**RISK ASSESSMENT SCHOOL:**

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| **experiment 4.1A: Direct synthesis with a ‘pop’** |

*Risks should be managed by use of PPE and/or specified control measures.*

Description of procedure (attach a copy of the experiment)

**Oxford Science 10:** pages 90–91 and 200

**Equipment required**

|  |
| --- |
| Each group requires:  Magnesium ribbon 3 strips of 1cm in length, 10ml of 1M hydrochloric acid, 2 test tubes and test tube rack, rubber stopper to fit test tube, wooden splint, matches |

**Hazardous chemicals required/produced**

| Reactant or product name and concentration | GHS classification | GHS hazard statement | Control measures |
| --- | --- | --- | --- |
| Magnesium ribbon | **DANGER**  https://jr.chemwatch.net/Resources/Images/GHSFla.GIF  Flammable | H228 – Flammable solid  H261 – In contact with water releases flammable gas (which may ignite spontaneously) | Keep away from ignition sources  Use magnesium ribbon only as described in this practical. Dangerous if instructions are not followed. Magnesium reacts violently with a number of other substances.  Refer to Safety Data Sheet.  Wear gloves, lab coat and safety glasses.  IF ON SKIN: wash off with soap and water.  IF IN EYES: flush eyes with fresh running water. If pain or irritation persists seek medical attention. | |
| Box of Matches | **WARNING**  GHSFla[1]  Flammable | H228 – Flammable solid | Keep the box of matches away from flames, heat, hot surfaces and sparks.  To safely light a match use a light downward stroke on the striking surface, away from the body, protected from wind.  Wear safety glasses to protect the eyes from matches splintering while being ignited. | |

NON-HAZARDOUS substances

|  |  |  |  |
| --- | --- | --- | --- |
| 1M Hydrochloric acid |  | Not classified as Hazardous | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  Diluted acid may cause burns and eye damage. Avoid inhalation of vapours. Use in a well ventilated room. |

Other hazards and possible risks

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| Warn students that the reaction will make a noise. This may avoid a fright and an accident.  Test tubes may break and cause cuts. Sweep up broken glass with a brush and dustpan, do not use fingers.  Discard any chipped or cracked test tubes to a broken glass bucket.  Wooden splint/taper may have splinters that can embed in skin. The splint/taper is also lit and may cause burns. Ensure the wooden splint/taper is extinguished with water when finished. |

Protective measures

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Lab coat | Safety glasses | Gloves | Fume cupboard | Other |
| Yes | Yes | Yes |  |  |

Student clean up and disposal of wastes

|  |
| --- |
| A plastic sieve over a large beaker is ideal for pouring the magnesium metal and acid through to collect the magnesium metal. Leave for the Lab technician to dispose of.  You can use long matches instead of lighting a taper/splint.  Collect equipment to one place for the lab technician. |

**Assessor’s signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

\*\*\*\*\***This assessment is not valid until it has been completed and signed by an assessor approved by the school.**

***All teachers are to sign the following statement before conducting this experiment.***

I have read this risk assessment and I understand the safety procedures and risks involved.

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| **Teacher’s name** | **Teacher’s signature** | **Date** |
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| \*\*\*\*NOTES:   * Individual schools have a legal obligation to acquire their own manufacturer’s SDS and produce a risk assessment relevant to their own situation. * This risk assessment sheet is provided for your guidance only. * Disposal of waste is subject to the laws and regulations of states, territories and local authorities. * It is not to be assumed that products bought from supermarkets are non-hazardous.   DISCLAIMER:  These guidelines are designed to serve as a general reference only. It does not replace the school’s legal obligation to provide a valid risk assessment to ensure the safety of the staff and students conducting this experiment. While the Publisher has endeavoured to ensure that the material provided is free from error, the Publisher does not warrant the accuracy, adequacy or completeness of that material or that the material is suitable for your intended use. To the fullest extent permitted by law the Publisher disclaims all responsibility for any actions taken or not taken in relation to the material provided. |

**RISK ASSESSMENT SCHOOL:**

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| **experiment 4.1B: Decomposing a carbonate** |

*Risks should be managed by use of PPE and/or specified control measures.*

Description of procedure (attach a copy of the experiment)

**Oxford Science 10:** pages 90–91 and 201

**Equipment required**

|  |
| --- |
| Each group requires:  Small jars (or samples) of copper carbonate, copper oxide and calcium carbonate (powder)  Pyrex (high strength) test tubes x3 and test tube rack  Test tube holder , Bunsen burner, matches and spatula  Additional equipment for student design may include limewater and a lit splint. |

