

| Pakistan Science Foundation                 |                             |  |             |
|---|-----------------------------|--|-------------|
| Ministry of Science & Technology, Islamabad |                             |  |             |
| List of STEM Activity Kits                  |                             |  | Annex-I     |
| Sr #  | Title                       | Suggestions/ Remarks                             | Any Remarks |
| 1   | Up Down Counter             | · Acrylic sheet                                  |             |
|   |                             | · Basic Electronics                              |             |
|   |                             | · PCB Layout with un assembled parts/ components |             |
| 2   | Code Lock                   | · Acrylic sheet                                  |             |
|   |                             | · Basic Electronics                              |             |
|   |                             | · PCB Layout with un assembled parts/ components |             |
| 3   | DIY Scissor Lift            | · Acrylic sheet                                  |             |
|   |                             | · Basic Electronics                              |             |
|   |                             | · PCB Layout with un assembled parts/ components |             |
| 4   | Wind Turbine DIY Kit        | · Acrylic sheet                                  |             |
|   |                             | · Basic Electronics                              |             |
|   |                             | · PCB Layout with un assembled parts/ components |             |
| 5   | Melody Bell                 | · Acrylic sheet                                  |             |
|   |                             | · Basic Electronics                              |             |
|   |                             | · PCB Layout with un assembled parts/ components |             |
| 6   | Water Level Indicator       | · Acrylic sheet                                  |             |
|   |                             | · Basic Electronics                              |             |
|   |                             | · PCB Layout with un assembled parts/ components |             |
| 7   | DIY Electromagnet Kit       | · Acrylic sheet                                  |             |
|   |                             | · Basic Electronics                              |             |
|   |                             | · PCB Layout with un assembled parts/ components |             |
| 8   | Shake Kit Generator         | · Acrylic sheet                                  |             |
|   |                             | · Basic Electronics                              |             |
|   |                             | · PCB Layout with un assembled parts/ components |             |
| 9   | Series and parallel circuit | · Acrylic sheet                                  |             |
|   |                             | · Basic Electronics                              |             |
|   |                             | · PCB Layout with un assembled parts/ components |             |
| 10  | Home Solar Energy           | · Acrylic sheet                                  |             |
|   |                             | · Basic Electronics                              |             |
|   |                             | · PCB Layout with un assembled parts/ components |             |
| 11  | Chair Swing Ride            | · Acrylic sheet                                  |             |

|    |                                    |  |
|----|------------------------------------|--|
|    |                                    | <ul style="list-style-type: none"> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul>                          |
| 12 | Infrared Switch                    | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 13 | Air Powered Car                    | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 14 | Hand Powered Generator             | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 15 | Electric Circuit 4 in 01           | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 16 | Water Boat Remote Control          | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 17 | Remote Control Car                 | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 18 | Home Solar Energy                  | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 19 | Robotic Car Drive With Hand Sensor | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 20 | Hovercraft Project Kit             | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 21 | Simple Circuit Kit                 | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 22 | Hydraulic Crane                    | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |

|    |  |   |
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| 23 | Infrared Remote                            | · Acrylic sheet                                     |
|    |  | · Basic Electronics                                 |
|    |  | · PCB Layout with un assembled parts/<br>components |
| 24 | FM Transmitter                             | · Acrylic sheet                                     |
|    |  | · Basic Electronics                                 |
|    |  | · PCB Layout with un assembled parts/<br>components |
| 25 | Energy Conversion Kit                      | · Acrylic sheet                                     |
|    |  | · Basic Electronics                                 |
|    |  | · PCB Layout with un assembled parts/<br>components |
| 26 | Oilfield Pump Jack                         | · Acrylic sheet                                     |
|    |  | · Basic Electronics                                 |
|    |  | · PCB Layout with un assembled parts/<br>components |
| 27 | Motor Water Pump Kit                       | · Acrylic sheet                                     |
|    |  | · Basic Electronics                                 |
|    |  | · PCB Layout with un assembled parts/<br>components |
| 28 | Electricity Generation<br>With Heat Energy | · Acrylic sheet                                     |
|    |  | · Basic Electronics                                 |
|    |  | · PCB Layout with un assembled parts/<br>components |
| 29 | Tesla Coil Manual                          | · Acrylic sheet                                     |
|    |  | · Basic Electronics                                 |
|    |  | · PCB Layout with un assembled parts/<br>components |
| 30 | Lucky Circle                               | · Acrylic sheet                                     |
|    |  | · Basic Electronics                                 |
|    |  | · PCB Layout with un assembled parts/<br>components |
| 31 | Motion Sensor                              | · Acrylic sheet                                     |
|    |  | · Basic Electronics                                 |
|    |  | · PCB Layout with un assembled parts/<br>components |
| 32 | Robotic Car Drive With<br>Sensor           | · Acrylic sheet                                     |
|    |  | · Basic Electronics                                 |
|    |  | · PCB Layout with un assembled parts/<br>components |
| 33 | Rain Alarm                                 | · Acrylic sheet                                     |
|    |  | · Basic Electronics                                 |
|    |  | · PCB Layout with un assembled parts/<br>components |
| 34 | Audio Level Indicator                      | · Acrylic sheet                                     |
|    |  | · Basic Electronics                                 |

|    |                                 |  |
|----|---------------------------------|--|
|    |                                 | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 35 | Laser Alarm                     | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|    |                                 | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|    |                                 | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 36 | Automatic water spray (in fire) | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|    |                                 | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|    |                                 | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 37 | Hydro Turbine                   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|    |                                 | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|    |                                 | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 38 | Astronomical Telescope          | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|    |                                 | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|    |                                 | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 39 | Walking Robot                   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|    |                                 | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|    |                                 | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 40 | Motor Water Pump                | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|    |                                 | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|    |                                 | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 41 | Safe Stopping Boat              | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|    |                                 | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|    |                                 | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 42 | Door Theft Alarm                | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|    |                                 | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|    |                                 | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 43 | Inter Com                       | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|    |                                 | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|    |                                 | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 44 | Sound Operated Switch           | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|    |                                 | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|    |                                 | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 45 | Lucky Circle                    | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|    |                                 | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|    |                                 | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 46 | Electronic Taps                 | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |

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|----|------------------------------|--|
|    |                              | <ul style="list-style-type: none"> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul>                          |
| 47 | Electro Magnet               | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 48 | Remote Control Toy Car       | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 49 | Anti-Gravity Pencil          | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 50 | Drawing Robot                | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 51 | Rubber Powered Propeller Car | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 52 | Pneumatic Jack               | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 53 | DIY Solar Fan                | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 54 | Water Dispenser              | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 55 | Quiz Project                 | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 56 | Variable Power Supply        | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 57 | FM Transmitter               | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |

|    |                       |   |
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| 58 | Electric Motor        | · Acrylic sheet                                     |
|    |                       | · Basic Electronics                                 |
|    |                       | · PCB Layout with un assembled parts/<br>components |
| 59 | Touch Switch          | · Acrylic sheet                                     |
|    |                       | · Basic Electronics                                 |
|    |                       | · PCB Layout with un assembled parts/<br>components |
| 60 | Auto Motor Controller | · Acrylic sheet                                     |
|    |                       | · Basic Electronics                                 |
|    |                       | · PCB Layout with un assembled parts/<br>components |
| 61 | Metal Detector        | · Acrylic sheet                                     |
|    |                       | · Basic Electronics                                 |
|    |                       | · PCB Layout with un assembled parts/<br>components |
| 62 | Auto Light Controller | · Acrylic sheet                                     |
|    |                       | · Basic Electronics                                 |
|    |                       | · PCB Layout with un assembled parts/<br>components |
| 63 | Water Level Indicator | · Acrylic sheet                                     |
|    |                       | · Basic Electronics                                 |
|    |                       | · PCB Layout with un assembled parts/<br>components |
| 64 | Traffic Signal Lights | · Acrylic sheet                                     |
|    |                       | · Basic Electronics                                 |
|    |                       | · PCB Layout with un assembled parts/<br>components |
| 65 | USB Table Fan         | · Acrylic sheet                                     |
|    |                       | · Basic Electronics                                 |
|    |                       | · PCB Layout with un assembled parts/<br>components |
| 66 | Wind Turbine          | · Acrylic sheet                                     |
|    |                       | · Basic Electronics                                 |
|    |                       | · PCB Layout with un assembled parts/<br>components |
| 67 | Hydraulic Robotic Arm | · Acrylic sheet                                     |
|    |                       | · Basic Electronics                                 |
|    |                       | · PCB Layout with un assembled parts/<br>components |
| 68 | Oilfield Pump Jack    | · Acrylic sheet                                     |
|    |                       | · Basic Electronics                                 |
|    |                       | · PCB Layout with un assembled parts/<br>components |
| 69 | Periscope             | · Acrylic sheet                                     |
|    |                       | · Basic Electronics                                 |

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|    |   | · PCB Layout with un assembled parts/<br>components |
| 70 | <b>Electric Generator</b>   | · Acrylic sheet                                     |
|    |   | · Basic Electronics                                 |
|    |   | · PCB Layout with un assembled parts/<br>components |
| 71 | <b>Fire Alarm</b>   | · Acrylic sheet                                     |
|    |   | · Basic Electronics                                 |
|    |   | · PCB Layout with un assembled parts/<br>components |
| 72 | <b>Basic Aircraft</b>   | · Acrylic sheet                                     |
|    |   | · Basic Electronics                                 |
|    |   | · PCB Layout with un assembled parts/<br>components |
| 73 | <b>Solar Powered House<br/>DIY Kit, Renewable<br/>Energy, Solar Energy</b>  | · Acrylic sheet                                     |
|    |   | · Basic Electronics                                 |
|    |   | · PCB Layout with un assembled parts/<br>components |
| 74 | <b>Day &amp; Night, Solar &amp;<br/>Lunar Eclipse Model,<br/>Astronomy</b>  | · Acrylic sheet                                     |
|    |   | · Basic Electronics                                 |
|    |   | · PCB Layout with un assembled parts/<br>components |
| 75 | <b>Automatic Water<br/>Sprinkler Firefighter<br/>System, Physics, Sensors,<br/>Electronics</b>  | · Acrylic sheet                                     |
|    |   | · Basic Electronics                                 |
|    |   | · PCB Layout with un assembled parts/<br>components |
| 76 | <b>Handmade AC<br/>Generator, Conversion<br/>of mechanical energy<br/>(kinetic energy) into<br/>electrical energy by<br/>using magnetic induction</b> | · Acrylic sheet                                     |
|    |   | · Basic Electronics                                 |
|    |   | · PCB Layout with un assembled parts/<br>components |
| 77 | <b>DIY Astronomical<br/>Telescope Kit 2.0,<br/>Astronomy Light Optics</b>   | · Acrylic sheet                                     |
|    |   | · Basic Electronics                                 |
|    |   | · PCB Layout with un assembled parts/<br>components |
| 78 | <b>Solar Car Science<br/>Project Kit 2,0,<br/>Renewable Energy,<br/>Solar Energy, Force and<br/>movement</b>  | · Acrylic sheet                                     |
|    |   | · Basic Electronics                                 |
|    |   | · PCB Layout with un assembled parts/<br>components |
| 79 |   | · Acrylic sheet                                     |

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|           | <b>Solar Powered Fan Science Project Kit, Renewable Energy, Solar energy</b>               | · Basic Electronics                              |
|           |  | · PCB Layout with un assembled parts/ components |
|           |  |  |
| <b>80</b> | <b>Science Project Wireless Electricity, Electronics, Wireless Electricity</b>             | · Acrylic sheet                                  |
|           |  | · Basic Electronics                              |
|           |  | · PCB Layout with un assembled parts/ components |
| <b>81</b> | <b>Automatic Street Light Kit, Electronics, Light sensor, switch bridge</b>                | · Acrylic sheet                                  |
|           |  | · Basic Electronics                              |
|           |  | · PCB Layout with un assembled parts/ components |
| <b>82</b> | <b>Mini DC Water Pump Science Project kit for Students, Water Pressure</b>                 | · Acrylic sheet                                  |
|           |  | · Basic Electronics                              |
|           |  | · PCB Layout with un assembled parts/ components |
| <b>83</b> | <b>DIY Mini Drone Kit, Flight &amp; Aerodynamics'</b>                                      | · Acrylic sheet                                  |
|           |  | · Basic Electronics                              |
|           |  | · PCB Layout with un assembled parts/ components |
| <b>84</b> | <b>Fruit Power Battery Kit, Chemical reaction. Voltaic Battery, Electricity Generation</b> | · Acrylic sheet                                  |
|           |  | · Basic Electronics                              |
|           |  | · PCB Layout with un assembled parts/ components |
| <b>85</b> | <b>Mobile Bluetooth Controlled Robotic Car for Racing, Robotics</b>                        | · Acrylic sheet                                  |
|           |  | · Basic Electronics                              |
|           |  | · PCB Layout with un assembled parts/ components |
| <b>86</b> | <b>PSC DIY Robotic Kit with 6 Lessons, Robotics</b>  | · Acrylic sheet                                  |
|           |  | · Basic Electronics                              |
|           |  | · PCB Layout with un assembled parts/ components |
| <b>87</b> | <b>Working Model of Heart and Circulatory System, Working of heart, Biology</b>            | · Acrylic sheet                                  |
|           |  | · Basic Electronics                              |
|           |  | · PCB Layout with un assembled parts/ components |
| <b>88</b> |  | · Acrylic sheet                                  |



