Name: ______________________________

(This booklet should be in class each day)
Electricity Play

Using the kits I assembled for you, complete these simple tasks. Draw a picture for each. Make a list of the materials used at the top. At the end, write a few reflections about what you learned in this process.

Materials Used:

__________________  __________________  _____________
__________________  __________________  _____________
__________________  __________________  _____________

Tasks

<table>
<thead>
<tr>
<th>a) Light a single bulb.</th>
<th>b) Spin a propeller.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>c) Operate a device using a switch.</th>
<th>d) Power a buzzer.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>e) Light 2 bulbs at once. Try it 2 ways.</th>
<th>f) Control two devices using a switch.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Reflections:

_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________

created by areynolds.org
The Shocking Background to Electricity.

1. Describe Luigi Galvani’s observations of electricity in 1786.

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

2. Ten years after Galvani’s discovery of electricity, another Italian, Alessandro Volta, made another important discovery. Describe his electrical experiment.

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

3. Imagine life 200 years ago, without electrical devices. Which of these would you miss the most?

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

4. Describe what a day in your life would be like, if you had no electricity.

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

created by areynolds.org
Where Does Electricity Come From

1. What do the words, renewable and non-renewable, mean when speaking of energy? Give 3 examples of each or these sources of energy.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

2. In the chart below, list some of the positive and negative characteristics of each energy resource.

<table>
<thead>
<tr>
<th>Source</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydro-electricity</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Solar Energy</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Wind Energy</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Nuclear Energy</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Coal Energy</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

created by areynolds.org
# Light Up the Class

Use the following materials to solve the 4 electrical problems:

1. Light bulbs and light bulb holders,
2. Wires with alligator clips
3. 6V battery (or battery pack)
4. Switch

When you think you have solved the problem, draw your solution below.

<table>
<thead>
<tr>
<th>Electro Problem #1</th>
<th>Electro Problem #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>How can you make the light bulb go on?</td>
<td>Can you make the light bulb go on and off using the switch?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electro Problem #3</th>
<th>Electro Problem #4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can you have two light bulbs on at the same time?</td>
<td>Can you make 2 lights go on, but when you unplug one of the lights, the other light stays on?</td>
</tr>
</tbody>
</table>
Key Features of Electrical Circuits

1. What is the difference between a conductor of electricity and an insulator? What is the common term for the conductor?

___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

2. Draw the symbols for:

Wire  Light Bulb  Battery

Open Switch  Closed Switch

3. Draw the following circuits using the correct symbols:

One battery and two light bulbs with a switch that can turn off both lights at the same time.  One battery and two light bulbs with two switches so that one light can be off and one light can be on.
Different Needs, Different Circuits

1. Follow the procedure on pages 20-21 to make a series circuit with 2 light bulbs. Using the correct symbols, draw a diagram of the circuit.

2. What happens when you unhook one of the light bulbs?

3. Follow the procedure on pages 21-22 to make a parallel circuit with 2 light bulbs. Using the correct symbols, draw a diagram of the circuit.

4. What happens when you unhook one of the light bulbs?
Fixing Electrical Problems

Read the troubleshooting guide on page 23 to determine the problems with each of the 6 circuits illustrated on page 24. State the problem with each, and write a solution.

Problem 1
___________________________________
___________________________________
___________________________________

Solution:
___________________________________
___________________________________
___________________________________

Problem 2
___________________________________
___________________________________
___________________________________

Solution:
___________________________________
___________________________________
___________________________________

Problem 3
___________________________________
___________________________________
___________________________________

Solution:
___________________________________
___________________________________
___________________________________

Problem 4
___________________________________
___________________________________
___________________________________

Solution:
___________________________________
___________________________________
___________________________________

Problem 5
___________________________________
___________________________________
___________________________________

Solution:
___________________________________
___________________________________
___________________________________

Problem 6
___________________________________
___________________________________
___________________________________