**Hazardous chemicals required/produced**

| Reactant or product name and concentration | GHS classification | GHS hazard statement | Control measures |
| --- | --- | --- | --- |
| Copper (ll) carbonate (solid) | **WARNING**  **C:\Users\temp\Dropbox\th4H7Q6WYY.jpg**  **Irritant** | H302- Harmful if swallowed  H315 – Causes skin irritation  H319 – Causes serious eye irritation  H335 – May cause respiratory irritation | Wear safety glasses, gloves and lab coats when using this substance.  Do not, eat or drink while using this substance.  If SWALLOWED: rinse mouth with fresh water and seek medical attention without delay.  IF IN EYES: wash immediately with fresh running water. Gently lift eye lids to irrigate occasionally. Seek medical help.  IF ON SKIN: wash off immediately with fresh running water and soap. |
| Copper (ll) oxide (solid) | **WARNING**  **C:\Users\temp\Dropbox\th4H7Q6WYY.jpg**  **C:\Users\temp\Dropbox\GHSEnv[1].gif**  **Environmentally**  **Hazardous** | H302 - Harmful if swallowed  H410 - Very toxic to aquatic life with lasting effects | Wear safety glasses, gloves and lab coats when using this substance.  IF SWALLOWED: rinse mouth and call a poison centre. Seek medical help if unwell.  IF IN EYES: wash immediately with fresh running water. Gently lift eye lids to irrigate occasionally. Seek medical help.  IF ON SKIN: wash off immediately with fresh running water and soap. |

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| --- | --- | --- | --- |
| Calcium carbonate  (solid powder) | **DANGER**  **C:\Users\temp\Dropbox\th4H7Q6WYY.jpg**  https://jr.chemwatch.net/Resources/Images/GHSCor.GIF  **Corrosive** | H315 - Causes skin irritation  H318 - Causes serious eye damage  H335 - May cause respiratory irritation | Wear safety glasses, gloves and lab coats.  IF SWALLOWED: rinse mouth and call a poison centre. Seek medical help if unwell.  IF IN EYES: wash immediately with fresh running water. Gently lift eye lids to irrigate occasionally. Seek medical help.  IF ON SKIN: wash off immediately with fresh running water and soap. |
| Box of Matches | **WARNING**  C:\Users\temp\Dropbox\GHSFla[1].gif  **Flammable** | H228 – Flammable solid | Keep the box of matches away from flames, heat, hot surfaces and sparks.  To safely light a match use a light downward stroke on the striking surface, away from the body, protected from wind.  Wear safety glasses to protect the eyes from matches splintering while being ignited.  Ensure hair is tied back and loose clothing tucked away. |
| Limewater  (saturated calcium hydroxide) | **DANGER**  https://jr.chemwatch.net/Resources/Images/GHSCor.GIF  **Corrosive** | H290 – May be corrosive to metals  H314 – Causes severe skin burns and eye damage  H318 – Causes serious eye damage | Wear gloves, lab coat and safety glasses.    IF ON SKIN: wash off with soap and water.  IF SWALLOWED: rinse mouth with fresh water do not induce vomiting.  IF IN EYES: flush eyes with fresh running water for several minutes. Remove contact lenses if present and easy to do. Seek medical attention. |

NON-HAZARDOUS substances

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Other hazards and possible risks

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| --- |
| Bunsen burners may be hot. Allow to cool before putting away. Check hoses to Bunsen burners show no sign of wear or holes. Replace if they do. If burnt, run burn under cold water for 15 minutes at least. Seek medical attention if pain persists.  Test tubes may break and cause cuts. Sweep up broken glass with a brush and dustpan, do not use fingers.  Discard any chipped or cracked test tubes to a broken glass bucket.  Wooden splint/taper may have splinters that can embed in skin. The splint/taper is also lit and may cause burns. Ensure the wooden splint/taper is extinguished with water when finished. |

Protective measures

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Lab coat | Safety glasses | Gloves | Fume cupboard | Other |
| Yes | Yes | Yes |  |  |
|  | | | | |

Student clean up and disposal of wastes

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| --- |
| All powders that have been heated should be collected into separate labelled waste containers for the lab technician to collect for waste disposal.  Try to give the students spatula’s that will go into the test tube or, alternatively supply small powder funnels so the powder goes into the test tube. The powder tends to go everywhere if the students haven’t got the appropriate equipment.  Collect all equipment to one place for the lab technician.  Allow Bunsen burners to cool before putting away.  Limewater can be flushed down the sink followed by running water. |

**Assessor’s signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

\*\*\*\*\***This assessment is not valid until it has been completed and signed by an assessor approved by the school.**

***All teachers are to sign the following statement before conducting this experiment.***

I have read this risk assessment and I understand the safety procedures and risks involved.