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|-----------|---|--|
|           | <b>Line Follower Robot, Robotics</b>  | <ul style="list-style-type: none"> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul>  |
| <b>89</b> | <b>Maze solver robotics kit, Robotics</b>   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul>                                   |
| <b>90</b> | <b>DIY Slime Kit, Chemistry</b>   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul>                                   |
| <b>91</b> | <b>Solar Powered Car 3.0, Renewable Energy, Solar energy</b>                          | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul>                                   |
| <b>92</b> | <b>Electric Motor Tank Kit, Gear pulley system. Force and movement, torque, speed</b> | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul>                                   |
| <b>93</b> | <b>Water rocket, Air pressure. Newton's third law, Aerodynamics</b>                   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul>                                   |
| <b>94</b> | <b>DIY Projector Kit, Optics</b>  | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul>                                   |
| <b>95</b> | <b>Led Distance Indicator Circuit Kit</b>   | <ul style="list-style-type: none"> <li>· Arduino UN/ NANO Based</li> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| <b>96</b> | <b>Password Based Door Lock System Circuit Kit</b>                                    | <ul style="list-style-type: none"> <li>· Arduino UN/ NANO Based</li> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| <b>97</b> | <b>Arduino Trash-Bot (Auto-Open/Close Trash Bin)</b>                                  | <ul style="list-style-type: none"> <li>· Arduino UN/ NANO Based</li> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| <b>98</b> | <b>How to make music with an Arduino Circuit Kit</b>                                  | <ul style="list-style-type: none"> <li>· Arduino UN/ NANO Based</li> <li>· Acrylic sheet</li> <li>· Basic Electronics</li> </ul>   |

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|     |   | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 99  | <b>Arduino Speed Detector Circuit Kit</b>       | <ul style="list-style-type: none"> <li>· Arduino UN/ NANO Based</li> </ul>                         |
|     |   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|     |   | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|     |   | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 100 | <b>RFID Based Door Lock system Circuit Kit</b>  | <ul style="list-style-type: none"> <li>· RFID / Arduino UN/ NANO Based</li> </ul>                  |
|     |   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|     |   | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|     |   | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 101 | <b>Ultrasonic Radar Circuit Kit</b>             | <ul style="list-style-type: none"> <li>· Arduino UN/ NANO Based</li> </ul>                         |
|     |   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|     |   | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|     |   | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 102 | <b>IOT Based Room Automation Circuit KIT</b>    | <ul style="list-style-type: none"> <li>· Arduino UN/ NANO Based</li> </ul>                         |
|     |   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|     |   | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|     |   | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 103 | <b>IOT Based Street Light Circuit Kit</b>       | <ul style="list-style-type: none"> <li>· Arduino UN/ NANO Based</li> </ul>                         |
|     |   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|     |   | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|     |   | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 104 | <b>IOT Based anti-theft alarm Circuit Kit</b>   | <ul style="list-style-type: none"> <li>· Arduino UN/ NANO Based</li> </ul>                         |
|     |   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|     |   | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|     |   | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 105 | <b>IOT Based Smart Gate Circuit Kit</b>         | <ul style="list-style-type: none"> <li>· Arduino UN/ NANO Based</li> </ul>                         |
|     |   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|     |   | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|     |   | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 106 | <b>Controlling LEDs Wirelessly Circuit Kit</b>  | <ul style="list-style-type: none"> <li>· Arduino UN/ NANO Based</li> </ul>                         |
|     |   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|     |   | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|     |   | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 107 | <b>Digital Clock Using 16*2 LCD Circuit Kit</b> | <ul style="list-style-type: none"> <li>· Arduino UN/ NANO Based</li> </ul>                         |
|     |   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|     |   | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |

|     |   |  |
|-----|---|--|
|     |   | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 108 | <b>Traffic Signal Lights Circuit Kit</b>              | <ul style="list-style-type: none"> <li>· Arduino UN/ NANO Based</li> </ul>                         |
|     |   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|     |   | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|     |   | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 109 | <b>Smart Gate With Counter Circuit Kit</b>            | <ul style="list-style-type: none"> <li>· Arduino UN/ NANO Based</li> </ul>                         |
|     |   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|     |   | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|     |   | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 110 | <b>Digital Voting Machine Circuit Kit</b>             | <ul style="list-style-type: none"> <li>· Arduino UN/ NANO Based</li> </ul>                         |
|     |   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|     |   | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|     |   | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 111 | <b>Jumping Jack Game Circuit Kit</b>                  | <ul style="list-style-type: none"> <li>· Arduino UN/ NANO Based</li> </ul>                         |
|     |   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|     |   | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|     |   | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 112 | <b>Obstacle Detector Robot</b>                        | <ul style="list-style-type: none"> <li>· Arduino UN/ NANO Based</li> </ul>                         |
|     |   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|     |   | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|     |   | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 113 | <b>Voice controlled Robot</b>                         | <ul style="list-style-type: none"> <li>· Arduino UN/ NANO Based</li> </ul>                         |
|     |   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|     |   | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|     |   | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |
| 114 | <b>Gesture Control Wheelchair For Disabled People</b> | <ul style="list-style-type: none"> <li>· Arduino UN/ NANO Based</li> </ul>                         |
|     |   | <ul style="list-style-type: none"> <li>· Acrylic sheet</li> </ul>                                  |
|     |   | <ul style="list-style-type: none"> <li>· Basic Electronics</li> </ul>                              |
|     |   | <ul style="list-style-type: none"> <li>· PCB Layout with un assembled parts/ components</li> </ul> |

### Chemistry KIT LIST

|     |                        |  |   |
|-----|------------------------|--|---|
| 115 | <b>Electro etching</b> | 1. Safety Wear   |   |
|     |                        | 2. Beaker 100 Ml 1   |   |
|     |                        | 3. DC power (4 regular AA battery cells)                                       | 1 |
|     |                        | 4. Electrode 1   |   |
|     |                        | 5. Single Hole Electric Discharge Machine with Copper Tube Electrode Drill Bit |   |

|     |                    |   |
|-----|--------------------|---|
|     |                    | 6. Sodium Chloride 500mg  |
|     |                    | 7. Sand Paper 1   |
|     |                    | 8. Steel plate for electro etching 1  |
|     |                    | 9. Stickers pasting on the electrode 1  |
|     |                    | 10. Cotton small roll   |
|     |                    | 11. Crocodile Clamps for connection securing 4                                |
|     |                    | 12. Chemical Electroetching Machine   |
| 116 | Salt Power         | 1. Sodium Chloride 500mg  |
|     |                    | 2. Glucose 500mg  |
|     |                    | 3. Beakers 100mL 2  |
|     |                    | 4. Battery  |
|     |                    | 5. Bulb   |
|     |                    | 6. Connecting Wires   |
|     |                    | 7. Measuring Cylinder 25 ml 2   |
|     |                    | 8. Beaker 1000ml 1  |
|     |                    | 9. Volumetric flask Measuring flasks of different size (100, 250, 500) 2 each |
| 117 | Boyles Law         | 1. Syringe 60mL 2   |
|     |                    | 2. Balloons   |
|     |                    | 3. Water bottle   |
|     |                    | 4. Food Color   |
| 118 | Solution making    | 1. Distilled water  |
|     |                    | 2. Analytical balance   |
|     |                    | 3. Weigh boats  |
|     |                    | 4. Graduated cylinder   |
|     |                    | 5. Volumetric flask Measuring flasks of different size (100, 250, 500) 2 each |
|     |                    | 6. Beakers 500ml 2  |
|     |                    | 7. Magnetic stir plate and stir bar   |
|     |                    | 8. pH meter   |
|     |                    | 9. Dilute sodium hydroxide  |
|     |                    | 10. Dilute hydrochloric acid  |
| 119 | Atomic Model       | Atomic Model 3D   |
| 120 | Periodic Table     | Periodic Table in the form of play cards                                      |
|     |                    | Periodic table made up of acrylic boxes for elements                          |
|     |                    | Periodic Table with Velcro  |
| 121 | Magnetic Separator | 1. Hollow plastic barrels open at two ends (two)                              |
|     |                    | 2. Cardboard 4*4ft  |
|     |                    | 3. Strong magnets (Four)  |
|     |                    | 4. Chart Paper 10   |

|     |                                    |   |
|-----|------------------------------------|---|
|     |                                    | 5. Wooden Sticks  |
|     |                                    | 6. Glue gun 1   |
|     |                                    | 7. Kebab Sticks 1 packets   |
|     |                                    | 8. Scissors 1 pair  |
| 122 | HYDROCARBONS                       | 1. Ball and stick model   |
|     |                                    | molecule with the molecular modeling  |
|     |                                    | Old Nobby, or HGS Polyhedron  |
| 123 | Gas Model                          | 1. <i>Instructions for Experiment Circus Cards</i>  |
|     |                                    | 2. Beaker, 250 cm <sup>3</sup>  |
|     |                                    | 3. Distilled water  |
|     |                                    | 4. Disprin  |
|     |                                    | 5. Plastic syringe  |
|     |                                    | 6. Air freshener or similar   |
|     |                                    | 7. Stopwatch or other timing device   |
|     |                                    | 8. Long tape measure to measure 10 m  |
|     |                                    | 9. Balloons   |
|     |                                    | 10. Freezer access  |
|     |                                    | 11. Conical flask, 250 cm <sup>3</sup>  |
|     |                                    | 12. Tea lights (small, metal-encased candles)   |
|     |                                    | 13. Beaker, 1 L   |
|     |                                    | 14. Matches   |
|     |                                    | 15. Calcium carbonate chips, about 100 g  |
|     |                                    | 16. Hydrochloric acid, 2 mol dm <sup>-3</sup><br>(IRRITANT), about 750 cm <sup>3</sup> This is best set up in<br>a draught-free area such as a fume cupboard. |
|     |                                    | 17. Conical flask, 250 cm <sup>3</sup>  |
|     |                                    | 18. 2 Measuring cylinders, 50 cm <sup>3</sup> each  |
|     |                                    | 19. Balloons to fit over the mouth of the<br>conical flask  |
|     |                                    | 20. electronic balance weighing to 0.01 g   |
|     |                                    | 21. Sodium carbonate solution, 2 mol dm <sup>-3</sup><br>(IRRITANT), about 500 cm <sup>3</sup>  |
| 124 | HYDROCARBONS IN<br>OUR DAILY LIVES | 1. <i>Tooth pick</i>  |
|     |                                    | 2. <i>Clay dough</i>  |
| 125 | Exo/endothermic<br>reactions       | 1. Vinegar  |
|     |                                    | 2. Sodium bicarbonate   |
|     |                                    | 3. Calcium chloride   |

|     |                 |  |
|-----|-----------------|--|
|     |                 | 4. Water   |
|     |                 | 5. Thermometer digital with stick  |
|     |                 | 6. 4 beakers   |
|     |                 | 7. 1 cup measuring cup   |
|     |                 | 8. WEIGHING BALANCE  |
|     |                 | 9. Glass rod 2   |
|     |                 | 10. Spatula 2  |
|     |                 | 11. Measuring spoons (1 tablespoon, ½ teaspoon)  |
| 126 | Magical liquid  | 1. Flask with cork   |
|     |                 | 2. Dropper   |
|     |                 | 3. Cork (bottle cap)   |
|     |                 | 4. Water   |
|     |                 | 5. <a href="#">Sodium hydroxide 500mg</a>  |
|     |                 | 6. <a href="#">Glucose 500mg</a>   |
|     |                 | 7. <a href="#">Methylene blue 500mL</a>  |
|     |                 | 8. Measuring Cylinder 25ml   |
|     |                 | 9. Beakers 250ml   |
|     |                 | 10. Volumetric flask 250ml   |
| 127 | Acid Rain       | Each group needs:  |
|     |                 | 1 cup vinegar  |
|     |                 | 1 cup distilled water  |
|     |                 | 2 medium-sized eggshell pieces (organic compound)  |
|     |                 | 2 small green leaves (organic compound)  |
|     |                 | 2 paperclips (inorganic compound)  |
|     |                 | 2 small- or medium-sized glass jars  |
|     |                 | masking tape and pen (for labeling containers)   |
|     |                 | two 1.5-inch strips of wide-range (0-14 pH) litmus paper; since groups need to use the comparison chart included with the litmus container, obtain enough dispensers for each group to have one; litmus paper is available from chemistry supply companies (such as Fisher) and well-equipped hardware stores. |
|     |                 | Acid Rain Effects Worksheet, 1 per student (can be found in Student Resources)   |
| 128 | Crystallization | 1. Hot Water   |
|     |                 | 2. Phenyl 2-hydroxybenzoate/phenyl salicylate  |
|     |                 | 3. Copper Sulphate   |
|     |                 | 4. Beakers   |
|     |                 | 5. Crystal seed  |
|     |                 | 6. Tweezer   |
|     |                 | 7. Watch glass   |
|     |                 | 8. Eye protection  |

