SASTA OLIPHANT SCIENCE AWARDS

SOUTH AUSTRALIAN SCIENCE TEACHERS ASSOCIATION

Highly Commended

Models & Inventions

Year 3-4

Jack Williams

Immanuel Primary School

Highly Commended

Jack Williams

Magic of the Microscope

MODEL REPORT

0259 - 019

Student(s):
Jack Williams

Immanuel Primary School
Coordinator: Gawain Duncan
School Phone: 08 8294 8422

Gender: M

Patent Sought N

App code: 2144787

Year Level: 3 - 4 ***Group Entry:*** N ***Students:*** 1
Category: Models & Inventions
Project Title:
The magic of the microscope

Magic of the Microscope

Jack Williams

Report

I made a microscope using lego pieces. I wanted to learn how a microscope works, and discovered that the scientific principle demonstrated is called magnification.

The microscope I made is a simple microscope. It is made up of an objective lens, an ocular lens, a lens tube, stage and a reflector. The object placed on the stage is magnified through the objective lens. When focused, a magnified image can be seen through the ocular lens. The microscope is designed to emit light through objects and magnify the transmitted or reflected light with the objective and ocular lenses.

I researched into the key parts of a simple microscope using some books and internet pages. I also watched some videos on youtube of other people who have made microscopes, but most of these were digital and used an old camera which is not what I wanted to make.

I designed the frame of the microscope using lego, which included the tube, the stage, base and battery storage. I had an adult help by drilling a hole to make way for the ocular lens, as well as a small hole for the light switch. I had an adult use the soldering iron to make a simple circuit for the light switch and illuminator, which I learnt about in my model last year.

There are two levels of the stage, but I learnt that the distance between ocular lens and objective lens works best at 160mm, and the distance from objective to the specimen is most focussed at 45mm. The top white stage level works best for focussing.

The objective lens can be moved very gently to adjust the focus if needed. There is a black line around the old photo film canister I used which shows where to line up with the base of the tube.

I had problems figuring out how to attach the objective lens to the tube, in a way that could be moved if needed to focus the image. I had help cutting an old film canister to use at it has a correct size to fit tightly into my tube. I had an adult help me find a simple objective lens and buy it for my model.

I made some slides to be used with my model to show how it can magnify things. I had trouble attaching the cover to these slides so had adult help doing this without putting finger prints all over the slides. I also had adult help use some superglue on some of these slides to keep the cover in place for transport.

I have used a small box to keep my microscope safe but hope that it is strong enough to not break when being transported. I had adult help making my video and uploading to youtube as well as attaching the QR code. I didn't want my face or voice to be in the video. An adult helped me with this report and the spelling and printing.

To operate:

1. Choose a slide from the microscope slides box
2. Turn on the light and place the slide on the stage, with the subject directly under the objective lens.
3. Look through the eyepiece
4. If needed, very gently move the objective up or down to clearly focus. Be careful not to put fingerprints on the lens part and be careful not to pull it too far out of the tube.
5. Look at the different images.
6. Turn light off and put the slide back into the slide box.

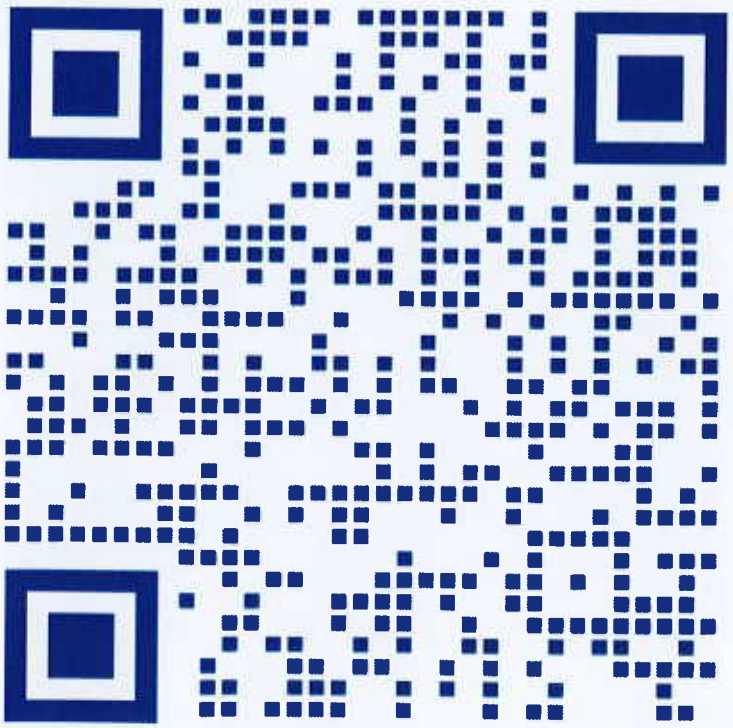
References

National geographic, 'how a microscope works', https://www.nationalgeographic.org/encyclopedia/microscopes/

Youtube video 'microscope and its working – Science'

Science Direct 'Light microscopes – an overview ' https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/light-microscopes

The Usborne Complete book of the microscope



OSA RISK ASSESSMENT FORM

for all entries in (✓) ☐ Models & Inventions and ☐ Scientific Inquiry

This must be included with your report, log book or entry. One form per entry.

NAME: Jack Williams ID: _____

SCHOOL: Immanuel Primary School

Activity: Give a brief outline of what you are planning to do.

I am going to make a lego microscope and learn about the parts that make it work.

Are there possible risks? Consider the following:

- Chemical risks: Are you using chemicals? If so, check with your teacher that any chemicals to be used are on the approved list for schools. Check the safety requirements for their use, such as eye protection and eyewash facilities, availability of running water, use of gloves, a well-ventilated area or fume cupboard.
- Thermal risks: Are you heating things? Could you be burnt?
- Biological risks: Are you working with micro-organisms such as mould and bacteria?
- Sharps risks: Are you cutting things, and is there a risk of injury from sharp objects?
- Electrical risks: Are you using mains (240 volt) electricity? How will you make sure that this is safe? Could you use a battery instead?
- Radiation risks: Does your entry use potentially harmful radiation such as UV or lasers?
- Other hazards.

Also, if you are using other people as subjects in an investigation you must get them to sign a note consenting to be part of your experiment.

Risks	How I will control/manage the risk
- glass - hot glue gun - soldering iron	hold carefully on the edges, don't walk around with it. Keep slides in the box. Use with an adult watching me. Don't touch the hot end. Unplug when finished An adult will use the soldering iron for me.

(Attach another sheet if needed.)

Risk Assessment indicates that this activity can be safely carried out

RISK ASSESSMENT COMPLETED BY (student name(s)): Jack Williams

SIGNATURE(S): Jack Williams

☐ By ticking this box, I/we state that my/our project adheres to the listed criteria for this Category.

TEACHER'S NAME: [illegible]

SIGNATURE: _____ DATE: 2018/21