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**RISK ASSESSMENT SCHOOL:**

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| **experiment 4.1c: Electrolysis** |

*Risks should be managed by use of PPE and/or specified control measures.*

Description of procedure (attach a copy of the experiment)

**Oxford Science 10:** pages 90–91 and 202

**Equipment required**

|  |
| --- |
| Each group requires:  Copper sulfate (solid) x 1 spatula, 100ml beaker, stirring rod, spatula, DC power supply,12 V globe and globe holder, wires with alligator clips, 2 carbon rods |

**Hazardous chemicals required/produced**

| Reactant or product name and concentration | GHS classification | GHS hazard statement | Control measures |
| --- | --- | --- | --- |
| Copper (II) sulfate  (solid) | **WARNING**  https://jr.chemwatch.net/Resources/Images/GHSHar.GIF  Irritant  https://jr.chemwatch.net/Resources/Images/GHSEnv.GIF  Environmentally damaging | H302 - Harmful if swallowed  H315 – Causes skin irritation  H319 – Causes serious eye irritation  H400 – Very toxic to aquatic life  H410 – Very toxic to aquatic life with long lasting effects | Wear gloves, safety glasses and lab coat.  IF ON SKIN: wash off immediately with soap and water.  IF IN EYES: rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  DO NOT put copper (II) sulfate solid or solution down the sink. Copper (II) sulfate is a hazard to the environment, particularly to aquatic/marine animals. Collect and put in a labelled waste container to recycle, reuse or store for waste collection. |
| Copper sulfate  (solution) | https://jr.chemwatch.net/Resources/Images/GHSEnv.GIF  **Environmentally damaging** | H411 – Toxic to aquatic life with long lasting effects | Wear gloves, safety glasses and lab coat.  IF ON SKIN: wash off immediately with soap and water.  IF IN EYES: rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  DO NOT put copper (II) sulfate solid or solution down the sink. Copper (II) sulfate is a hazard to the environment, particularly to aquatic/marine animals. Collect and put in a labelled waste container to recycle, reuse or store for waste collection. |

NON-HAZARDOUS substances

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Other hazards and possible risks

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| --- |
| Power supply boxes are plugged into mains electricity. There is the possibility of an electric shock. Ensure electrical equipment has current tag, safe and operated correctly. Check cords regularly and replace if any signs of damage.  Glass beakers, and glass stirring rods may break and cause cuts. Sweep up broken glass with a brush and dustpan, do not use fingers. Discard any chipped or cracked beakers to a broken glass bucket.  12V light globes can become hot during use with the possibility of causing burns if touched. They are fragile and the glass may break if not handled carefully if replacing globe or tightening. Ensure globe is cool before touching. There is a possibility of skin or eye damage. Ensure safety glasses are worn. |

Protective measures

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Lab coat | Safety glasses | Gloves | Fume cupboard | Other |
| Yes | Yes | Yes |  |  |
|  | | | | |

Student clean up and disposal of wastes

|  |
| --- |
| All copper sulfate solid and solution must be collected into a large beaker for the lab technician to dispose of. It must not go down the sink.  Collect all equipment to one place for the lab technician.  Unplug the power boxes and wrap cord around the box.  Rinse carbon rods under running water and dry. |

**Assessor’s signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

\*\*\*\*\***This assessment is not valid until it has been completed and signed by an assessor approved by the school.**

***All teachers are to sign the following statement before conducting this experiment.***

I have read this risk assessment and I understand the safety procedures and risks involved.

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| **Teacher’s name** | **Teacher’s signature** | **Date** |
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**RISK ASSESSMENT SCHOOL:**

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| **experiment 4.2: Acid titrations** |

*Risks should be managed by use of PPE and/or specified control measures.*

Description of procedure (attach a copy of the experiment)

**Oxford Science 10:** pages 92–93 and 203

**Equipment required**

|  |
| --- |
| Each group requires:  Dropper bottles of:  Hydrochloric acid 0.1M, hydrochloric acid 1M, ethanoic acid 0.1M, ethanoic acid 1M, sodium hydroxide 0.1M  Universal indicator solution and pH universal indicator colour chart  Small pieces of magnesium ribbon, 4 test tubes and rack, Matches, dropping pipette if not using dropping bottles |

**Hazardous chemicals required/produced**

| Reactant or product name and concentration | GHS classification | GHS hazard statement | Control measures |
| --- | --- | --- | --- |
| **Universal indicator**  **(diluted in ethanol)** | **WARNING**  https://jr.chemwatch.net/Resources/Images/GHSFla.GIF  Flammable | H226 - flammable liquid and vapour | Keep away from heat  Wear safety glasses, gloves and lab coat.  IF IN EYES: rinse with water for several minutes. If irritation persists seek medical advice.  IF ON SKIN: wash off with plenty of water.  IF SWALLOWED: Immediately drink two glasses of water. Consult Doctor. |
| **Magnesium ribbon** | **DANGER**  https://jr.chemwatch.net/Resources/Images/GHSFla.GIF  Flammable | H228 – Flammable solid  H261 – In contact with water releases flammable gas (which may ignite spontaneously) | Keep away from ignition sources  Use magnesium ribbon only as described in this practical. Dangerous if instructions are not followed. Magnesium reacts violently with a number of other substances.  Refer to Safety Data Sheet.  Wear gloves, lab coat and safety glasses.  If skin contact is made wash off with soap and water.  If magnesium comes in contact with eyes flush eyes with fresh running water. If pain or irritation persists seek medical attention. |
| **Box of Matches** | **WARNING**  C:\Users\temp\Dropbox\GHSFla[1].gif  Flammable | H228 – Flammable solid | Keep the box of matches away from flames, heat, hot surfaces and sparks.  To safely light a match use a light downward stroke on the striking surface, away from the body, protected from wind.  Wear safety glasses to protect the eyes from matches splintering while being ignited. |