|     |                      |  |
|-----|----------------------|--|
|     |                      | 9. Alum  |
|     |                      | 10. Food Color   |
|     |                      | 11. Sugar  |
|     |                      | Kaliumaluminium sulphate   |
| 129 | Electrochemical cell | 1. safety goggles (one pair per student)   |
|     |                      | 2. gloves (one pair per student)   |
|     |                      | 3. 2 beakers (500 ml) 1  |
|     |                      | 4. graduated cylinder (250 ml) 1   |
|     |                      | 5. Voltmeter 1   |
|     |                      | 6. copper sulfate (CuSO <sub>4</sub> ) solution (1.0M, 250 mL)   |
|     |                      | 7. zinc sulfate (ZnSO <sub>4</sub> ) solution (1.0M, 250 mL)   |
|     |                      | 8. 2-4 pieces of electrical wiring each with alligator clips   |
|     |                      | 9. Copper electrode 2  |
|     |                      | 10. Zinc electrode 2   |
|     |                      | 11. sodium chloride (NaCl) solution (500 mg)   |
|     |                      | 12. pipette (plastic or glass) 2   |
|     |                      | 13. 20-cm filter paper strips OR filter paper folded to ~1 cm thick and long enough to touch the liquids in each 250 mL beaker |
|     |                      | 14. LED-emitting light 4   |
| 130 | Design a cell        | 1. dilute sulphuric acid+sodium chloride   |
|     |                      | 2. Sodium sulphate 1L  |
|     |                      | 3. small fan, 2  |
|     |                      | 4. voltmeter, 1  |
|     |                      | 5. ammeter, 1  |
|     |                      | 6. several wires, 1  |
|     |                      | 7. glass tube, 1   |
|     |                      | 8. graphite electrode, 2   |
|     |                      | 9. Power supply. 1   |
| 131 | Solar Cell           | 1. mini solar PV panel   |
|     |                      | 2. piece of foam core board, on which to tape the solar panel  |
|     |                      | 3. 2 small alligator clamps  |
|     |                      | 4. a single light, such as a small Christmas tree light  |
|     |                      | 5. a voltmeter   |
|     |                      | 6. graph paper and pencils   |
|     |                      | 7. measuring ruler   |

|     |           |  |
|-----|-----------|--|
|     |           | 8. ¼-inch-thick foam core board, pre-cut into sets of wall and roof pieces that form variously-sized structures (different for each team),   |
|     |           | 9. cardboard, for plots of land; suggested size: ~24 x 24 in (~61 x 61 cm),  |
|     |           | 10. acrylic paint and paint brushes,   |
|     |           | 11. duct tape  |
|     |           | 12. scissors   |
|     |           | 13. light, small motor or buzzer   |
|     |           | 14. Xacto™ knife (and blades)  |
|     |           | 15. hot glue gun and glue sticks   |
| 132 | Batteries | 1. 2 pieces' aluminum foil: 8 in x 12 in (20 cm x 30 cm)   |
|     |           | 2. 2 wide-mouth glass jars (must be able to hold at least 150 ml)  |
|     |           | 3. 2 small paper cups (such as Dixie cups), cut at ¾ in from the cup bottom, or 2 plastic caps from milk jugs  |
|     |           | 4. 3 pieces (one wire of 30 cm and two wires of 80 cm) of non-insulated copper wire (gauge AWG 20) totaling 200 cm per student group. Or, if you have insulated wire, it will work if you strip the insulation off the ends. |
|     |           | 5. masking tape  |
|     |           | 6. wire cutters  |
|     |           | 7. marking pens  |
|     |           | 8. 3 glass jar with lids must be able to hold at least 150 ml);  |
|     |           | 9. vinegar,  |
|     |           | 10. citrus juice   |
|     |           | 11. sodium chloride  |
|     |           | 12. a few graduated cylinders (10–25 ml)   |
|     |           | 13. 3 pairs of safety glasses or goggles   |
|     |           | 14. 1 DC ammeter (to measure current in amperes)   |
|     |           | 15. paper towels   |
|     |           | 16. water and sink, or, if no drain is available, a large empty container to collect the used electrolyte solutions  |
|     |           | 17. 1 cup vinegar  |
|     |           | 18. 1 cup distilled water  |



|            |                                 |   |
|------------|---------------------------------|---|
|            |                                 | 19. 2 medium-sized eggshell pieces (organic compound)                       |
|            |                                 | 20. 2 paperclips (inorganic compound)                                       |
|            |                                 | 21. 2 small- or medium-sized glass jars                                     |
|            |                                 | 22. masking tape and pen (for labeling containers)                          |
|            |                                 | 23. 1.5-inch strips of wide-range (0-14 pH) litmus paper                    |
| <b>133</b> | <b>Green house</b>              | 1. 6 acrylic squares, approximately 10 to 12 inches (25 to 30-cm ) per side |
|            |                                 | 2. hot glue gun and glue sticks 1   |
|            |                                 | 3. soil and plant   |
|            |                                 | 4. thermometer digital 2  |
|            |                                 | 5. clear, wide strapping tape 1   |
|            |                                 | 6. saws, to cut acrylic or Plexiglas 1                                      |
| <b>134</b> | <b>Silver nanoparticles Kit</b> | 1. whiteboards (one per pair of students in group of four)                  |
|            |                                 | 2. dry erase markers and erasers  |
|            |                                 | 3. 15 m conical tube 2  |
|            |                                 | 4. mortar and pestle 1  |
|            |                                 | 5. 400 ml beaker with 200 ml of water 1                                     |
|            |                                 | 6. Distilled water 1L   |
|            |                                 | 7. Funnel 1   |
|            |                                 | 8. filter papers 4  |
|            |                                 | 9. hot plate 1  |
|            |                                 | 10. pipette 1   |
|            |                                 | 11. scale 1   |
|            |                                 | 12. gloves 1 PAIR   |
|            |                                 | 13. goggles 1   |
|            |                                 | 14. razor blade 1   |
|            |                                 | 15. 200 ml of 0.1 M of AgNO <sub>3</sub> stock solution 1                   |
|            |                                 | 16. Measuring Flask 1   |
|            |                                 | 17. silver nitrate, 25mg  |
|            |                                 | 18. trisodium citrate 500mg   |
|            |                                 | 19. Iron hydrogen sulfide   |
|            |                                 | 20. sodium sulfite 500mg  |
|            |                                 | 21. Nano silver sol   |
|            |                                 | 22. Karbaum 940; 1mol · L <sup>-1</sup>                                     |
|            |                                 | 23. sodium hydroxide solution; or 500Mg Solid                               |
|            |                                 | 24. distilled water   |
|            |                                 | 25. beaker, 2 -----250ML  |
|            |                                 | 26. measuring cylinder 25ML 1   |

|     |                  |   |
|-----|------------------|---|
|     |                  | 27. magnetic stirrer 1  |
|     |                  | 28. Hotplate 1  |
|     |                  | 29. agar culture medium, 1 box                                      |
|     |                  | 30. glucose coccus aureus suspension<br>(concentration OD600=0.1) 1 |
|     |                  | 31. antibiotics, 2 antibiotics box                                  |
|     |                  | 32. alcohol 1L  |
|     |                  | 33. Petri dish, 4   |
|     |                  | 34. tweezers, 1   |
|     |                  | 35. filter paper, 1 box   |
|     |                  | 36. sterile operating platform, 1                                   |
|     |                  | 37. thermostatic incubator 1  |
| 135 | pH Scale         | 1. 10 100mL beakers paper cups to hold test material                |
|     |                  | 2. Masking tape and pen (for labeling cups)                         |
|     |                  | 3. Vinegar  |
|     |                  | 4. Lemon juice  |
|     |                  | 5. Tomato or apple juice (pure)                                     |
|     |                  | 6. Distilled water 1L   |
|     |                  | 7. Sodium Chloride  |
|     |                  | 8. Household liquid bleach 1L                                       |
|     |                  | 9. Magnesium hydroxide Milk of Magnesia                             |
|     |                  | 10. Sodium Carbonate  |
|     |                  | 11. 2 Alka-Seltzer /Dispirit tables                                 |
|     |                  | 12. litmus paper and comparison chart. 1box                         |
|     |                  | 13. 1 small red cabbage   |
|     |                  | 14. Cold, distilled water   |
|     |                  | 15. Blender (for teacher use only)                                  |
|     |                  | 16. Fine mesh strainer  |
|     |                  | 17. Large beaker 1000mL   |
| 136 | Water Filtration | 1. activated charcoal   |
|     |                  | 2. gravel,  |
|     |                  | 3. sand (coarse and / or fine),                                     |
|     |                  | 4. cotton balls   |
|     |                  | 5. Filter papers pore size 190                                      |
|     |                  | 6. Filter papers pore size 150                                      |
|     |                  | 7. Disposable box with lid and 250ml 4                              |
|     |                  | 8. Scissors   |
|     |                  | 9. Measuring cup  |
|     |                  | 10. Spoon   |

|     |   |  |
|-----|---|--|
|     |   | 11. Stopwatch or clock with a second hand  |
|     |   | 12. Pencil and paper   |
|     |   | 13. Coffee Filter  |
| 137 | <b>NOMENCLATURE<br/>FOR FUNCTIONAL<br/>GROUPS</b> | 1. Ball and Stick Mode   |
| 138 | <b>Potato Polymer</b>                             | 1. Potatoe POWDER 500MG  |
|     |   | 2. 250 mL beaker 1   |
|     |   | 3. large watch glass, 1  |
|     |   | 4. hot plate 1   |
|     |   | 5. petri dish 4  |
|     |   | 6. pH paper 1box   |
|     |   | 7. disposable pipettes 10mL (approx. 4-5)  |
|     |   | 8. stirring rod 1  |
|     |   | 9. 25 mL graduated cylinder 1  |
|     |   | 10. 10 mL graduated cylinder 1   |
|     |   | 11. Goggles 1 pair   |
|     |   | 12. vegetable grater 1   |
|     |   | 13. food processor (at least one per class, but one for each group is preferred) |
|     |   | 14. Conical flask 1  |
|     |   | 15. Funnel 1   |
|     |   | 16. Filter Paper   |
|     |   | 17. bottle of glycerol 100-150 mL  |
|     |   | 18. bottle of 0.1 M hydrochloric acid 100-150 mL                                 |
|     |   | 19. bottle of sodium hydroxide 100-150 mL  |
|     |   | 20. distilled water 1L   |
|     |   | 21. water bottles, 250mL   |
|     |   | 22. plastics bags, medium Zip Lock 6   |
|     |   | 23. containers, and PVC  |
|     |   | 24. Test tubes, at least 1.5 cm ID and 10 cm long (6)                            |
|     |   | 25. Test tube rack, 1  |
|     |   | 26. modeling clay 1 box  |
|     |   | 27. Graduated Pipettes, 3-mL (3)   |
|     |   | 28. Any local dishwashing liquid 1   |
|     |   | 29. 3% hydrogen peroxide 500mL   |
|     |   | 30. Dried yeast 1 box  |
|     |   | 31. Beakers small (5)  |

|            |                        |   |
|------------|------------------------|---|
|            |                        | 32. Measuring spoons  |
|            |                        | 33. spatula for mixing 2  |
|            |                        | 34. Metric ruler 1  |
|            |                        | 35. Digital Timer 1   |
|            |                        | 36. Calculator 1  |
|            |                        | 37. Graph paper 1   |
|            |                        | 38. Paper   |
|            |                        | 39. Pen   |
|            |                        | 40. Paper towels 1 box  |
| <b>139</b> | <b>Green Chemistry</b> | 1. Goggles 1 pair   |
|            |                        | 2. Gloves 1   |
|            |                        | 3. (10 mL) graduated cylinders 2  |
|            |                        | 4. test tubes 3   |
|            |                        | 5. Magnesium strip 1roll  |
|            |                        | 6. Steel wool 1roll   |
|            |                        | 7. hydrochloric acid3 M 500mL   |
|            |                        | 8. Zinc strip 2   |
|            |                        | 9. 5 mL 0.1 M copper (II) chloride solution 500mL                         |
|            |                        | 10. 5 mL 0.1 M copper (II) sulfate solution 500mL                         |
|            |                        | 11. 5 mL 0.1 M potassium carbonate solution 500mL                         |
|            |                        | 12. 5 mL 0.1 M sodium carbonate solution 500mL                            |
|            |                        | 13. 5 mL 0.1 M calcium chloride solution 500mL                            |
|            |                        | 14. 5 mL hydrogen peroxide (5-6%)<br>1.....500mL bottle                   |
|            |                        | 15. Potato piece/yeast/liver (sources of catalase).                       |
|            |                        | 16. Calcium oxide 500mg   |
|            |                        | 17. Copper wire 1   |
|            |                        | 18. Rubber stopper 1  |
|            |                        | 19. Wooden splint 1   |
|            |                        | 20. Match 1   |
|            |                        | 21. Calcium carbonate chips 1packet                                       |
|            |                        | 22. Wire gauze 1  |
|            |                        | 23. Bunsen burner 1   |
|            |                        | 24. Scoopula 1  |
| <b>140</b> | <b>Pesticide</b>       | 1. 6 pots or cups with drainage holes, such as seed-starting plastic pots |
|            |                        | 2. container or tray to catch draining water from the seed starting pots  |

