**LAB TECHNICIAN NOTES SCHOOL:**

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| **EXPERIMENT 3.3: Reactivity of metals** |

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

Description of procedure (attach a copy of the experiment)

**Oxford Science 10:** pages 74–75 and 195

**Equipment required**

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| Each group requires:  100ml approximately of 2M Hydrochloric acid, 5 test tubes and test tube rack, a 0.5cm piece of the metals aluminium, copper, iron, magnesium and zinc. Small ball of steel wool, ruler, timer, bench mat and dishwashing detergent. |

**Recipes**

| Chemical/solution | Formula | Mol. Wt | Procedure |
| --- | --- | --- | --- |
| 2M Hydrochloric acid (liquid) | HCl | 36.46 | Make up in a fume cupboard with all safety equipment on.  Always add acid to water, never add water to acid as this may cause violent splashes.  32% Hydrochloric acid – in a 1 litre volumetric flask take 200ml of 32% hydrochloric acid and add to 800ml of deionised /distilled water with gentle swirling. Make up to 1 litre with deionised/distilled water.  36% Hydrochloric acid – 172ml of 36% hydrochloric acid to 1 litre of deionised/distilled water. Procedure as for 32% hydrochloric acid. |

**Hazardous chemicals required/produced**

| Reactant or product name and concentration | GHS classification | GHS hazard statement | Control measures |
| --- | --- | --- | --- |
| Hydrochloric acid  32% - 36%  (concentrate) | **DANGER**  https://jr.chemwatch.net/Resources/Images/GHSTox.GIF  Toxic  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 | Acute Toxicity.  Do not breathe vapour and avoid skin contact. May damage eyes.  Wear safety glasses, lab coat, closed in shoes and use in a fume cupboard at all times when preparing dilutions etc.  Always add acid to water never add water to acid as this may cause violent splashes.  IF ON SKIN (or hair): Rinse skin with water/shower. Remove/take off immediately all contaminated clothing.  IF INHALED: remove person to fresh air keep at rest in a position comfortable for breathing.  IF IN EYES: Rinse eyes carefully with water for several minutes. Remove contact lenses if able to without causing distress. Continue rinsing.  If SWALLOWED: Rinse mouth. Do not induce vomiting.  Seek medical attention if required. |
| 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. |
| Magnesium  (solid) | **DANGER**  https://jr.chemwatch.net/Resources/Images/GHSFla.GIF  Flammable | H228 – Flammable solid  H261 – In contact with water releases flammable gas | Keep magnesium away from open flames, hot surfaces, heat and sparks.  Wear lab coat, safety glasses and gloves when handling magnesium ribbon.  IF IN EYES: Rinse eyes carefully with fresh running water. Do not attempt to remove magnesium if it is embedded in the eye or contact lenses. Seek medical attention.  IF ON SKIN: wash with soapy water. Seek medical attention immediately if any irritation persists.  Avoid breathing any vapours produced from reactions. Do experiment in a well ventilated room. |
| Zinc foil  (solid) | **WARNING**  **C:\Users\temp\Dropbox\GHSEnv[1].gif**  Environmentally damaging | H410 – Very toxic to aquatic life with long lasting effects | Dispose of in accordance with local regulations. Suggest collecting zinc pieces that have been rinsed with water and dried, and putting in a labelled small container for waste collection. |

Other hazards and possible risks

|  |
| --- |
| Iron nails may be used. They have a sharp end which may pierce or graze skin.  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 | Yes | Use fume cupboard when preparing 2M hydrochloric acid. |
|  | | | | |

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

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

***All technicians 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.

|  |  |  |
| --- | --- | --- |
| **Technician’s name** | **Technician’s signature** | **Date** |
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Disposal of waste and lab technician notes

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| Iron nails can be used instead of iron metal.  Magnesium ribbon and zinc foil can be rinsed with water, dried and put in separate labelled containers for waste collection. Supply a large plastic sieve and beaker that the students can tip their metals into for collection.  Copper, iron nails and aluminium are not classified as hazardous, however suggest collecting rinsed and dried metals into a waste containers for waste collection. |

