

# HIGH SCHOOL SCIENCE PROGRAM

## 2011-2012

Welcome to the Science Education Program for High Schools at Redeemer University College. We offer exciting, affordable, and interactive workshops for students in grades 9-12. In these workshops young people are encouraged, through hands-on activities, to explore the wonders of God's creation.

### Location

- Redeemer University College ([www.redeemer.ca](http://www.redeemer.ca)) is a Christian liberal arts and science university located in Ancaster, Ontario. It is a 15 minute drive from downtown Hamilton and 100 km from both Niagara Falls and Toronto.
- The campus is situated on 90 acres of land, with a Natural Regeneration Site and a Teaching Garden a short walking distance from the academic building.
- The main building is a modern facility with fully equipped laboratories to enhance the learning experience.

### Cost

- The charge per workshop is \$2.00 per student.
- There is no charge for teachers or adult chaperones.
- Additional fees apply to specialized topics (see workshop topics)

### Cancellations

- To cancel a workshop please email Jennifer Chiang at the address below.
- Cancellations must be received two weeks prior to the scheduled visit to avoid the cancellation fee.

### Workshop information

- All workshops are taught by qualified staff assisted by upper level university biology students
- Each workshop requires a minimum class size of 10, and a maximum of 25
- Availability of workshop dates and times are subject to change.
- Outdoor workshops are held weather permitting.
- Each workshop is approximately 90 minutes in length

### For more information or to reserve a workshop contact:

- Jennifer Chiang
- Telephone: (905) 648 2139 ext. 4245
- E mail: [jchiang@redeemer.ca](mailto:jchiang@redeemer.ca)

Or Write:  
Redeemer University College  
Attn: J. A. Chiang  
777 Garner Road East,  
Ancaster, ON., L9K 1J4

**Please Note:** While we endeavour to provide the workshops and workshop dates as outlined below it is important to note that they may be subject to change.

## Fall Session - 2011

\* All fall workshops are held on Thursday mornings from 9:30 a.m. - 11:00 a.m.

### Working in the Lab (Available: September 22)

This unit provides an opportunity for students to learn and practise valuable laboratory techniques. Instruction may include some or all of the following: how to make simple solutions and dilutions, the use of pipettes, Erlenmeyer flasks, graduated cylinders, balances, pH meters and more.

### Microscopy (Available: October 6)

In this exercise students will gain valuable hands-on experience in the field of light microscopy using both the dissecting microscope and the compound microscope. Students will begin this study by learning about the parts and function of each type of microscope. Students will then be encouraged to prepare temporary slides, to view prepared slides, to observe the details of a variety of specimens and to measure specimen size

### Diffusion and Osmosis (Available: October 20)

In this workshop the structure and function of the human kidney will be discussed. Students will conduct experiments to determine the permeability of dialysis tubing exposed to isotonic, hypotonic and hypertonic conditions.

### The Amazing Race (FRIDAY, NOVEMBER 11, 2011 9:00 a.m. – 3:30 p.m.)

An extraordinary opportunity for your Grade 11 & 12 Science students to experience hands-on, what studying the sciences at a Christian university is like! During this AMAZING day, your students can expect to:

- Race around the campus and have fun, while they...

- Acquaint themselves with our facilities and Christian university environment;

- Collaborate and interact with distinguished Sciences Division faculty and students and...

- Experience what studying the Sciences at Redeemer is like by solving clues along the way!

CLUES, TASKS, and PIT STOPS will include elements from:

BIOLOGY | CHEMISTRY | COMPUTER SCIENCE | MATHEMATICS | PHYSICS

For more information go to [www.redeemer.ca/amazingsciencrace](http://www.redeemer.ca/amazingsciencrace) Register early- space is limited!

### Enzymes (Available: November 24)

How do we digest the different types of food we eat? By simulating chemical reactions that occur in the stomach, students will learn about enzymes that facilitate the digestion of proteins, lipids, and starch. Students will also learn about factors (such as pH, temperature and concentration) that affect the rate of enzyme activity.

## **Spring Session - 2012**

\* All spring workshops are held on Thursday mornings from 9:30 a.m. - 11:00 a.m.

### **The Physiology of Circulation (Available: January 12 )**

In this unit students dissect and examine the structure of a mammalian heart. Students are taught how to measure human heart rates before and after exercise and how to determine blood pressure. Comparisons are made between the circulatory systems of mammals, fish, and insects.

### **DNA (Available: January 26 )**

In this exercise we will look at the complexity and intricacy of DNA. Using their own DNA, as well as DNA extractions from fruit, students will have the opportunity to examine, investigate, and compare DNA, as well as learn more about the function and form of DNA strands.

### **Cell Division (Available: February 9)**

This workshop focuses on the phases, functions, and products of mitosis. Using a mitosis simulation technique, students will learn about chromosome movement and function, as well as engage in a visual interpretation of the mitotic phases. Students will also be able to observe mitosis in both plant and animal cells, providing opportunity for comparison

### **Genetics (Available: February 23)**

Meiosis, genotypes, phenotypes, chromosomes, DNA, genes and genetics. In this exercise we will look at these and other terms and the different ways that traits can be passed from parents to offspring.

### **Earthworm Dissection (Available: March 8)**

In this unit students will explore the body parts of a worm and learn about the circulatory, excretory and reproductive biology of this unique creature.

### **Crayfish Dissection (Available: March 22) (Limited availability + additional cost)**

In this dissection lab, students will observe many internal and external features of the crayfish. They will learn about the body parts, and how the size and shape of each part allows for the crayfish to survive in its environment.

### **Frog Dissection (Available: May 3) (Limited availability + additional cost)**

In this lab students will dissect a preserved frog. They will gain valuable experience in dissection techniques as they learn about the complexity of a familiar organism.

### **Insect Development (Available: May 17)**

Students will have the unique experience of observing the blood sucking insect *Rhodnius prolixus* under the dissecting microscope. Arthropod classification, life history, structure, and function will be examined.

### **Survey of the Plant Kingdom (Available: May 31)**

In this unit, students will learn the proper terminology for many vascular plants. They will learn how to use classification guides in the laboratory, and then apply this knowledge by participating in some field work. Using a guide for reference, students will be able to classify trees native to the area by observing the leaves. Students will also examine more closely, different types of plants

and their parts; leaves, stem, roots.