.





### Microscope License

Class: \_\_\_\_\_

Date Issued: \_\_\_\_\_

This license certifies that

\_\_\_\_\_ can name the parts of the microscope and use it effectively.

Authorized by: \_\_\_\_\_

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