|     |   |   |
|-----|---|---|
|     |   | 3. 60 seeds, such as lettuce or other plant that sprouts within a week  |
|     |   | 4. 1 graduated container, to measure the volume of the seed starting pots   |
|     |   | 5. bucket for mixing soil and “organic waste,” big enough to hold enough soil and organic waste to fill 3 of the seed-starting pots |
|     |   | 6. thermometer  |
|     |   | 7. potting soil or compost,   |
|     |   | 8. “Organic waste,” such as a solid food source that is easy to mix with soil, like oatmeal, flour or cornstarch.                   |
|     |   | 9. Transparent plastic wrap   |
| 141 | <b>Galvanization/Corrosion Resistance</b> | 1. . Safety Wear  |
|     |   | 2. Metal Object to Be Plated (Must be Steel)  |
|     |   | 3. A Power Supply (3v-6v)   |
|     |   | 4. Zinc Sulfate   |
|     |   | 5. Water  |
|     |   | 6. A Beaker (Glass or Plastic Object Can Be Used Instead)   |
|     |   | 7. Zinc Metal   |
|     |   | 8. Sand Paper (120)   |
|     |   | 9. A Tissue Paper   |
|     |   | 10. Wires   |
| 142 | <b>Water Filtration unit</b>              | 1. Filtration Assembly  |
|     |   | 2. activated charcoal   |
|     |   | 3. gravel,  |
|     |   | 4. sand (coarse and / or fine),   |
|     |   | 5. cotton balls   |
|     |   | 6. Filter papers pore size 190  |
|     |   | 7. Filter papers pore size 150  |
|     |   | 8. F  |
|     |   | 9. Measuring cup  |
|     |   | 10. Spoon   |
|     |   | 11. Stopwatch or clock with a second hand   |
|     |   | 12. Pencil and paper  |
|     |   | 13. Coffee Filter   |
| 143 | <b>Corrosion Prevention</b>               | 1. Test Tubes   |
|     |   | 2. Test Tube Stands   |
|     |   | 3. Oil  |
|     |   | 4. CaCl <sub>2</sub>  |
|     |   | 5. Water  |
|     |   | 6. Nails (Galvanized)   |
| 144 | <b>Turn Milk into Plastic</b>             | 1. Measuring cup glass (500ml) (1)  |

|            |   |  |
|------------|---|--|
|            |   | 2. Milk powder 1000mg  |
|            |   | 3. Stovetop/ heating mentle 1                                  |
|            |   | 4. Thermos 1   |
|            |   | 5. White vinegar 1L  |
|            |   | 6. Work surface that is safe to get damp<br>Aesbestos 1(2*2ft) |
|            |   | 7. Styrofoam or other heat-resistant cup 6                     |
|            |   | 8. White or distilled vinegar 1L                               |
|            |   | 9. Paper towels 1roll  |
|            |   | 10. Spoon 2  |
|            |   | 11. food coloring, 1 packet                                    |
|            |   | 12. glitter, or markers 1 packet                               |
| <b>145</b> | <b>Paper Chromatography</b>             | 1. Beaker 3 100mL  |
|            |   | 2. Ink red and blue  |
|            |   | 3. Filter paper strips/ Rectangular                            |
|            |   | 4. Filter paper round  |
|            |   | 5. Plant   |
|            |   | 6. Ethanol 500Ml   |
| <b>146</b> | <b>Simple Distillation Assembly</b>     | 1. Flask Round bottom---- 250 ml                               |
|            |   | 2. Condenser 1----- fits in the Round bottom flask             |
|            |   | 3. Iron stands with clamps 2                                   |
|            |   | 4. Hot plate 1   |
|            |   | Or Burner or Spirit lamp with Spirit 1                         |
|            |   | 5. Iron Bowl 1   |
|            |   | 6. Gas pipes 2 meter   |
|            |   | 7. Conical flask 1   |
|            |   | 8. Collecting duct 2   |
|            |   | 9. T- for distillation column 2                                |
|            |   | 10. Thermometers 2   |
| <b>147</b> | <b>Fractional Distillation Assembly</b> | 1. Flask Round bottom---- 250 ml                               |
|            |   | 2. Condenser 1----- fits in the Round bottom flask             |
|            |   | 3. Iron stands with clamps 2                                   |
|            |   | 4. Hot plate 1   |
|            |   | Or Burner or Spirit lamp with Spirit 1                         |
|            |   | 5. Iron Bowl 1   |
|            |   | 6. Gas pipes 2 meter   |
|            |   | 7. Conical flask 1   |
|            |   | 8. Collecting duct 2   |
|            |   | 9. T- for distillation column 2                                |
|            |   | 10. Thermometers 2   |
| <b>148</b> | <b>Invisible Inks</b>                   | 1. Safety Wear   |
|            |   | 2. Beakers 6 small,  |
|            |   | 3. cotton swabs  |

|     |                      |   |
|-----|----------------------|---|
|     |                      | 4. pipette 2                              |
|     |                      | 5. spatula 1                              |
|     |                      | 6. Glass rods 2                           |
|     |                      | 7. index card, one packet                 |
|     |                      | 8. pencil, one packet                     |
|     |                      | 9. lemon juice 1L                         |
|     |                      | 10. ammonia-based glass/window cleaner 1L |
|     |                      | 11. vinegar 1L                            |
|     |                      | 12. baking soda 500mg                     |
|     |                      | 13. red cabbage juice 1L                  |
| 149 | Design a fuel cell   | dilute sulphuric acid, Sodium Sulphate    |
|     |                      | Sodium sulphate                           |
|     |                      | small fan,                                |
|     |                      | voltmeter,                                |
|     |                      | ammeter,                                  |
|     |                      | plastic shell,                            |
|     |                      | several wires,                            |
|     |                      | copper sheet,                             |
|     |                      | glass tube,                               |
|     |                      | membrane electrode,                       |
|     |                      | graphite electrode,                       |
|     |                      | carbon paper,                             |
|     |                      | 8. power supply.                          |
|     |                      | Proton exchange membrane fuel cell        |
| 150 | Lead Acid Battery    | 1. Lead Acid battery                      |
|     |                      | 2. Electric fan                           |
|     |                      | 3. Crocodile clamps                       |
| 151 | Organic Ink          | 1. Powdered activated charcoal 500mg      |
|     |                      | 2. Water                                  |
|     |                      | 3. Glass bowl for mixing 1                |
|     |                      | 4. Spatula 1                              |
|     |                      | 5. Droppers 5                             |
|     |                      | 6. Ink pens 1                             |
|     |                      | 7. Beakers 6 small                        |
|     |                      | 8. Red Cabbage                            |
|     |                      | 9. Beetroot                               |
|     |                      | 10. Spinach                               |
| 152 | DIY Water Filtration | 1. activated charcoal                     |
|     |                      | 2. gravel,                                |
|     |                      | 3. sand (coarse and / or fine),           |
|     |                      | 4. cotton balls                           |
|     |                      | 5. Filter papers pore size 190            |
|     |                      | 6. Filter papers pore size 150            |
|     |                      | 7. Bottles 250mL                          |

|                              |   |   |  |
|------------------------------|---|---|--|
|                              |   | 8. Scissors   |  |
|                              |   | 1. Measuring cup  |  |
|                              |   | 2. Spoon  |  |
|                              |   | 3. Stopwatch or clock with a second hand                                      |  |
|                              |   | 4. Pencil and paper   |  |
|                              |   | 5. Coffee Filter  |  |
| 153                          | Red Cabbage Chemistry                   | 1. Eight small beakers 100ml  |  |
|                              |   | 2. Acetic acid 1L   |  |
|                              |   | 3. Lemon juice 1L   |  |
|                              |   | 4. Milk,  |  |
|                              |   | 5. 7-up or sprite,  |  |
|                              |   | 6. Sodium carbonate 500mg   |  |
|                              |   | 7. Sodium hydroxide   |  |
|                              |   | 8. Glint glass cleaner, and   |  |
|                              |   | 9. Red cabbage juice indicator (prepared by teacher, see below), respectively |  |
|                              |   | 10. 7 ph indicator strips   |  |
|                              |   | 11. Red cabbage   |  |
| 154                          | Glucose Concentration                   | 1. Manual polarimeter   |  |
|                              |   | 2. Color filter   |  |
|                              |   | 3. Sample tank  |  |
|                              |   | 4. Grid value dial  |  |
|                              |   | 5. Polarizer  |  |
|                              |   | 6. A group of glucose standard concentration solutions with equal gradient    |  |
|                              |   | 7. Glucose solution to be tested  |  |
|                              |   | 8. Sodium lamp  |  |
|                              |   | 9. 9. Other parts   |  |
| <b>Computer Science Kits</b> |   |   |  |
| 155                          | Home Automation                         | · Arduino Uno   |  |
|                              | System using Bluetooth                  | · Bluetooth Module  |  |
|                              |   | · Relay Module  |  |
| 156                          | AI based street light                   | · Node Mcu  |  |
|                              |   | · IR Sensor   |  |
|                              |   | · Led's   |  |
| 157                          | Voice Controlled LED's                  | · Arduino based   |  |
|                              |   | · IR Sensor and Led's   |  |
| 158                          | Controlling Multiples devices using IOT | Esp 32 Based  |  |
| 159                          | Water Level Indicator with Arduino      | Arduino Uno Based   |  |



|     |   |                                   |
|-----|---|-----------------------------------|
| 160 | <b>AI-based Anti-theft alarm</b>                            | · IOT based                       |
|     |   | · Node Mcu                        |
|     |   | · Bulb and Holders                |
|     |   | · PIR Sensor                      |
|     |   | · Relay                           |
|     |   | · Transistor BC 547               |
|     |   | · Diode 1N4007                    |
| 161 | <b>Line follower robot</b>                                  | · Arduino Uno                     |
|     |   | · Motor Driver Shield             |
|     |   | · Wheels (4x)                     |
|     |   | · TT Gear Motor                   |
|     |   | · Infrared Sensor                 |
|     |   | · 18650 Li-on Battery and holders |
|     |   | · Acrylic Sheet                   |
|     |   | · DC Power Switch                 |
|     |   | · Jumpers                         |
| 162 | <b>AI-based control of light</b>                            | Arduino UNO                       |
|     |   | HC-05 Bluetooth Module            |
|     |   | 4-CH Relay Module                 |
|     |   | Jumpers                           |
|     |   | Breadboard / PCB                  |
| 163 | <b>AI-based Smart Gate</b>                                  | Arduino Board                     |
|     |   | Ultrasonic Distance Sensor        |
|     |   | Motor Driver Module               |
|     |   | DC or Servo Motor                 |
|     |   | Gate (or prototype gate)          |
|     |   | Power Supply                      |
| 164 | <b>Indicating distance between two objects using LED's</b>  | · Arduino UNO                     |
|     |   | · Ultrasonic sensor HC-SR04       |
|     |   | · Jumper wires                    |
|     |   | · LEDs                            |
| 165 | <b>Tic Tac Toe Game</b>                                     | · Acrylic Sheet                   |
| 166 | <b>Make Your own Digital stop watch</b>                     | Arduino nano                      |
| 167 | <b>Building a Digital Clock with Arduino and RTC Module</b> | Arduino Uno                       |
| 168 | <b>ATM Machine Working Model</b>                            | · Acrylic Sheet                   |
| 169 | <b>Arduino Trash-Bot</b>                                    | Arduino Uno                       |
|     |   | HC sr0                            |
|     |   | Ultrasound sensor                 |
|     |   | Servo motor                       |