NON-HAZARDOUS substances

|  |  |  |  |
| --- | --- | --- | --- |
| **1M Hydrochloric acid** | Not classified as Hazardous |  | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  Diluted acid may cause burns and eye damage. Avoid inhalation of vapours. Use in a well ventilated room. |
| **0.1M Hydrochloric acid** | Not classified as Hazardous |  | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  Diluted acid may cause burns and eye damage. Avoid inhalation of vapours. Use in a well ventilated room. |
| **1M Ethanoic acid** | Not classified as Hazardous |  | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  Diluted acid may cause burns and eye damage. Avoid inhalation of vapours. Use in a well ventilated room. |
| **0.1M Ethanoic acid** | Not classified as Hazardous |  | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  Diluted acid may cause burns and eye damage. Avoid inhalation of vapours. Use in a well ventilated room. |
| **0.1M Sodium hydroxide** | Not classified as Hazardous | https://jr.chemwatch.net/Resources/Images/GHSHar.GIF  **WARNING** | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  Diluted sodium hydroxide may cause burns and eye damage.  If in eye rinse immediately with plenty of fresh running water. See doctor if pain, irritation or redness persists.  Wash of skin immediately with fresh running water. |

Other hazards and possible risks

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| --- |
| Test tubes may break and cause cuts. Sweep up broken glass with a brush and dustpan, do not use fingers.  Discard any chipped or cracked test tubes to a broken glass bucket. |

Protective measures

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Lab coat | Safety glasses | Gloves | Fume cupboard | Other |
| Yes | Yes | Yes |  |  |

Student clean up and disposal of wastes

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| A plastic sieve and a large beaker could be supplied to the class, so solutions containing the magnesium metal can be separated from the hydrochloric acid. Rinse magnesium with water and leave to dry on paper towel for the lab technician to collect and dispose of. No metals down the sink.  The diluted hydrochloric acid, ethanoic acid, sodium hydroxide and the drops of universal indicator can be put down the sink, followed by water.  Collect equipment to one place for the lab technician.  Ensure sinks are clear and work area wiped clean and dried. |

**Assessor’s signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

\*\*\*\*\***This assessment is not valid until it has been completed and signed by an assessor approved by the school.**

***All teachers are to sign the following statement before conducting this experiment.***

I have read this risk assessment and I understand the safety procedures and risks involved.

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| **Teacher’s name** | **Teacher’s signature** | **Date** |
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**RISK ASSESSMENT SCHOOL:**

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| **experiment 4.3: Precipitation reactions** |

*Risks should be managed by use of PPE and/or specified control measures.*

Description of procedure (attach a copy of the experiment)

**Oxford Science 10:** pages 94–95 and 204

**Equipment required**

|  |
| --- |
| Each group requires:  Plastic sleeve and white A4 paper or prepared laminated tables (see method)  0.1M of the following solutions:  Group A: calcium nitrate, copper (ll) nitrate, magnesium nitrate, silver nitrate, copper (ll) sulfate  Group B: sodium chloride, sodium hydroxide, sodium sulfate, sodium carbonate |

**Hazardous chemicals required/produced**

| Reactant or product name and concentration | GHS classification | GHS hazard statement | Control measures |
| --- | --- | --- | --- |
|  |  |  |  |

NON-HAZARDOUS substances

|  |  |  |
| --- | --- | --- |
| **0.1M Calcium**  **nitrate** | Not classified as Hazardous | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  If in eye rinse immediately with plenty of fresh running water.  Seek medical attention if irritation persists.  Wash off skin with running water and soap. |
| **0.1M Copper**  **nitrate** | Not classified as Hazardous | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  If in eye rinse immediately with plenty of fresh running water.  Seek medical attention if irritation persists.  Wash off skin with running water and soap. |
| **0.1M Magnesium nitrate** | Not classified as Hazardous | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  If in eye rinse immediately with plenty of fresh running water.  Wash off skin with running water and soap. |
| **0.1M Silver**  **nitrate** | Not classified as Hazardous | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  If in eye rinse immediately with plenty of fresh running water.  Wash off skin with running water and soap.  Silver nitrate solution will stain black and is hard to remove once the colour develops. Wipe all spills up immediately and rinse the spill area with a little water. Wipe and dry. |
| **0.1M Copper**  **sulfate** | Not classified as Hazardous | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  If in eye rinse immediately with plenty of fresh running water. See doctor if pain, irritation or redness persists.  Wash of skin immediately with fresh running water. |
| **0.1M Sodium chloride** | Not classified as Hazardous | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  If in eye rinse immediately with plenty of fresh running water. See doctor if pain, irritation or redness persists.  Wash of skin immediately with fresh running water. |
| **0.1M Sodium hydroxide** | Not classified as Hazardous | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  If in eye rinse immediately with plenty of fresh running water. See doctor if pain, irritation or redness persists.  Wash of skin immediately with fresh running water. |
| **0.1M Sodium sulfate** | Not classified as Hazardous | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  If in eye rinse immediately with plenty of fresh running water. See doctor if pain, irritation or redness persists.  Wash of skin immediately with fresh running water. |
| **0.1M Sodium carbonate** | Not classified as Hazardous | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  If in eye rinse immediately with plenty of fresh running water. See doctor if pain, irritation or redness persists.  Wash of skin immediately with fresh running water. |