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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. |

**LAB TECHNICIAN NOTES SCHOOL:**

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| **EXPERIMENT 3.5: Conductivity of ionic compounds** |

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

Description of procedure (attach a copy of the experiment)

**Oxford Science 10:** pages 78–79 and 197

**Equipment required**

|  |
| --- |
| Each group requires: 1 spatula of large sodium chloride crystals, 1 spatula of coarse sea salt crystals, small petri dish, 4V battery or other 4V DC power source, ammeter, wires with alligator clips, 2 graphite electrodes (rods),  3 x 100ml beakers, large spatula, glass stirring rod, paper towel |

**Recipes**

| Chemical/solution | Formula | Mol. Wt | Procedure |
| --- | --- | --- | --- |
| Sodium chloride (salt) crystals (large) | NaCl | 58.5 | To make large salt crystals for the class you will need to make up 50ml of a saturated sodium chloride (salt) solution.  Pour a little of the saturated solution into a watch glass and allow the liquid to evaporate. Gently mix the dry crystals to disperse a little and then add more saturated salt solution and allow to evaporate. Continue the process until the crystals are at the required size. Crystals need to be big enough that the ends of the alligator clips do not touch when they are being tested for conductivity.  Large crystals can be stored for future classes. |

**Hazardous chemicals required/produced**

| Reactant or product name and concentration | GHS classification | GHS hazard statement | Control measures |
| --- | --- | --- | --- |
| Salt (solid) | **WARNING**  C:\Users\temp\Dropbox\GHSHar[1].gif  IRRITANT | H315 – Causes skin irritation  H319 – Causes serious eye irritation.  H350 – May cause respiratory irritation | IF ON SKIN: wash hands with soap and water. Wear gloves.  Wear safety glasses. Avoid contact with eyes.  IF IN EYES: flush immediately with fresh running water for several minutes. If irritation continues seek medical advice.  Avoid breathing dust. Use in a well ventilated area. |

Other hazards and possible risks

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| --- |
| Broken glass – glass beakers, petri dishes and stirring rods may break and cause cuts. Sweep up broken glass with a brush and dustpan, do not use fingers. Discard to a broken glass bucket.  A 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.  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. |

Protective measures

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

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

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

***All technicians 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.

|  |  |  |
| --- | --- | --- |
| **Technician’s name** | **Technician’s signature** | **Date** |
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Disposal of waste and lab technician notes

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| Salt solution can be collected and evaporated to make more large crystals for the future. Diluted salt solutions can be put down the sink followed by running water.  Coarse sea salt can be purchased from the supermarket.  Use carbon rods for liquid salt conductivity measurement. The ends of the alligator clips are fine to use for the solid salt crystals. |

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**LAB TECHNICIAN NOTES SCHOOL:**

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| **CHALLENGE 3.7: Modelling alloys** |

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

Description of procedure (attach a copy of the experiment)

**Oxford Science 10:** pages 82–83 and 199

**Equipment required**

|  |
| --- |
| Each group requires:  4 different colours of plasticine  Sand (12g)  Newspaper  Balance  Magnifying glass |

**Recipes**

| **Chemical/solution** | **Formula** | **Mol. Wt** | **Procedure** |
| --- | --- | --- | --- |
|  |  |  |  |

**Hazardous chemicals required/produced**

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

NON-HAZARDOUS substances

|  |  |  |
| --- | --- | --- |
| Plasticine |  | Plasticine not classified as hazardous. |
| Sand |  | Ensure clean from a supplier. Avoid getting in eyes, will irritate. |

Other hazards and possible risks

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| --- |
| Electronic balances 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 |  |  |  |  |
|  | | | | |

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

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

***All technicians 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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| **Technician’s name** | **Technician’s signature** | **Date** |
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Disposal of waste and lab technician notes

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| --- |
| Electronic balance: have as many electronic balances set up as possible. There is a lot of weighing, so balances will be in high demand.  Playdough can be used instead of plasticine. As sand is rolled into the plasticine/playdough it will need to be discarded after the experiment. Perhaps suggest the groups are bigger so as to limit waste. |

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