Solution:
___________________________________
___________________________________
___________________________________

created by areynolds.org
A Special Kind of Electricity – Static Electricity

1. What is the definition of static electricity?

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

2. Determine which of the eight statements given below are characteristics of static electricity, and which are characteristics of current electricity:

   • You rub your feet on the carpet, touch something made of metal and get a shock.  
     __________________________

   • You forget to use fabric softener when you wash your clothes, and they stick together when you take them out of the dryer. ____________________

   • You turn on the television. __________________________

   • On a cold evening, your jacket crackles when you take it off. __________________________

   • A flashlight is turned on. ______________________________

   • Dust gathers under your bed. ____________________________

   • The school bell rings. ________________________________

   • You play a computer game. ____________________________

3. Describe what happens when a balloon can hang from the wall all by itself, and when small pieces of paper stick to the balloon.

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

created by areynolds.org
Electrical Picker Uppers

1. Electromagnets are temporary in that they can turn their magnetism on and off. Give three examples of electromagnets.

2. You are going to build an electromagnet. Follow the scientific procedure outlined on page 30, and fill in the observation table below.

<table>
<thead>
<tr>
<th>Number of coils</th>
<th>Predicted Number of paper clips picked up</th>
<th>Actual number of paper clips picked up</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Draw a bar graph to show the findings of the experiment above.

4. What happens when you coil the wire around a pencil and a film canister, instead of a nail?

_______________________________________________________________

_______________________________________

5. What is the most common use of an electromagnet?

___________________________________________________
1. How do we measure the amount of electricity used by an appliance, and how much does this energy cost?

2. Read the stories of both the Mongolian and Canadian girls on page 36. Then, using the table on the previous page, calculate how much energy in kilowatt hours each girl used on that particular day.

<table>
<thead>
<tr>
<th>Batsuury</th>
<th>Jennifer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appliance</td>
<td>Energy usage</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total kWh</th>
<th>Total kWh</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Total cost</th>
<th>Total cost</th>
</tr>
</thead>
</table>

3. What might be some explanations for the difference in the amount of energy used by a Mongolian family and a Canadian family?

---
created by areynolds.org
**Cumulative Activity 1.0: Making A Drawing Machine**

In your groups you will design a drawing machine, test its abilities and suggest ways to improve its design. Record all your observations and any drawings in your Science notebook with a title.

After the testing you will write up and illustrate your findings using the Design Report sheet that follows. Ensure that you record real data to report as your findings. Avoid being vague or too general.

**You need:**
- a yogurt container
- alligator clips
- a handheld generator
- a strip of cardboard about 2cm by 5 cm
- a motor
- four or five markers from the bin by the chess sets
- masking tape
- a large sheet of paper
- a small ball of modeling clay
- scissors

**Steps**
1. turn the yogurt container upside down
2. select three markers from your collection and test them to see if they still write well
3. leaving the caps on, tape the markers around the edge of the yogurt container equally far apart from each other (in a triangular shape) so that the container is raised off the surface of the table about 6-7 cm and so that the marker caps are touching the surface
4. poke the spindle of the motor through one end of the cardboard strip
5. secure the spindle on the other side with a small ball of modeling clay and/or tape
6. attach the motor to one part of the curved outer surface so that the cardboard strip can spin freely (on the outer edge or by cutting a hole in the container)
7. take the caps off the markers and place the machine over the sheet, which is taped to the desk surface at the corners
8. attach the alligator clips to the motor and crank the generator to create energy to spin the propeller
9. observe the designs created and the movement of the machine and adjust the marker height, motor location or other variable as needed
10. experiment with other design changes as time permits
11. write up your experiment following our design report format, using your rough notes in your Science notebook as a draft
Drawing Machine Design Report

Name:                      Score: _______________       Date:

Materials I Used:          --                               --
                           --                               --
                           --                               --
                           --                               --

Procedure Steps: (list in order from start to finish)

1.                                2.

3.

Observations:
(Write sentences describing what happened when you completed the electrical connection. How did it function? Draw a fully detailed diagram in colour.)