Other hazards and possible risks

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| --- |
| Glass dropper bottles may break and cause cuts. Sweep up broken glass with a brush and dustpan, do not use fingers.  Discard any chipped or cracked droppers or dropper bottles to a broken glass bucket.  Refer to SDS Safety Data Sheets for instructions of particular chemical, if a spill occurs. |

Protective measures

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Lab coat | Safety glasses | Gloves | Fume cupboard | Other |
| Yes | Yes | Yes |  |  |

Student clean up and disposal of wastes

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| --- |
| All drops of chemicals may be washed down the sink as the chemicals are diluted a lot and quantities are very small. Flush with water. If uncertain, check with local water authority. Rinse plastic sleeves or laminated tables with water and dry.  The experiment requests a plastic sleeve to put an A4 table in (as in the method). The students then combine particular drops of chemicals on the plastic sleeve and look for precipitation reactions. Laminating a prepared table works really well. Prepare a laminated table for each group, prior to class. They then can be reused in future classes. Ensure big enough for the drops.  Each group requires two tables one for the experiment and one for writing on.  Collect all equipment to one place for the lab technician. Ensure benches are wiped and dry and chemicals are flushed properly out of sinks. |

**Assessor’s signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

\*\*\*\*\***This assessment is not valid until it has been completed and signed by an assessor approved by the school.**

***All teachers are to sign the following statement before conducting this experiment.***

I have read this risk assessment and I understand the safety procedures and risks involved.

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| **Teacher’s name** | **Teacher’s signature** | **Date** |
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| \*\*\*\*NOTES:   * Individual schools have a legal obligation to acquire their own manufacturer’s SDS and produce a risk assessment relevant to their own situation. * This risk assessment sheet is provided for your guidance only. * Disposal of waste is subject to the laws and regulations of states, territories and local authorities. * It is not to be assumed that products bought from supermarkets are non-hazardous.   DISCLAIMER:  These guidelines are designed to serve as a general reference only. It does not replace the school’s legal obligation to provide a valid risk assessment to ensure the safety of the staff and students conducting this experiment. While the Publisher has endeavoured to ensure that the material provided is free from error, the Publisher does not warrant the accuracy, adequacy or completeness of that material or that the material is suitable for your intended use. To the fullest extent permitted by law the Publisher disclaims all responsibility for any actions taken or not taken in relation to the material provided. |

**RISK ASSESSMENT SCHOOL:**

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| **experiment 4.4: Combustion of wire wool** |

*Risks should be managed by use of PPE and/or specified control measures.*

Description of procedure (attach a copy of the experiment)

**Oxford Science 10:** pages 96–97 and 205

**Equipment required**

|  |
| --- |
| Each group requires:  Wire wool, 9V battery, crucible, bench mat, scales, spatula, steel tongs |

**Hazardous chemicals required/produced**

| Reactant or product name and concentration | GHS classification | GHS hazard statement | Control measures |
| --- | --- | --- | --- |
|  |  |  |  | |

Other hazards and possible risks

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| --- |
| Wire wool contains fine wires which may implant in skin. Wear gloves or handle with steel tongs. Heat reaction occurs when the wire wool is put in a circuit. The students need to know that it is a quick reaction and not to make it lengthy as this could cause the battery to rupture.  Battery 9V: The battery can release heat while connected via a short circuit. This may lead to a rupturing of the battery case. The contents of the battery are corrosive. Batteries if no longer charged should be collected and stored for waste removal. Do not put in the rubbish bin.  Crucibles are fragile and can break if not handled carefully. This may cause cuts. Sweep up broken crucible with a brush and dustpan, do not use fingers. Discard any chipped or cracked crucibles to a broken glass bucket.  Scales or electronic balances that are connected to mains electricity have the possibility of an electric shock if not used properly. Ensure electrical equipment has current tag, safe and operated correctly. Check cords regularly and replace if any signs of damage.  Have as many scales or electronic balances set up as possible. There is a lot of weighing, so balances will be in high demand. Ask teacher to supervise the use of the electronic balances. They are delicate instruments and the students may need direction on how to tare an object and place it gently on the pan.  Ensure bench mats are non-flammable. |