|     |  |                                     |
|-----|--|-------------------------------------|
|     |  | Any box or Bin                      |
| 170 | <b>Car game with Arduino and I2C LCD Display</b>           | Arduino UNO                         |
|     |  | I2C 16x2 Arduino LCD Display Module |
| 171 | <b>Wireless Water-Tank Level Meter with Alarm</b>          | ultrasonic sensor                   |
|     |  | wireless transmitter                |
| 172 | <b>Hand gesture control wheelchair for disabled people</b> | Specified in the video              |
| 173 | <b>Smart Glasses for Blind Prototype</b>                   | Arduino nano                        |
|     |  | Ultrasonic sensor                   |
| 174 | <b>Arduino Speed Object Detector</b>                       | Arduino based                       |
| 175 | <b>Arduino Mega Chess</b>                                  | Arduino based                       |
| 176 | <b>Smart Blind Stick</b>                                   | Ultrasonic                          |
|     |  | sensor ,                            |
|     |  | arduino,                            |
|     |  | vibration motor,                    |
|     |  | 9v battery.                         |
| 177 | <b>Make a Siren Using Arduino</b>                          | Arduino Uno                         |
|     |  | Battery 9v                          |
|     |  | Led's                               |
| 178 | <b>Lamp Controller Using Arduino</b>                       | Arduino Based                       |
| 179 | <b>Train accident Prevention project</b>                   | Arduino Uno                         |
|     |  | 1. 7.4v Battery or Cable            |
|     |  | 2. Ultrasonic sensor                |
|     |  | 3. Sun board sheet                  |
|     |  | 4. 4x wheels                        |
|     |  | 5. 6x Led lights                    |
|     |  | 6. 6x Buzzer                        |
| 180 | <b>Temperature and Humidity Sensor</b>                     | Arduino Based                       |
| 181 | <b>Arduino Trash-Bot (Auto-Open/Close Trash Bin)</b>       | 1. Arduino (any board)              |
|     |  | 2. HC sr04 ultrasound sensor        |
|     |  | 3. Servo motor.                     |
|     |  | 4. Any box or Bin.                  |
| 182 | <b>Arduino Calculator</b>                                  | Arduino Uno                         |
| 183 | <b>Smartphone Control Self Balancing Robot</b>             | Arduino Nano                        |
| 184 | <b>Arduino Wheather Station</b>                            | Arduino Uno                         |
| 185 | <b>patient health monitoring system</b>                    | Arduino Uno                         |

|   |  |                                       |  |
|---|--|---------------------------------------|--|
| 186   | Simple RC Airplane for Simple Radio Control                              | Arduino Uno                           |  |
| 187   | Arduino based Wire harness wrapping machine                              | Arduino based                         |  |
| <b>DIY/ Models / Electronics / ICT/Arduino/ IoT/ Engineering KITs</b> |  |                                       |  |
| 188   | How to Generate Electricity by Trash , Plastic , Non-biodegradable Waste | · As per experiment requirement       |  |
| 189   | Running LED Tower  | · USING IC                            |  |
|   |  | · PCB Layout with required components |  |
| 190   | Garbage to electricity   | · As per experiment requirement       |  |
| 191   | Free Energy from Road  | · As per experiment requirement       |  |
| 192   | DIY-How to make free energy water pump                                   | · As per experiment requirement       |  |
| 193   | Gas from a Fridge Compressor   | · As per experiment requirement       |  |
| 194   | Electric Power Free Energy Generator With DC Motor at Home               | · As per experiment requirement       |  |
| 195   | Solar, wind and hydro power working model for science project            | · As per experiment requirement       |  |
| 196   | Drip irrigation working model for school                                 | · Arduino Base                        |  |
| 197   | Traffic Light Circuit Using   555 Timer IC   Led Projects.               | · USING Timer IC 555                  |  |
|   |  | · PCB Layout                          |  |
|   |  | · Required Components                 |  |
| 198   | Amazing RGB Led chaser Using Timer IC555 and Counter IC 4017             | USING IC 555 + IC 4017                |  |
|   |  | PCB Layout                            |  |
|   |  | · Required Components                 |  |
| 199   | Water Fountain with Plastic Bottle                                       | USING Plastic Bottles                 |  |
|   |  | Required Components                   |  |

|     |   |                                       |
|-----|---|---------------------------------------|
|     |   | Acrylic Sheet Base                    |
| 200 | How to make rocket with plastic bottle                    | USING Plastic Bottles                 |
|     |   | Required Components                   |
|     |   | Acrylic Sheet Base                    |
| 201 | V8 Engine Model - DIY at Home                             | Wooden Sheet                          |
|     |   | Required Components                   |
|     |   | · Acrylic Sheet Base                  |
| 202 | How To Make Drone With Hand-made Radio Control. DIY Drone | Wooden Sheet                          |
|     |   | Required Components                   |
|     |   | Acrylic Sheet Base                    |
| 203 | How to Make a Water Pump from Motor at Home               | Use a DC Motor                        |
|     |   | Required Components                   |
|     |   | PVC Pipe                              |
| 204 | Made Steam Engine Free Energy At Home                     | · As per requirement                  |
| 205 | How to Make 6 Cylinder Steam Engine at home               | · As per requirement                  |
| 206 | 8x8x8 LED CUBE WITH ARDUINO UNO                           | USING Arduino                         |
|     |   | · PCB Layout with required components |
| 207 | Amazing DIY Marble Machine made com Soda Cans             | · As per requirement                  |
| 208 | Automatic Hand Sanitizer Dispenser                        | · As per requirement                  |
| 209 | A Mini Hydroelectric Pond At Home                         | · As per requirement                  |
| 210 | 16x16x16 LED CUBE at home with Arduino platform           | · As per requirement                  |
| 211 | How To Make Wall Hanging Lamp                             | · As per requirement                  |
| 212 | how to make robot hand moving using muscle at your home   | · As per requirement                  |
| 213 | Arduino Humanoid Robot with Robotic Palms                 | · Arduino Based                       |

|     |   |                      |
|-----|---|----------------------|
| 214 | How to Make a Spider Robot □  | · Arduino Based      |
| 215 | Electronic Mosquito Repellent Circuit Using 555 timer IC (DIY)            | · Arduino Based      |
| 216 | Holographic Flex LED  | · Arduino Based      |
| 217 | How to Make Emergency light from Scrap LED                                | · As per requirement |
| 218 | How to make transparent folding display at your home                      | · As per requirement |
| 219 | How to make touch screen keypad display at your home                      | · As per requirement |
| 220 | DIY 7 Segment Digital Clock   | · Arduino Based      |
| 221 | Automatic Solar Tracker *□ ( Without Arduino )                            | · Arduino Based      |
| 222 | How to make Rain drop light   Simple 74hc595 ic Projects.                 | · Arduino Based      |
| 223 | How to make a 8x48 LED Scrolling Display at home                          | · Arduino Based      |
| 224 | How to Make Scrolling Text Display With Arduino   8x8 Matrix Display      | · Arduino Based      |
| 225 | How to make Wireless Control at Your Fingertips: DIY IR Remote Switch     | · As per requirement |
| 226 | How to Make # IR 4 Channel Remote Control System for your Room Appliances | · Arduino Based      |

|     |   |                      |
|-----|---|----------------------|
| 227 | <b>How to Make Homework Writing Machine at Home   Science Project</b>                         | · As per requirement |
| 228 | <b>Turn Plastic Bottles Into A Simple And Creative 220V Water Turbine Permanent Generator</b> | · As per requirement |
| 229 | <b>Automatic Staircase lights IR sensor Based using Ic 555</b>                                | · Arduino Based      |
| 230 | <b>Digital Clock DIY Kit project</b>  | · Arduino Based      |
| 231 | <b>How to Make Digital Universal Object Counter for Conveyor Belt Systems</b>                 | · Arduino Based      |
| 232 | <b>Electric Lift</b>  | · Arduino Based      |
| 233 | <b>Arduino Project - DIY IR BIDIRECTIONAL PERSON COUNTER</b>                                  | · Arduino Based      |
| 234 | <b>IoT Based Bidirectional Visitor Counter using ESP8266 &amp; MQTT</b>                       | · Arduino Based      |
| 235 | <b>Logic Gates Learning Kit # Transistor</b>  | · Arduino Based      |
| 236 | <b>Logic Car Parking Counter</b>  | · Arduino Based      |
| 237 | <b>Intelligent Traffic Light Control System</b>   | · Arduino Based      |
| 238 | <b>Smart Floor Cleaner Robot</b>  | · Arduino Based      |
| 239 | <b>Train &amp; Platform Accident Prevention</b>   | · Arduino Based      |
| 240 | <b>Carbon Purification for industries</b>   | · Arduino Based      |

|     |  |                               |
|-----|--|-------------------------------|
| 241 | <b>TEEN MAKES A DIY CO2 CAPTURE DEVICE</b>   | · Arduino Based               |
| 242 | <b>Laser Home Security System</b>  | · Arduino Based               |
| 243 | <b>How to Make Arduino based Smart Vacuum Cleaner Robot</b>  | · Arduino Based               |
| 244 | <b>LPG Gas Leakage Detector Project</b>  | · Arduino Based               |
| 245 | <b>As a '0' Gravity Hanging Water</b>  | · Arduino Based               |
| 246 | <b>Advance Solar Tracking and Automatic Sprinkler Irrigation</b>   | · Arduino Based               |
| 247 | <b>How To Make Mobile Charger At Home</b>  | · Arduino Based               |
| 248 | <b>How To Make Wireless Power Transfer System Like In Smart phones</b>                                       | · Arduino Based               |
| 249 | <b>How To Make Power Bank Using PVC Pipe</b>   | · Arduino Based               |
| 250 | <b>Grass Cutter</b>  | · Arduino Based               |
| 251 | <b>Logic Gates using Transistors</b>   | · Arduino Based               |
| 252 | <b>How To Make Emergency Power Bank within 2 minutes</b>   | · Arduino Based               |
| 253 | <b>DIY LED lamp/Acrylic sign light Acrylic Design/ How to make light name board/ homemade Acrylic design</b> | As per experiment requirement |
| 254 | <b>How To Make decorative Lamp   Antique Lamp   DIY Decor Lights</b>   | As per experiment requirement |
| 255 | <b>How to Make Homework Writing Machine at Home   Science Project</b>  | As per experiment requirement |

|     |  |   |
|-----|--|---|
| 256 | <b>Making a Simple Hydrogen Generator from Screw  at home</b>  | As per experiment requirement                     |
| 257 | <b>Made Steam Engine Free Energy At Home</b>   | Using Low Cost Materials                          |
| 258 | <b>Best Hydraulic bridge model    Engineering Science Project    Bascule Bridge   Award Winning Models</b> | As per experiment requirement                     |
| 259 | <b>solar power irrigation system project model   science project  </b>                                     | As per experiment requirement                     |
| 260 | <b>photosynthesis model 3d making step by step   science project</b>                                       | Using Acrylic Sheet                               |
|     |  | Other experimental requirements with minimum cost |
| 261 | <b>water cycle project 3d model   DIY</b>  | Using Acrylic Sheet                               |
| 262 | <b>Bio-gas plant working model making   science project   source of energy</b>                             | As per experiment requirement                     |
| 263 | <b>TYPES OF MOTION   PHYSICS WORKING MODEL   SCIENCE WORKING MODEL</b>                                     | As per experiment requirement                     |
| 264 | <b>Convection Project   Convection Working Model   Convection of heat experiment</b>                       | As per experiment requirement                     |
| 265 | <b>solar system working model for science exhibition with lights and stars -</b>                           | As per experiment requirement                     |

#### **MATH PROPOSED KITs**

|     |  |  |
|-----|--|--|
| 266 |  |  |
|-----|--|--|



|            |   |   |
|------------|---|---|
|            | <b>BASIC PROPORTIONALITY THEOREM</b>  | Convert it onto acrylic sheet with some modification to avoid copy right.   |
| <b>267</b> | <b>Linear Graph</b>   | Convert it onto electronic board using LEDs etc along base on acrylic sheet with some modification to avoid copy right. |
| <b>268</b> | <b>Congruency between triangles</b>   | Convert it onto acrylic sheet with some modification to avoid copy right.   |
| <b>269</b> | <b>PERDPENDICULAR AND ANGLE BISECTORS</b>                                     | Convert it onto acrylic sheet with some modification to avoid copy right.   |
| <b>270</b> | <b>How to Make a Working Model of Pythagoras Theorem / Math working Model</b> | Convert it onto acrylic sheet with some modification to avoid copy right.   |
|            |   | Convert it onto wooden sheet with some modification to avoid copy right.  |
|            |   |   |
| <b>271</b> | <b>CIRCLE THEOREMS</b>  | Convert it onto acrylic sheet with some modification to avoid copy right.   |
| <b>272</b> | <b>SETS AND FUNCTIONS</b>   | · Convert it onto acrylic sheet with some modification to avoid copy right.   |
| <b>273</b> | <b>TRIGONOMETRIC RATIOS</b>   | · Convert it onto electronic board using LEDs etc with some modification to avoid copy right.                           |
| <b>274</b> | <b>TRIGONOMETRIC FUNCTIONS AND THEIR GRAPHS</b>                               | Convert it onto electronic board using LEDs etc along base on acrylic sheet with some modification to avoid copy right. |
| <b>275</b> | <b>FUNDAMENTALS OF TRIGONOMETRY</b>   | · Convert it onto acrylic sheet with some modification to avoid copy right.   |
| <b>276</b> | <b>CONICS II</b>  | Convert it onto acrylic sheet with some modification to avoid copy right.   |
| <b>277</b> | <b>Plane Analytical Geometry</b>  | Convert it onto acrylic sheet with some modification to avoid copy right.   |
| <b>278</b> | <b>Properties of circle working math model</b>                                | Convert it onto acrylic sheet with some modification to avoid copy right.   |
| <b>279</b> | <b>Innovative Method of Learning the Concept of Circle and its Theorem</b>    | Convert it onto acrylic sheet with some modification to avoid copy right.   |
| <b>280</b> | <b>32 Soldiers Game</b>   | Convert it onto acrylic sheet with some modification to avoid copy right.   |
| <b>281</b> | <b>PRACTICAL GEOMETRY- TRIANGLES</b>  | Convert it onto acrylic sheet with some modification to avoid copy right.   |