Design Reflections
Answer these questions in your own sentences below:
   a) what adjustments did you have to make?
   b) How could you have improved the design?
   c) Why did it work or not work?
Bill Nye Electricity Video Guided Viewing

Answer the following questions in sentences OR fill in the blanks with the correct word using information from the video.

1. What is electricity?
   Electricity is the flow __________________________________________________________
   __________________________________________________________

2. Another name for the "closed path" the electrons flow through is
   ___________, which comes from an old word that means ________________.

3. To what does Bill compare the flow of electricity?
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

4. __________________________ can do work.

5. How would you get a shock in a bumper car ride? Why?
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

6. Write out one of the three "Did You Know That" facts.
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

7. In ______ Michael Faraday and ________________________ "created" electricity, or showed its existence. Faraday used two coils of
   __________________ connected to each other. He passed one coil over
   a_____________________, and the other one caused a _________ needle to
   move.

8. Give two reasons why an electric car would be a good thing.
   __________________________________________________________
9. How is a sandwich like a car battery?

10. _________________ can control the flow of electricity through wires.

11. Aluminum is a good _______________ through which electricity can travel.

12. Electrons can jump from atom to atom very easily inside pieces of _______________.

13. Bees are like _______________.
    Hives are like _______________.
    Bees going from hive to hive is like the _______________.

14. This material conducts electricity well: _______________.
    These materials do not conduct electricity well: _______________.
    This material is only an average conductor: _______________.

15. (Circle correct answer in brackets.)
    Insulators (do / don’t) let electricity flow through them.
    Conductors (do / don’t) let electricity flow through them.
    Resistors let (none / some / all) electrons pass through them in a flow of electric current.

16. Another word for the pressure of the flow of electrons is _______________, or volts. Higher pressure equals higher _______________.

17. Amperage or ______________ describes the ______________ of electrons in the flow of electricity. Higher amperage equals more _______________.

18. The combination of amps and volts is called _______________.

19. ______________ watts equals a brighter light bulb.

created by areynolds.org
20. Name two ways electrons are pushed so that they flow:
   By ______________________________

   By ______________________________

21. The chemicals inside a battery are called ________________. They
   surround a ________________ inside a metal can.

22. Electricity in a battery flows from __________ to __________ and
   from __________ pole to __________ pole.

23. Why do batteries run out of power?
   _____________________________________________________________________

24. Water generates electricity by going through a _________________.
   We could see a similar hydroelectric generating site near Toronto
   at ________________________________.

25. ______________________, or AC, is made with a magnet and a coil of wire,
   one of which moves.

26. Electricity made with batteries goes in one direction only and is called
   _____________________________________________________________________ or DC.

27. A ________________ cell receives and stores energy from the sun, which
   can be used as electricity.

28. Complete circuits can be made by turning on a ________________________.

29. Why do plugs have two prongs? Make a guess about what a third plug would be
   used for.

   _____________________________________________________________________

   _____________________________________________________________________

   _____________________________________________________________________

created by areynolds.org
**Wonder Why? – Electricity Guided Viewing**

Answer the following questions below by filling in the blanks using information from the video and the vocabulary below.

- fuse panel
- carpet
- air
- signals
- static electricity
- Thomas Edison
- transmission tower
- key
- water
- current
- ice
- meter
- coal
- substation
- filament
- gas
- light

1. Our bodies use electricity to send _________________ from one part of the body to another.

2. How did Benjamin Franklin discover that there was electricity in clouds?
   ________________________________
   ________________________________

3. Lightning is one of the few types of __________________________ that is dangerous.

4. Name two ways to generate static electricity (use a complete sentence).
   ________________________________
   ________________________________

5. Lightning is made when __________________________ , __________________________ and __________________________ rub together in clouds to create many small charges that combine in a "bolt" of lightning.

6. Two types of electricity described in the video are __________________ electricity and __________________ (also called "useful") electricity.

7. Trace the path electricity takes from your wall socket to a power plant by filling in the blanks.
   plug >>> __________________>>>> __________________>>>>
   >>> power line >>> __________________ >>> __________________ >> power plant.