Protective measures

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Lab coat | Safety glasses | Gloves | Fume cupboard | Other |
| Yes | Yes |  |  | Use steel tongs to handle wire wool. |

Student clean up and disposal of wastes

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| Wire wool once cool and be put in the bin.  Supply spatulas and/or metal tongs for moving wire wool if it sticks to the battery when reacting.  Brush bench mats and put away.  Put all equipment in one place for the lab technician. |

**Assessor’s signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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***All teachers are to sign the following statement before conducting this experiment.***

I have read this risk assessment and I understand the safety procedures and risks involved.

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**RISK ASSESSMENT SCHOOL:**

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| **experiment 4.5: Polymerisation of casein** |

*Risks should be managed by use of PPE and/or specified control measures.*

Description of procedure (attach a copy of the experiment)

**Oxford Science 10:** pages 98–99 and 206

**Equipment required**

|  |
| --- |
| Each group requires:  100ml full cream milk  5ml ethanoic acid (acetic acid CH3COOH or Vinegar)  Bunsen burner, tripod, gauze mat, thermometer, bench mat, spatula, filter paper, funnel, beaker, conical flask, matches |

**Hazardous chemicals required/produced**

| **Reactant or product name and concentration** | **GHS classification** | **GHS hazard statement** | **Control measures** |
| --- | --- | --- | --- |
| **Box of Matches** | **WARNING**  GHSFla[1]  Flammable | H228 – Flammable solid | Keep the box of matches away from flames, heat, hot surfaces and sparks.  To safely light a match use a light downward stroke on the striking surface, away from the body, protected from wind.  Wear safety glasses to protect the eyes from matches splintering while being ignited. | |

**NON-HAZARDOUS substances**

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| --- | --- | --- |
| **Ethanoic acid**  **(Vinegar )** | Not classified as Hazardous | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  If in eye rinse immediately with plenty of fresh running water.  Wash off skin with running water and soap.  Vapour may be irritating. |

Other hazards and possible risks

|  |
| --- |
| **Milk** – ALLERGY ALERT – be aware of milk allergies which could be quite serious. Thorough clean up required to ensure no traces left on benches etc. Wear lab coat, glasses and gloves and provide for students.  Bunsen burners, tripods and gauze mats may be hot. Allow to cool before putting away. Check hoses to Bunsen burners show no sign of wear or holes. Replace if they do.  Run any burns under cold water for 15 minutes at least. Seek medical attention if pain persists.  Beakers, flasks, thermometers and funnels if glass may break and cause cuts. Sweep up broken glass with a brush and dustpan, do not use fingers.  Discard any chipped or cracked glassware to a broken glass bucket. |

Protective measures

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Lab coat | Safety glasses | Gloves | Fume cupboard | Other |
| Yes | Yes | Yes |  |  |

Student clean up and disposal of wastes

|  |
| --- |
| Casein whey can go down the sink, followed by water. The curd and used filter paper can be bagged and put out in the rubbish bin.  Allow Bunsen burners, tripods and gauze mats to cool before putting away. Burnt matches into the bin.  Collect all equipment to one place for the lab technician.  Check benches are wiped and dried with paper towel and that sinks contain no curd and all whey has been flushed away. Will smell with time if left in sinks. |

**Assessor’s signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**RISK ASSESSMENT SCHOOL:**

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| **experiment 4.6A: Effect of temperature on reaction rate** |

*Risks should be managed by use of PPE and/or specified control measures.*

Description of procedure (attach a copy of the experiment)

**Oxford Science 10:** pages 100–103 and 207

**Equipment required**

|  |
| --- |
| Each group requires:  0.001M potassium permanganate solution 100ml  0.005M oxalic acid solution 100ml  Test tubes, stopwatch, 250ml beaker, 10ml measuring cylinders, thermometer  Class requires: Kettle or access to hot water  Water baths set at specific temperatures. |

**Hazardous chemicals required/produced**

| Reactant or product name and concentration | GHS classification | GHS hazard statement | Control measures |
| --- | --- | --- | --- |
|  |  |  |  |

NON-HAZARDOUS substances

|  |  |  |  |
| --- | --- | --- | --- |
| 0.001M potassium permanganate  (solution) |  | Not classified as Hazardous | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  Collect waste for waste disposal.  Potassium permanganate **solid** is very toxic to aquatic life with long lasting effects.  IF IN EYES: Rinse with fresh running water.  IF ON SKIN: Wash off with running water. |
| 0.005 oxalic acid  (solution) |  | Not classified as Hazardous | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  Collect waste for waste disposal.  IF IN EYES: Rinse with fresh running water.  IF ON SKIN: Wash off with running water.  **SAFETY ALERT: For solid Oxalic acid the**  **H361 hazard statement reads:**  **Suspected of damaging fertility or the unborn child. This has been revised after the preparation of this practical. Please read detailed SDS and make informed decisions for your school.** |
| 0.001M potassium permanganate / 0.005 oxalic acid mixture  (solution) |  | Not classified as Hazardous | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  Collect waste mixture for waste disposal.  IF IN EYES: Rinse with fresh running water.  IF ON SKIN: Wash off with running water. |