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|-----|--|---|
| 282 | <b>RATIO AND PROPORTION</b>                        | Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 283 | <b>Factorization</b>                               | Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 284 | <b>Basic Statistics</b>                            | Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 285 | <b>DIRECT AND INVERSE VARIATIONS</b>               | Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 286 | <b>Quadratic Equation</b>                          | Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 287 | <b>INTRODUCTION TO TRIGONOMETRY</b>                | Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 288 | <b>QUADRATIC EQUATIONS</b>                         | Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 289 | <b>ANGLE IN A SEGMENT OF A CIRCLE</b>              | Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 290 | <b>PROBABILITY</b>                                 | Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 291 | <b>ARITHMETIC SEQUENCES AND SERIES</b>             | Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 292 | <b>Complex Number</b>                              | Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 293 | <b>Mathematical induction and binomial theorem</b> | Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 294 | <b>Differentiation-I</b>                           | · Convert it onto acrylic sheet with some modification to avoid copy right.                                     |
| 295 | <b>POLYNOMIALS</b>                                 | · Convert it onto acrylic sheet with some modification to avoid copy right.                                     |
| 296 | <b>DIFFERENTIATION</b>                             | · Convert it onto acrylic sheet with some modification to avoid copy right.                                     |
| 297 | <b>Matrices and Determinants</b>                   | Convert it onto electronic board using LEDs using acrylic sheet etc with some modification to avoid copy right. |
| 298 | <b>MEASUREMENTS AND CALCULATIONS</b>               | Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 299 | <b>Algebraic Expressions</b>                       |   |

|     |  |   |
|-----|--|---|
|     |  | Convert it onto acrylic sheet with some modification to avoid copy right.   |
| 300 | <b>GEOMETRIC SEQUENCES AND SERIES</b>                  | Convert it onto acrylic sheet with some modification to avoid copy right.   |
| 301 | <b>Transformation of Graph</b>                         | Convert it onto electronic board using LEDs etc using acrylic sheet with some modification to avoid copy right.   |
| 302 | <b>The Sum should be "15" – Math Puzzle</b>            | Convert it onto acrylic sheet with some modification to avoid copy right.   |
| 303 | <b>Geometrical Figures</b>                             | Convert it onto electronic board using LEDs etc using acrylic sheet with some modification to avoid copy right.   |
| 304 | <b>Working model on algebraic identity</b>             | · Convert it onto electronic board using LEDs etc using acrylic sheet with some modification to avoid copy right. |
| 305 | <b>Sum Should be "26" Puzzle</b>                       | · Convert it onto electronic board using LEDs etc using acrylic sheet with some modification to avoid copy right. |
| 306 | <b>Distance Formula</b>                                | · Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 307 | <b>Proof of Area of Circle</b>                         | · Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 308 | <b>Diagonal Move @ Math Game Puzzle</b>                | · Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 309 | <b>Cartesian co-ordinate math working model.</b>       | · Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 310 | <b>Exterior angle property - theorem working model</b> | · Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 311 | <b>HCF and LCM</b>                                     | · Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 312 | <b>Complementary angles working model</b>              | · Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 313 | <b>Corresponding angle working model (traversal)</b>   | · Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 314 | <b>Puzzle</b>  | · Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 315 | <b>Parallel lines and a transversal math</b>           | · Convert it onto acrylic sheet with some modification to avoid copy right.                                       |
| 316 | <b>3D shapes using thread</b>                          | · Convert it onto acrylic sheet with some modification to avoid copy right.                                       |

|     |   |   |
|-----|---|---|
| 317 | <b>How to make Easy Puzzle from Cardboard</b> | · Convert it onto acrylic sheet with some modification to avoid copy right. |
| 318 | <b>Types of triangle math's working model</b> | · Convert it onto acrylic sheet with some modification to avoid copy right. |
| 319 | <b>Sum should be 34</b>                       | · Convert it onto acrylic sheet with some modification to avoid copy right. |
| 320 | <b>Counting of Figure(No. of Triangle)</b>    | · Convert it onto acrylic sheet with some modification to avoid copy right. |
| 321 | <b>Venn Diagram Through Activity</b>          | · Convert it onto acrylic sheet with some modification to avoid copy right. |

## PHYSICS KITS

|     |   |   |
|-----|---|---|
| 322 | <b>PRESSURE IN LIQUIDS / Pascal Law/</b>                  | Can be build up with light weight plywood, acrylic sheet and cardboard. |
|     |   |   |
|     | <b>HYDRAULIC BRIDGE</b>                                   |   |
| 323 | <b>Archimedes principle</b>                               | Share with us if you have any better idea                               |
| 324 | <b>Speed/ Velocity/ Acceleration</b>                      | Kit should be re-assemble able.   |
| 325 | <b>Wind Power</b>   | All components should be de-attachable.                                 |
| 326 | <b>Physical Quantities Measurements</b>                   | Also give comparison among different systems of units                   |
| 327 | <b>DIY Bi-Metallic Strip: Exploring Thermal Expansion</b> | Do it with multiple types of metallic strips<br>Use Acrylic base        |
| 328 | <b>Force and Motion</b>                                   | Suggestion is welcome   |
| 329 | <b>Thermometer</b>  | Any advanced method is welcomed<br>Use Acrylic base                     |
| 330 | <b>Making a DIY telescope</b>                             | Any suggestion is welcomed  |
| 331 | <b>TOUCH SENSOR</b>                                       | Any suggestion is welcomed  |
| 332 | <b>DIY Wave Machine</b>                                   | It can be made more attractive with help of transparent sticks          |
| 333 |   | Make it using Acrylic   |

|            |                                 |                                       |
|------------|---------------------------------|---------------------------------------|
|            | <b>Electricity Generation</b>   |                                       |
| <b>334</b> | <b>DIY capacitors</b>           | Any suggestion to improve is welcomed |
| <b>335</b> | <b>WAVES</b>                    | Any suggestion to improve is welcomed |
| <b>336</b> | <b>PHYSICAL OPTICS</b>          | Any suggestion to improve is welcomed |
| <b>337</b> | <b>Periodic Waves</b>           | Any suggestion to improve is welcomed |
| <b>338</b> | <b>FLUID DYNAMICS</b>           | Any suggestion to improve is welcomed |
| <b>339</b> | <b>Polarization</b>             | Any suggestion to improve is welcomed |
| <b>340</b> | <b>Projectile motion</b>        | Any suggestion to improve is welcomed |
| <b>341</b> | <b>Projectile motion</b>        | Any suggestion to improve is welcomed |
| <b>342</b> | <b>Homemade projector</b>       | Make it with minimum cost             |
| <b>343</b> | <b>Simulating Radioactivity</b> | Suggest if you've better idea         |
| <b>344</b> | <b>Simulate Ohm's Law</b>       | Suggest if you've better idea         |
| <b>345</b> | <b>OPERATING LOGIC GATES</b>    | Suggest if you've better idea         |
| <b>346</b> | <b>Changing Fields</b>          | Any improved idea is welcomed         |
| <b>347</b> | <b>RLC</b>                      | Any improved idea is welcomed         |
| <b>348</b> | <b>Current Loop</b>             | Any improved idea is welcomed         |
| <b>349</b> | <b>Force Pair</b>               | Any improved idea is welcomed         |

|            |                                |  |
|------------|--------------------------------|--|
|            |                                |  |
| <b>350</b> | <b>Circuit Construction</b>    | Any improved idea is welcomed                                  |
| <b>351</b> | <b>Electronic Torque</b>       | Use DIY motor using neodymium to better elaboration of concept |
| <b>352</b> | <b>Newton's laws of motion</b> | Any advanced suggestion is welcomed                            |
| <b>353</b> | <b>Solar sails</b>             | Any advanced suggestion is welcomed                            |
| <b>354</b> | <b>Sound Science</b>           | Any advanced suggestion is welcomed                            |
| <b>355</b> | <b>Momentum</b>                | Any advanced suggestion is welcomed                            |
| <b>356</b> | <b>Forces and Motion</b>       | Any advanced suggestion is welcomed                            |
| <b>357</b> | <b>Electrostatic Charge</b>    | Any advanced suggestion is welcomed                            |
| <b>358</b> | <b>Ohm's Law</b>               | Any advanced suggestion is welcomed                            |
| <b>359</b> | <b>Seismograph</b>             | Any advanced suggestion is welcomed                            |
| <b>360</b> | <b>Gravity</b>                 | Any advanced suggestion is welcomed                            |
| <b>361</b> | <b>Steam Engine</b>            | Any advanced suggestion is welcomed                            |
| <b>362</b> | <b>Hologram</b>                | Any advanced suggestion is welcomed                            |
| <b>363</b> | <b>Solar Eclipse</b>           | Any advanced suggestion is welcomed                            |
| <b>364</b> | <b>Solar System</b>            | Any advanced suggestion is welcomed                            |
| <b>365</b> | <b>LiFi</b>                    | Any advanced suggestion is welcomed                            |
| <b>366</b> | <b>Ruby Laser</b>              | Any advanced suggestion is welcomed                            |
| <b>367</b> | <b>Mutual Induction</b>        | Any advanced suggestion is welcomed                            |
| <b>368</b> | <b>Full Wave Rectifier</b>     | Any advanced suggestion is welcomed                            |
| <b>35</b>  | <b>Auto Hand Sanitizer</b>     | Any advanced suggestion is welcomed                            |
| <b>370</b> | <b>LPG Detector</b>            | Any advanced suggestion is welcomed                            |

|     |                            |   |
|-----|----------------------------|---|
| 371 | Thermal to Electric Energy | Any advanced suggestion is welcomed   |
| 372 | Non Stop Water Fountain    | Any advanced suggestion is welcomed   |
| 373 | Vacuum Cleaner             | Any advanced suggestion is welcomed   |
| 374 | Pulley System              | Any advanced suggestion is welcomed   |
| 375 | Servo Motor                | Any advanced suggestion is welcomed   |
| 376 | Digital Microscope         | Any advanced suggestion is welcomed   |
| 377 | Laser Fencing              | Any advanced suggestion is welcomed   |
| 378 | DIY Auto Fire Gun          | Any advanced suggestion is welcomed   |
| 36  | Remote Control             | Any advanced suggestion is welcomed   |
| 380 | Fire Detector              | Any advanced suggestion is welcomed   |
| 381 | Smart Agri Monitoring      | Any advanced suggestion is welcomed   |
| 382 | Emergency System           | Any advanced suggestion is welcomed   |
| 383 | Magnetic Slime             | Any advanced suggestion is welcomed   |
| 384 | Electromagnet              | Any advanced suggestion is welcomed   |
| 385 | Gauss Magnetic Accelerator | Any advanced suggestion is welcomed   |
| 386 | Smart Fertilizing          | Any advanced suggestion is welcomed   |
| 387 | Smart Speed Breaker        | Any advanced suggestion is welcomed   |
| 388 | Smart Glasses for blinds   | Any advanced suggestion is welcomed   |
| 37  | Tornados using magnets     | Any advanced suggestion is welcomed   |
| 390 | Lenz's Law                 | Any advanced suggestion is welcomed   |
| 391 | Neodymium Magic            | Any advanced suggestion is welcomed   |
| 392 | Title                      | PHARMACOLOGY  |
|     | Material                   | o Potassium iodide (KI) 1.5 parts   |
|     |                            | o Iodine 2.5 parts  |
|     |                            | o Ethanol 100 parts   |
|     |                            | o Water 2.5 parts   |
|     |                            | o Postal mortar   |
|     |                            | o weighing scale  |
|     |                            | o Beaker  |
|     |                            | o Flask   |
|     |                            | o Graduate cylinder   |
| 393 | Title                      | RAIN RESPONSIVE UMBRELLA  |
|     | Material                   | o Distilled water<br>o Acid Rain Solution: (adding 4 ml 1M H <sub>2</sub> SO <sub>4</sub> to 2 liters distilled water<br>o pH meter or pH paper |