8. The inventor of the light bulb was _____________________________.

9. A __________________________ is the part of a light bulb that __________________________ and creates light and heat.

10. What types of fuel do you think are used at power stations to create the heat energy to power the turbines that run the generators which create electricity? Name at least two sources of fuel.
    ____________________________________________________________________
    ____________________________________________________________________

created by areynolds.org
Bill Nye Static Electricity Video Guided Viewing

Answer the following questions in sentences OR fill in the blanks with the correct word using information from the video.

1. Lightning bolts and sparks happen when electricity makes air ____________.

2. Static is from a word meaning "______________". The electrons stay in one place until a big enough charge builds up and then they ______________________, producing lightning when the electrons flow.

3. List two ways you have probably felt static electricity.
   When you rub your feet across a carpet and: ____________________________
   or ____________________________.

4. When you rub your feet across a carpet or rub a plastic rod with a piece of fur _______________________ build up on one or the other piece, creating a _______________________ electric charge.

5. Bill uses a ______________________ generator to demonstrate the workings of static electricity. You could find a similar machine at the __________________________.

6. You can see evidence of a static electrical charge when Bill’s wig _______________ _____________. The hair behaves this way because the charges are all ___________________ and are ___________________ each other. The static electric charge is reduced when he gets the charge _________ of his body. You can see the charge by observing the _______________ that jumps from one ball back to the Van De Graaf generator. At that point his hair _____________ down.

7. A negative static electric charge in your laundry is also known as __________________________. Water is a substance that can ____________ the negative static electric charge.

8. Name three things that can happen at home when you rub a balloon on your hair:
   a) ______________________________________________________
   b) ______________________________________________________
   c) ______________________________________________________

9. Electrons have a ___________________ charge in the structure of the atom.

10. Radio and TV static is caused when the antenna on either device picks up static electricity on _______________ or _______________ in the Earth’s atmosphere.
11. Another word for letting the static electricity charge "jump off" is called letting the electrons "__________________". When they jump off, they go into the ____________________. Usually a _________________________ is attached to some piece of metal that runs out of the building until they touch the earth. The _________________ prong of an electrical plug is the _________________________ that helps extra electrons go to or from the ground efficiently.

12. Did You Know That:
   a) Lightning can strike _________________ from the ground to a ____________.
   b) _________________ lightning bolts hit the ground every _______________ all over the earth.

13. It is easier to get a static electric shock on a _________________ than it is on humid, moist day. This is because water helps _____________________ the electrical charges, preventing them from building up.

14. The word electricity can be traced back to the Greek word "________________" which means _______________. The Greek philosopher ________________ discovered that when he rubbed his piece of amber it became _____________________ charged because he rubbed away electrons from the cloth to the amber.

15. When your TV reception is fuzzy it could be because an electric motor nearby is creating _________________ that looks and sounds just like static.

16. A _________________ can be used to attract lightning and quickly send it to the ground so that tall buildings are not damaged. In Toronto, you’d likely find many of these on the _________________.

17. Did You Know That:
   a) Lightning heats the air in its path to nearly _______________ degrees Celsius.
   b) A single bolt of lightning contains _________________ volts of electricity.
   c) A flash of lightning may be up to _______________ kilometres long.

18. Your _______________ helps spread out the static electricity of lightning bolts because the metal _________________ electricity so it spreads out instead of affecting you.

19. _________________ is created when the air heated by lightning hits the surrounding cool air. That's why lightning comes _________________ thunder.

20. Lightning is created when electrical charges _________________ in the sky and then push away from each other until they fall to the ground.

21. An _________________ can be used to detect static electrical charges. Static electricity will cause the aluminium foil leaves to _________________.
Electricity Design Challenge

As part of our Electricity Unit in Science, the students in 365 will design a vehicle that could be used to explore the terrain of another moon, asteroid or planet. The Mars Rovers are useful examples of such a vehicle. The vehicle is to be electrically powered, likely with dry cell batteries, and should be functional (i.e. it should roll on its own in some way). It can include some form of simple machine that can perform a simple task (like a claw or crane). Students are also encouraged to add interesting objects to the basic vehicle that could be used on an exploration mission, such as a "robot arm" or a "soil collector", or a satellite dish (these will not actually function...).