Other hazards and possible risks

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| --- |
| Glass test tubes, thermometers, measuring cylinders and beakers may break and cause cuts. Sweep up broken glass with a brush and dustpan, do not use fingers. Discard any chipped or cracked glassware to a broken glass bucket.  Water baths and Kettle: If electric water baths and/or kettle is used they are plugged into mains electricity. There is the possibility of an electric shock. Ensure electrical equipment has current tag, safe and operated correctly. Check cords regularly and replace if any signs of damage. |

Protective measures

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Lab coat | Safety glasses | Gloves | Fume cupboard | Other |
| Yes | Yes | Yes |  | The solutions used are very dilute and do not pose the risk of the solid or concentrate. Continue to use best laboratory safety practise and wear safety equipment to reduce any risk. |

Student clean up and disposal of wastes

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| --- |
| Potassium permanganate/ oxalic acid solution must not go down sinks. Students will need to have labelled waste containers in class to put their finished solutions in. Waste to be stored for waste collection.  Allow all hot equipment to cool before putting in one place for the lab technician.  Wipe all benches and dry with paper towel.  **Teacher notes:**  Large beakers may be used as water baths. Each needs a thermometer and each group needs access to hot water and ice in order to keep water baths at the required temperatures.  Depending on the size of the test tube, 3ml of each chemical (6ml total) is sufficient for each test tube. Test tubes containing the mix of oxalic acid and potassium permanganate react quicker (become clear) at hotter temperatures for example 2 minutes at 65°C and 1 hour for 10°C. Ideal temperatures could be 10°C 30°C 50° and 70°C. Not too many under 40°C as it may take too long to react.  Students need to ensure the potassium permanganate solution and oxalic acid solution sit in the water bath to reach the required temperature prior to being combined and timed. |

**Assessor’s signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**RISK ASSESSMENT SCHOOL:**

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| **experiment 4.6B: Factors affecting reaction rate** |

*Risks should be managed by use of PPE and/or specified control measures.*

Description of procedure (attach a copy of the experiment)

**Oxford Science 10:** pages 100–103 and 208

**Equipment required**

|  |
| --- |
| Each group requires:  Each group requires:  30g small marble chips (calcium carbonate) of similar size  20ml of 0.5M hydrochloric acid  20ml of 1.0M hydrochloric acid  20ml of 2.0M hydrochloric acid  Electronic balance, stopwatch, 25ml measuring cylinder, 3 x 100ml conical flasks |

**Hazardous chemicals required/produced**

| **Reactant or product name and concentration** | **GHS classification** | **GHS hazard statement** | **Control measures** |
| --- | --- | --- | --- |
| **2M Hydrochloric acid** | **WARNING**  https://jr.chemwatch.net/Resources/Images/GHSHar.GIF  https://jr.chemwatch.net/Resources/Images/GHSCor.GIF  Corrosive | H290 - May be corrosive to metals  H330 - Fatal if inhaled  H314 - Causes severe skin burns and eye damage  H335 - May cause respiratory irritation | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  **Diluted acid** may cause burns and eye damage. Avoid inhalation of vapours. Use in a well ventilated room.  IF ON SKIN: Rinse skin with water/shower  IF IN EYES: Rinse eyes carefully with water for several minutes. Remove contact lenses if able to without causing distress. Continue rinsing.  IF INHALED: remove person to fresh air keep at rest in a position comfortable for breathing.  If SWALLOWED: Rinse mouth. Do not induce vomiting.  Seek medical attention if required. |

NON-HAZARDOUS substances

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| --- | --- | --- | --- |
| Marble chips (calcium carbonate)  Solid |  | Not classified as Hazardous | Wear safety glasses, lab coat, gloves and closed in shoes when handling. |
| 0.5M Hydrochloric acid |  | Not classified as Hazardous | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  Diluted acid may cause burns and eye damage. Avoid inhalation of vapours. Use in a well ventilated room. |
| 1M Hydrochloric acid |  | Not classified as Hazardous | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  Diluted acid may cause burns and eye damage. Avoid inhalation of vapours. Use in a well ventilated room. |

Other hazards and possible risks

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| Glass measuring cylinders and flasks may break and cause cuts. Sweep up broken glass with a brush and dustpan, do not use fingers. Discard any chipped or cracked glassware to a broken glass bucket.  Ensure electronic balances have a current tag, are safe and operated correctly. |

Protective measures

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Lab coat | Safety glasses | Gloves | Fume cupboard | Other |
| Yes | Yes | Yes |  |  |