|            |                 |  |
|------------|-----------------|--|
|            |                 | <ul style="list-style-type: none"> <li>o pH probe material (Universal Indicator Solution, or extract of cabbage/beet*)</li> <li>o White powder paint</li> <li>o Paint brush</li> <li>o Beakers or clear plastic cups (200-ml size, two per student or group)</li> <li>o 25-ml graduated cylinders (one per student or group of students)</li> <li>o 10-ml pipette (one per student or group of students)</li> <li>o Safety goggles</li> <li>o Gloves</li> <li>o Commercially available umbrella</li> </ul> |
| <b>394</b> | <b>Title</b>    | DETERMINING RATE OF A CHEMICAL REACTION  |
|            | <b>Material</b> | <ul style="list-style-type: none"> <li>o 5 Alka-Seltzer tablets</li> <li>o Ice + water (250 mL combined total)</li> <li>o 1.5 L room temperature water</li> <li>o 1-2 x 500 mL beakers</li> <li>o Kettle to heat 250 mL of water</li> <li>o Thermometer</li> <li>o Timer</li> <li>o Safety goggles</li> <li>o Spoon / spatula</li> <li>o Mortar &amp; pestle</li> </ul>  |
| <b>395</b> | <b>Title</b>    | HOW DOES COLOR AFFECT HEATING BY ABSORPTION OF LIGHT?  |
|            | <b>Material</b> | <ul style="list-style-type: none"> <li>o 6–8 identical glass jars with lids</li> <li>o 6–8 sheets of colored construction paper (different colors)</li> <li>o Scissors</li> <li>o Tape</li> <li>o Water</li> <li>o Thermometer</li> <li>o Modeling clay</li> <li>o Heat lamp,</li> <li>o Timer or clock</li> <li>o Drill and bit for making holes in jar lids</li> </ul>   |
| <b>396</b> | <b>Title</b>    | GAS DETECTING SENSOR USING NODEMCU   |
|            | <b>Material</b> | <ul style="list-style-type: none"> <li>o MQ-135</li> <li>o NODEMCU</li> </ul>  |



|     |                 |  |
|-----|-----------------|--|
|     |                 | <ul style="list-style-type: none"> <li>o Connecting Wires</li> <li>o Buzzer, Breadboard</li> <li>o USB Cable</li> <li>o uPy craft (or) Arduino IDE.</li> </ul>   |
| 397 | <b>Title</b>    | ATMOSPHERIC DISTILLATION UNIT  |
|     | <b>Material</b> | <ul style="list-style-type: none"> <li>o Distillation flask</li> <li>o Condenser</li> <li>o Cooling bath</li> <li>o Metal shield</li> <li>o Heat source</li> <li>o Thermometer</li> <li>o Automated unit</li> </ul>  |
| 398 | <b>Title</b>    | FLOURCENT INDICATOR  |
| 399 | <b>Material</b> | <ul style="list-style-type: none"> <li>o Silica Gel</li> <li>o Fluorescent Indicator Dyed Gel</li> <li>o Isoamyl Alcohol</li> <li>o (3- methyl-1-butanol) 99%.</li> <li>o Pressuring Gas</li> <li>o Acetone</li> <li>o Buffer Solution</li> <li>o Isopropyl Alcohol</li> <li>o Adsorption Column</li> <li>o Zone Measuring Device</li> <li>o Ultraviolet Light Source</li> <li>o Electric Vibrator</li> <li>o Hypodermic Syringe</li> <li>o Regulator</li> </ul> |
| 400 | <b>Title</b>    | ANILINE POINT AND MIXED ANILINE POINT OF PETROLEUM   |
|     | <b>Material</b> | <ul style="list-style-type: none"> <li>o Aniline Point Apparatus</li> <li>o Aniline and Sample</li> <li>o Pipette or syringe</li> <li>o Balance (if sample cannot be pipetted)</li> <li>o Safety goggles</li> <li>o Safety gloves</li> </ul>   |
| 401 | <b>Title</b>    | CAT ION EXCHANGE & AN ION EXCHANGE RE-GENERATION.  |
|     | <b>Material</b> | o LS-26131 water demineralization unit w/ data acquisition unit.   |
| 402 | <b>Title</b>    |  |

|            |                 |   |
|------------|-----------------|---|
|            |                 | STUDY THE PH NEUTRALIZATION FROM THE EARLIER DEMINERALIZATION PROCESS   |
|            | <b>Material</b> | o LS-26131 water demineralization unit w/ data acquisition unit.  |
| <b>403</b> | <b>Title</b>    | PRESSURE LOSS $\Delta P$ FOR A RANGE OF PIPE FITTINGS,<br>INCLUDING BENDS AND CONTRACTION.<br>(34MM DIA, 24 MM DIA, 16MM DIA PIPES) |
|            | <b>Material</b> | o HM 230 Flow of compressible fluids  |
| <b>404</b> | <b>Title</b>    | THE BOILING RANGE PETROLEUM PRODUCT BY USING ASTM D-86.   |
|            | <b>Material</b> | o Distillation flask  |
|            |                 | o Condenser   |
|            |                 | o Cooling bath  |
|            |                 | o Metal shield  |
|            |                 | o Heat source   |
|            |                 | o Thermometer   |
|            |                 | o Automated unit  |
| <b>405</b> | <b>Title</b>    | THE TYPES OF HYDROCARBONS IN LIQUID PETROLEUM PRODUCTS BY FLUORESCENT INDICATOR ADSORPTION (FIA).                                   |
|            | <b>Material</b> | o Silica Gel  |
|            |                 | o Fluorescent Indicator Dyed Gel  |
|            |                 | o Isoamyl Alcohol   |
|            |                 | o (3- methyl-1-butanol) 99%.  |
|            |                 | o Pressuring Gas  |
|            |                 | o Acetone   |
|            |                 | o Buffer Solution   |
|            |                 | o Isopropyl Alcohol   |
|            |                 | o Adsorption Column   |
|            |                 | o Zone Measuring Device   |
|            |                 | o Ultraviolet Light Source  |
|            |                 | o Electric Vibrator   |
|            |                 | o Hypodermic Syringe  |
|            |                 | o Regulator   |
| <b>406</b> | <b>Title</b>    | ANILINE POINT OF GIVEN SAMPLE AND CALCULATE DIESEL INDEX FROM IT.   |
|            | <b>Material</b> | o Aniline Point Apparatus   |
|            |                 | o Aniline and Sample  |
|            |                 | o Pipette or syringe  |

|            |                 |  |
|------------|-----------------|--|
|            |                 | <ul style="list-style-type: none"> <li>o Balance (if sample cannot be pipetted)</li> </ul>   |
|            |                 | <ul style="list-style-type: none"> <li>o Safety goggles</li> </ul>   |
|            |                 | <ul style="list-style-type: none"> <li>o Safety gloves</li> </ul>  |
| <b>407</b> | <b>Title</b>    | CREATE A VISUAL DOPPLER  |
|            | <b>Material</b> | <ul style="list-style-type: none"> <li>o Two pieces of construction paper in different colors</li> </ul>   |
|            |                 | <ul style="list-style-type: none"> <li>o Ruler</li> </ul>  |
|            |                 | <ul style="list-style-type: none"> <li>o Scissors</li> </ul>   |
|            |                 | <ul style="list-style-type: none"> <li>o Tape</li> </ul>   |
|            |                 | <ul style="list-style-type: none"> <li>o Small toy car</li> </ul>  |
|            |                 | <ul style="list-style-type: none"> <li>o Some blank paper and a pencil, or a camera</li> </ul>   |
| <b>408</b> | <b>Title</b>    | CREATE A POTATO BATTERY  |
|            | <b>Material</b> | <ul style="list-style-type: none"> <li>o Potato (Use a fresh potato as the experiment depends upon the juices inside the potato)</li> </ul>  |
|            |                 | <ul style="list-style-type: none"> <li>o Galvanized nail (are standard nails that have a zinc coating. They can be purchased at any hardware or home improvement store)</li> </ul> |
|            |                 | <ul style="list-style-type: none"> <li>o copper coin</li> </ul>  |
|            |                 | <ul style="list-style-type: none"> <li>o two alligator clips</li> </ul>  |
|            |                 | <ul style="list-style-type: none"> <li>o Voltmeter</li> </ul>  |
| <b>409</b> | <b>Title</b>    | DESIGN A SALTWATER CIRCUIT   |
|            | <b>Material</b> | <ul style="list-style-type: none"> <li>o Cup or beaker</li> </ul>  |
|            |                 | <ul style="list-style-type: none"> <li>o Masking tape</li> </ul>   |
|            |                 | <ul style="list-style-type: none"> <li>o Water</li> </ul>  |
|            |                 | <ul style="list-style-type: none"> <li>o Insulated copper wire</li> </ul>  |
|            |                 | <ul style="list-style-type: none"> <li>o Salt</li> </ul>   |
|            |                 | <ul style="list-style-type: none"> <li>o 9-volt battery</li> </ul>   |
|            |                 | <ul style="list-style-type: none"> <li>o Aluminum foil</li> </ul>  |
|            |                 | <ul style="list-style-type: none"> <li>o 3.7-volt light bulb in socket (or buzzer)</li> </ul>  |
|            |                 | <ul style="list-style-type: none"> <li>o Tongue depressors (or popsicle sticks)</li> </ul>   |
| <b>410</b> | <b>Title</b>    | DESIGN FORMAT FOR GRAVITATION  |
|            | <b>Material</b> | <ul style="list-style-type: none"> <li>o Small Dowel or Stick</li> </ul>   |
|            |                 | <ul style="list-style-type: none"> <li>o String</li> </ul>   |
|            |                 | <ul style="list-style-type: none"> <li>o Paperclips</li> </ul>   |
|            |                 | <ul style="list-style-type: none"> <li>o Scissors</li> </ul>   |
|            |                 | <ul style="list-style-type: none"> <li>o Tape</li> </ul>   |
|            |                 | <ul style="list-style-type: none"> <li>o Magnets</li> </ul>  |

|     |          |  |
|-----|----------|--|
|     |          | o Blocks or Books  |
| 411 | Title    | THE STRENGTH OF AN ELECTROMAGNET   |
|     | Material | o 6 volt (V) lantern battery<br>o Enamel-coated magnet wire, 30 AWG (75 feet)<br>o Alligator clip leads (2)<br>o Iron bolts; about 2 1/2 inches long and 1/2 inch in diameter (4)<br>o 220 grit sandpaper (about 1 square inch)<br>o Masking tape (1 roll)<br>o Box of steel paper clips (about 100 count)<br>o Scissors or wire cutters<br>o Optional: Shallow plastic container, slightly longer and wider than the iron bolts<br>o Recommended: A paper towel holder, or materials to make a simple spool holder for the magnet wire, like a pencil and a small cardboard box |
| 412 | Title    | SCAVENGER HUNT TO FIND PI  |
|     | Material | o 10 circular objects<br>o Measuring tape<br>o Calculator<br>o Notebook  |
| 413 | Title    | WATER BEADS   SUPERABSORBENT POLYMER   HYDROGELS   |
|     | Material | o Water beads<br>o Two 1000 ml beakers<br>o Water<br>o Saltwater<br>o Food color<br>o Stainless steel spatula<br>o Ruler<br>o Cookie sheet with rim or plate   |
| 414 | Title    | DEALING WITH DIABETES: THE ROAD TO DEVELOPING AN ARTIFICIAL PANCREAS   |
|     | Material | o Solderless breadboard;<br>o 330 kΩ resistor;<br>o 100 kΩ resistor;<br>o Jumper wire kit;   |

- o N-channel MOSFET;
- o 1 M $\Omega$  potentiometer;
- o 100 k $\Omega$  potentiometer;
- o 10 k $\Omega$  potentiometer;
- o Alligator clip test leads (4);
- o Battery holder for 8 AA batteries with wires;
- o AA batteries (8);
- o 24 AWG bare copper wire;
- o Bromothymol Blue Indicator solution 0.04% (w/v);
- o 12 V peristaltic liquid pump. The pump needs metal leads to connect alligator clips to it.
- o Although the pump comes with some tubing (inner diameter (ID) 2 mm and outer diameter (OD) 4 mm), extra tubing that works with the pump is also needed. You will need at least 40 cm of silicone tubing with an inner diameter (ID) of 4 mm so you can fit it over the pump tubing.
- o Digital scale with 0.1 g increments. A digital scale that would be suitable is the Fast Weigh MS-500-BLK Digital Pocket Scale;
- o Graduated cylinder, 100 mL or 250 mL;
- o Alternatively, a metric measuring cup could be used.
- o If you are using a graduated cylinder, you will also want to have a funnel that fits with the top of the graduated cylinder.
- o Optional: pH test strips;
- o Piece of Styrofoam® (at least 4 cm  $\times$  7 cm); this could be part of a Styrofoam take-out container, or a small Styrofoam block.
- o Bendable plastic drinking straw
- o Teaspoon
- o Scissors; in addition to cutting Styrofoam and a plastic straw, you will also need to cut some copper wire. Because of this, you will need a pair of scissors that you do not mind denting, or you could use a pair of wire cutters.

