**Activity: Recording Baseline Frog Heart Activity**

Record the heart rate as Beats per Minute for this and all the experiments on the table below:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Heart rate (bpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>“normal”</td>
<td></td>
</tr>
<tr>
<td>cold (5ºC)</td>
<td></td>
</tr>
<tr>
<td>warm (32ºC)</td>
<td></td>
</tr>
<tr>
<td>Pilocarpine</td>
<td></td>
</tr>
<tr>
<td>Atropine</td>
<td></td>
</tr>
<tr>
<td>Epinephrine</td>
<td></td>
</tr>
<tr>
<td>Digitalis</td>
<td></td>
</tr>
<tr>
<td>Calcium ions</td>
<td></td>
</tr>
<tr>
<td>Sodium ions</td>
<td></td>
</tr>
<tr>
<td>Potassium ions</td>
<td></td>
</tr>
</tbody>
</table>

**Activity: Investigating the Refractory Period of Cardiac Muscle**

During which portion of the cardiac cycle was it possible to induce an extrasystole?

Describe the result of your attempt to induce tetanus:

Why is it important that the heart muscle cannot be tetanized?

**Activity: Examining the Effect of Vagus Nerve Stimulation**

What is the effect of vagal stimulation on heart rate?
Activity: Assessing the Effect of Temperature

What change occurred with the cold (5°C) Ringer’s solution?

What change occurred with the warm (32°C) Ringer’s solution?

What can you conclude about temperature and heart rate?

Activity: Assessing the Effect of Pilocarpine

What happened with the pilocarpine?

Activity: Assessing the Effects of Atropine

What was the effect of atropine on the heart?

Do your results accurately reflect the true effect of atropine?

Are pilocarpine and atropine agonists or antagonists in their effects on heart activity?

Activity: Assessing the Effect of Epinephrine

What happened when the heart was bathed in the epinephrine solution?

Which division of the autonomic nervous system does its effect imitate?

Activity: Assessing the Effect of Digitalis

What is the effect of digitalis on the frog heart?
Activity: Assessing the Effects of Various Ions

Effect of Calcium ions:
Does the heart rate stabilize and remain stable?

Describe your observations of force and rhythm of the heartbeat:

Effect of Sodium ions:
Does the heart rate stabilize and remain stable?

Describe your observations of force and rhythm of the heartbeat:

Effect of Potassium Ions:
Does the heart rate stabilize and remain stable?

Describe your observations of force and rhythm of the heartbeat:

Was there any evidence of premature beats in the recording of potassium ion effects, explain?

Printing your Data: When you have finished, print your data for at least one activity and attach it to this report.