Student clean up and disposal of wastes

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| **Teacher note:** have as many electronic balances set up as possible. There is a lot of weighing, so balances will be in high demand. Supervise the use of the electronic balances. They are delicate instruments and the students may need direction on how to tare an object and place it gently on the pan.  A plastic sieve could be supplied to the class and a large beaker so solutions containing the marble chips can be separated from the hydrochloric acid. No marble chips down the sink. Dilute hydrochloric acid may be put down the sink, followed by water.  Ensure sinks are clear and work bench wiped clean and dried.  Move all equipment to one place for the lab technician. |

**Assessor’s signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**RISK ASSESSMENT SCHOOL:**

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| **experiment 4.7: Using a catalyst** |

*Risks should be managed by use of PPE and/or specified control measures.*

Description of procedure (attach a copy of the experiment)

**Oxford Science 10:** pages 104–105 and 209

**Equipment required**

|  |
| --- |
| Each group requires:  Hydrogen peroxide (H2O2) 10 volume (vol) solution 2x 5ml  Manganese dioxide (MnO2) powder  Test tubes x 2 and test tube rack  Spatula (small enough to fit inside a test tube) |

**Hazardous chemicals required/produced**

| Reactant or product name and concentration | GHS classification | GHS hazard statement | Control measures |
| --- | --- | --- | --- |
| **30% (100vol) hydrogen peroxide** (liquid) | **DANGER**  C:\Users\temp\Dropbox\GHSHar[1].gif  C:\Users\temp\Dropbox\GHSCor[1].gif  Corrosive  C:\Users\temp\Dropbox\GHSOxy[1].gif  Oxidising | H272 – may intensify fire; oxidizer  H290 – May be corrosive to metals  H302 – Harmful if swallowed  H332 - Harmful if inhaled  H314 – Causes severe skin burns and eye damage  H318 – Causes serious eye damage | Keep away from heat, flames, hot surfaces and sparks  Do not mix with combustibles or organic material  Do not breathe gas or vapours. Use in a fume cupboard.  Wear gloves.  IF ON SKIN: wash off immediately with cold water.  Wear safety glasses.  IF IN EYES: rinse with clean running water for several minutes. Lift eye lids occasionally to allow complete irrigation. Contact medical advice as soon as possible. Patient will need to be checked by a medical practitioner. |
| **Manganese dioxide (solid)** | **DANGER**  https://jr.chemwatch.net/Resources/Images/GHSHar.GIF  C:\Users\temp\Dropbox\GHSOxy[1].gif  Oxidising  **C:\Users\temp\Dropbox\Healthhazard_big[1].jpg**  Health hazard | H272 – May intensify fire, oxidiser  H303 – Harmful if swallowed  H332 - Harmful if inhaled  H373 - May cause damage to organs through prolonged or repeated exposure | Keep away from heat, flames and sparks.  Wear safety glasses, lab coat, gloves and closed in shoes when handling.  IF ON SKIN: Wash skin with water and soap.  IF IN EYES: Rinse eyes carefully with water for several minutes.  If SWALLOWED: Seek medical advice from doctor without delay.  IF INHALED: Remove to fresh air and rest in a position comfortable for breathing. Seek immediate medical advice.  If powder ignites put out with water. Do not use any other type of extinguisher. | |

NON-HAZARDOUS substances

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| **10vol (3%) hydrogen peroxide (liquid)** |  | Not classified as Hazardous | Wear safety glasses, lab coat, gloves and closed in shoes when handling.  Diluted hydrogen peroxide may cause burns and eye damage.  IF IN EYES: rinse with clean running water for several minutes. Lift eye lids occasionally to allow complete irrigation.  Wash off skin with water.  IF SWALLOWED: do not induce vomiting.  Avoid inhalation of vapours. Use in a well ventilated room. |

Other hazards and possible risks

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| Test tubes may break and cause cuts. Sweep up broken glass with a brush and dustpan, do not use fingers.  Discard any chipped or cracked test tubes to a broken glass bucket. |

Protective measures

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| --- | --- | --- | --- | --- |
| Lab coat | Safety glasses | Gloves | Fume cupboard | Other |
| Yes | Yes | Yes |  |  |

Student clean up and disposal of wastes

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| **Teacher notes:**  The approximate amount of manganese dioxide required is the amount that fits on the tip of a small spatula.  Try to give the students spatula’s that will go into the test tube. The powder tends to go everywhere if the students haven’t got the appropriate equipment.  **Student clean up:**  Do not put anything down the sink.  Have two labelled waste beakers set up in class. One for just manganese dioxide and the other the mix of manganese dioxide and hydrogen peroxide. Students with all safety equipment on, to carefully empty their test tubes into the correct beakers. Test tubes can be rinsed/cleaned afterwards. Lab technician to deal with waste appropriately.  Collect all equipment to one place for the lab technician. |

**Assessor’s signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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