The finished project will include a demonstration of the actual vehicle and a science board outline of their work using schematic diagrams, pictures, drawings and graphs in the design portfolio package the students receive. I will provide Science boards to the students for free.

Students should not make use of prefabricated kits (such as Lego vehicles that are already designed) to construct the entire vehicle, but may use pieces from them to complete their original design. "Found" materials at home such as toothpicks, empty spools, plastic sheets cut from bottles, Styrofoam meat trays, Kleenex boxes, rubber bands, wooden skewers, baby food lids, checker pieces and film canisters, among other things, are cheap substitutes for more expensive hobby shop materials.

There are some materials that I can provide at cost to students. These items include:

- suitable pulleys for the drive train
- a motor

Because solar cells are so expensive and produce limited power, students are not expected to use them. They may create a fake solar panel or array as a decorative feature to add realistic detail.

Students should be prepared to work on the building of the vehicle primarily at home. We will work on the design portfolio in class, although some sections may be assigned as daily homework. The term three Science mark will be partly based on this activity and I will be anecdotally tracking their work habits and readiness during class work periods.

Due ____________________________.

Name: _______________________
Date: _______________________
Due Date: _____________________
Parent Signature: ____________

created by areynolds.org
<table>
<thead>
<tr>
<th>Understanding Of Basic Concepts</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrates a limited understanding of a variety of electric circuits, troubleshooting problems, current and static electricity, and the use of different types of materials in building an electromagnet.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Demonstrates some understanding of a variety of electric circuits, troubleshooting problems, current and static electricity, and the use of different types of materials in building an electromagnet.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Demonstrates a general understanding of a variety of electric circuits, troubleshooting problems, current and static electricity, and the use of different types of materials in building an electromagnet.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Demonstrates a thorough understanding of a variety of electric circuits, troubleshooting problems, current and static electricity, and the use of different types of materials in building an electromagnet.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Relating of Science and Technology to the world outside the school.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Shows limited understanding of connections to the world outside the school, such as the pros and cons of different sources of electricity, and energy consumption and conservation.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Shows some understanding of connections to the world outside the school, such as the pros and cons of different sources of electricity, and energy consumption and conservation.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Shows good understanding of connections to the world outside the school, such as the pros and cons of different sources of electricity, and energy consumption and conservation.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Shows extensive understanding of connections to the world outside the school, such as the pros and cons of different sources of electricity, and energy consumption and conservation.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Communication Of Required Knowledge</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Makes limited use of appropriate scientific vocabulary. *Diagrams are done with little clarity and few of the necessary labels and symbols are evident.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Makes some use of appropriate scientific vocabulary. *Diagrams are done with some clarity, however a number of the necessary labels and symbols are not evident.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Makes considerable use of appropriate scientific vocabulary. *Diagrams are done with clarity, having most of the necessary labels and symbols.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Makes extensive use of appropriate scientific vocabulary. *Diagrams are done with clarity and precision, having all or almost all of the necessary labels and symbols.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Electricity Design Challenge</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Understanding of few of the basic concepts, with incomplete explanations given. *Diagrams are not clear and usually lack the necessary labels and symbols. *During the presentation, was unprepared and communicated ideas with much hesitation.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Understanding of some of the basic concepts, with occasionally complete explanations given. *Diagrams are somewhat clear and some are labelled appropriately. *During the presentation, communicated ideas with some hesitation.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Understanding of most of the basic concepts, with generally complete explanations given. *Diagrams are clear and mostly well-labelled. *During the presentation, communicated ideas with clarity.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Understanding of all of the basic concepts, with complete explanations given. *Diagrams are clear and always well-labelled. *During the presentation, communicated ideas with clarity and confidence.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>