|     |          |   |
|-----|----------|---|
|     |          | <ul style="list-style-type: none"> <li>o Ruler, metric</li> <li>o Baking soda (at least 90 g)</li> <li>o Measuring cup or other small container to use for weighing baking soda on the scale</li> <li>o Distilled white vinegar (at least 1 L)</li> <li>o Distilled water (at least 1.2 L); available at your local grocery store.</li> <li>o Mixing bowls (at least 3). Two will need to be able to hold at least 200 mL, or 0.25 quarts, each.</li> <li>o Masking tape and a permanent marker for labeling bowls. Alternatively, small sticky notes and a pen or pencil could be used.</li> <li>o Permanent marker</li> <li>o Optional: Tape</li> <li>o Lab notebook</li> </ul> |
| 415 | Title    | HEAT TRANSFER CONCEPTS  |
|     | Material | <ul style="list-style-type: none"> <li>o Rods (Metallic and wood)</li> <li>o Arduino UNO x 1</li> <li>o 16 x 2 LCD Display x 2</li> <li>o LM35 temperature sensor</li> <li>o Connecting Wires</li> </ul>  |
| 416 | Title    | GRAVITY   |
|     | Material | <ul style="list-style-type: none"> <li>o Two blocks of known masses</li> <li>o Pulley with stand</li> <li>o Thread to place masses on pulley</li> <li>o Arduino UNO x 1</li> <li>o 16 x 2 LCD Display</li> <li>o Infrared (IR) sensor</li> <li>o Connecting Wires</li> </ul>  |
| 417 | Title    | DYNAMICS  |
|     | Material | <ul style="list-style-type: none"> <li>o Arduino UNO</li> <li>o IR Sensors x 2</li> <li>o 10k potentiometer x 2</li> <li>o 16X2 LCD Display Module</li> <li>o Connecting terminals</li> <li>o Power Supply</li> </ul>   |
| 418 | Title    | WORK AND ENERGY   |
|     | Material | <ul style="list-style-type: none"> <li>o Two blocks of known masses</li> <li>o Pulley with stand</li> </ul>   |

|     |                 |  |
|-----|-----------------|--|
|     |                 | <ul style="list-style-type: none"> <li>o Thread to place masses on pulley</li> <li>o Arduino UNO x 1</li> <li>o 16 x 2 LCD Display</li> <li>o Infrared (IR) sensor</li> <li>o Connecting Wires</li> </ul>  |
| 419 | <b>Title</b>    | PROPERTIES OF MATTER   |
|     | <b>Material</b> | <ul style="list-style-type: none"> <li>o Irregular shaped object</li> <li>o Arduino UNO x 1</li> <li>o 16 x 2 LCD Display</li> <li>o Load sensor</li> <li>o HX711 Amplifier Module</li> <li>o Connecting Wires</li> </ul>  |
| 420 | <b>Title</b>    | PHOTOELECTRIC EFFECT   |
|     | <b>Material</b> | <ul style="list-style-type: none"> <li>o Ne gas filled tube with two electrodes and quartz windows</li> <li>o Laser diode with low power of different colors</li> <li>o Digital voltmeter</li> <li>o Power supply</li> <li>o High-value resistors</li> </ul>                                     |
| 421 | <b>Title</b>    | DESIGNING AN INTEGRATED SYSTEM FOR WATER QUALITY MONITORING (WQM)  |
|     | <b>Material</b> | <ul style="list-style-type: none"> <li>o Target boards</li> <li>o Arduino Mega</li> <li>o data transmission module ESP8266 Wi-Fi module (NodeMCU)</li> <li>o pH sensor</li> <li>o Turbidity sensor</li> <li>o Ultrasonic sensor</li> <li>o DHT-11 sensor</li> <li>o ThingSpeak server</li> </ul> |
| 422 | <b>Title</b>    | ROBOTIC OPTIMIZATION OF AUTONOMOUS BATTERY ELECTROLYTES  |
|     | <b>Material</b> | <ul style="list-style-type: none"> <li>o High-precision pumping units,</li> <li>o Custom-machined PTFE fixtures,</li> <li>o Standard electrochemical tooling in the Consort probe</li> </ul>   |
| 423 | <b>Title</b>    | AUTOMATED TITRATION EXPERIMENT   |
|     | <b>Material</b> | <ul style="list-style-type: none"> <li>o pH probe</li> </ul>   |

|     |          |   |
|-----|----------|---|
|     |          | o Raspberry Pisingle, peristaltic pumps single, peristaltic pumps |
|     |          | o peristaltic pumps   |
|     |          | o PH meter  |
| 424 | Title    | BOYLE’S LAW AND DETERMINATION OF                                  |
|     |          | UNIVERSAL GAS CONSTANT (R)  |
|     | Material | o Boyle’s Law apparatus   |
|     |          | o four beakers (2 L)  |
|     |          | o warm-water bath   |
|     |          | o ice   |
|     |          | o barometer   |
|     |          | o digital thermometer   |
|     |          | o air compressor  |
|     |          | o tire gauge  |
|     |          | o 250 mL beaker   |
|     |          | o gas collection tube   |
|     |          | o 25 mL graduated cylinder  |
|     |          | o Mg ribbon   |
|     |          | o Cu wire   |
|     |          | o 3 M HCl   |
| 425 | Title    | CHEMICAL CAR: CONVERSION OF CHEMICAL REACTION INTO KINETIC ENERGY |
|     | Material | o Water bottle (square one is best)                               |
|     |          | o 1 straw   |
|     |          | o 1 bamboo skewer   |
|     |          | o Scissors  |
|     |          | o 4 plastic caps  |
|     |          | o 4 pony beads  |
|     |          | o Glue gun or other glue  |
|     |          | o Duct tape   |
|     |          | o Vinegar   |
|     |          | o Baking soda   |
|     |          | o Tissue paper  |
| 426 | Title    | MAKING HANDMADE PAPER ON LAB-SCALE                                |
|     |          | FROM DISCARDED PAPER  |
|     | Material | o Waste Paper   |
|     |          | o Straw   |
|     |          | o Shredder  |
|     |          | o Local sieves  |
|     |          | o Waste buckets   |
|     |          | o 2- 1000 ml beakers (heat-resistant)                             |
|     |          | o Stirrer   |
|     |          | o Hot plate   |



|     |                 |   |
|-----|-----------------|---|
|     |                 | <ul style="list-style-type: none"> <li>o Sodium Hydroxide</li> <li>o Calcium Carbonate</li> <li>o Starch</li> <li>o Shallow large size rectangular containers</li> <li>o Sponge</li> <li>o Blotting paper (blotters: paper, cloth, etc.)</li> <li>o Mold and Deckles</li> <li>o Lab-oven</li> <li>o Hand-press</li> </ul>   |
| 427 | <b>Title</b>    | DO PLANTS GROW IN GRAY WATER?   |
|     | <b>Material</b> | <ul style="list-style-type: none"> <li>o tap water (about 1 gallon [g]) (3.8 liters [l]) per group</li> <li>o 2 gray water (about 1 g [3.8 l] per group)</li> <li>o 2 20 seeds (of any type)</li> <li>o 20 small pots</li> <li>o 2 potting soil</li> <li>o 2 ruler</li> <li>o 2 triple-beam balance or electronic scale</li> <li>o 2 science notebook</li> </ul>  |
| 428 | <b>Title</b>    | IMPACT OF NITROGEN LEVELS ON GROWTH OF DUCKWEED   |
|     | <b>Material</b> | <ul style="list-style-type: none"> <li>o 80 fronds of duckweed</li> <li>o Petri dishes (four)</li> <li>o A nitrogen solution B of 25 milliliters (ml)</li> <li>o Nitrogen solution C (25 mL)</li> <li>o Nitrogen solution D (25 mL)</li> <li>o 25 ml of tap water</li> <li>o Inoculating loop</li> <li>o Magnifying glass or stereomicroscope</li> <li>o Multicolored pencils</li> <li>o Permanent pen or marker</li> <li>o Graph paper</li> <li>o Scientific notebook</li> <li>o Grow light or accessibility to a sunlit window</li> </ul> |
| 429 | <b>Title</b>    |   |
|     | <b>Material</b> | <ul style="list-style-type: none"> <li>o Metallic Impurity Detection by Making Use of Archimedes' Principle.</li> </ul>   |

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| 430 | Title      | Synthesis of Gold Nanoparticles for Diagnostics and Therapeutics   |
|     | Material   | Tetrachloroaurate ( $\text{HAuCl}_4 \cdot 3\text{H}_2\text{O}$ ), trisodium citrate ( $\text{Na}_3\text{C}_6\text{H}_5\text{O}_7 \cdot 2\text{H}_2\text{O}$ ), Round, bottom flask, graduated cylinder, volumetric flask, centrifuge tubes, Micro pipette, Tips, Falcon tubes, Condenser, Thermometer, Magnetic stirrer, Magnetic bar, and Centrifuge machine. |
| 431 | Title      | Synthesis of magnetic nanoparticles for biological and diagnostic applications   |
|     | Material's | iron chloride ( $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ ), Iron sulphate ( $\text{FeSO}_4$ ), Ammonium hydroxide, beakers, Micro pipette, graduated cylinder, centrifuge tubes, Thermometer, Micro pipette, Tips, Magnetic stirrer, Magnetic bar, Centrifuge machine, and Vacuum oven.   |
| 432 | Title      | Demonstration of Natural Substances as Weak Acids  |
|     | Material's | Syringe  |
|     |            | Knife  |
|     |            | Test tubes   |
|     |            | Test tube racks  |
|     |            | Beaker   |
|     |            | Citrus and non- citrus fruits  |
|     |            | pH paper   |
|     |            |  |
| 433 | Title      | Identification of Plant Compounds by Thin Layer Chromatography   |
|     | Material's | One TLC plate  |
|     |            | 2. Pencil  |
|     |            | 10 $\mu\text{L}$ capillary tubes (four tubes, in a Petri dish)   |
|     |            | Solutions like plant extract   |
|     |            | TLC chamber (jar) and lid, containing mobile phase   |
|     |            | Ruler  |
|     |            | Latex gloves   |
|     |            |  |
| 434 | Title      | Acid-Base Titration  |
|     | Material's | • Burette  |
|     |            | • Pipette  |
|     |            | • Conical flask  |

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|-----|-------------------|---|
|     |                   | <ul style="list-style-type: none"> <li>• Burette stand</li> <li>• Funnel</li> <li>• White glazed tile</li> <li>• Measuring flask (100 mL)</li> <li>• Oxalic acid</li> <li>• Sodium hydroxide solution</li> <li>• Indicator (iv) Indicators like Phenolphthalein, Methyl orange etc. depending upon the acid/base reaction.</li> </ul>   |
| 435 | <b>Title</b>      | Work and Energy: Heat Absorbing Capacity of Dark and Light-Colored Bodies   |
|     | <b>Material's</b> | Black colored pot, White colored pot, Water, Thermocouple, Data Logger, Computer  |
| 436 | <b>Title</b>      | Properties of Matter: 2.1 Young's Modulus   |
|     | <b>Material's</b> | Wires of different known materials, Micrometer, Extensometer, Weights of 0.5 kg, Stand, Hanger.   |
| 437 | <b>Title</b>      | How to access, visualize and explore the genomic and proteomic data   |
|     | <b>Material's</b> | <ul style="list-style-type: none"> <li>o A Computer / Laptop or Tablet</li> <li>o An Internet Connection</li> <li>o Access to few freely Online Databases and Tools</li> </ul>  |
| 438 | <b>Title</b>      | Measuring energy content of various types of food   |
|     | <b>Material's</b> | <ul style="list-style-type: none"> <li>• Materials to construct calorimeter include:</li> <li>1. A small lid-less tin can (4 by 4.5 inches)</li> <li>2. A Large lid- and bottom-less tin can (6 by 7 inches)</li> <li>3. A Wooden dowel (12 by 1/4 inches)</li> <li>4. An Aluminum foil pan (8 inch diameter)</li> <li>5. A bottle cork</li> <li>6. Minimum four Sewing needles (sharps size 10)</li> <li>7. Two 14-gauge craft wire (6 inch long)</li> <li>8. Graduated cylinder (measuring 250 mL)</li> </ul> |

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|     |            | 9. An Immersion thermometer   |
|     |            | 10. Safety glasses  |
|     |            | • A Lighter or long matches   |
|     |            | • Distilled water   |
|     |            | • Digital pocket scale (500g x 0.1 g increments)  |
|     |            | • Various food materials (dry food materials with high fat content are better) such as:   |
|     |            | 1. Peanuts, cashew nuts or other nuts   |
|     |            | 2. Popcorns   |
|     |            | • Paper or cloth towels   |
|     |            | • A calculator  |
| 439 | Title      | Panic Alarm System  |
|     | Material's | 555 IC  |
|     |            | • Resistor – 1K $\Omega$  |
|     |            | • Resistor – 22K $\Omega$   |
|     |            | • Resistor – 100K $\Omega$  |
|     |            | • Capacitor – 10 $\mu$ F  |
|     |            | • 9V Battery  |
|     |            | • Push Button   |
|     |            | • Mini Buzzer   |
|     |            | • Breadboard  |
|     |            | • Connecting Wires  |
| 440 | Title      | Climate crisis  |
|     | Material's | Experimental setup  |
|     | Duration   | 17–18 days  |
| 441 | Title      | Biodiversity - Endangered species   |
|     | Material's | Forceps, glass stir rod, micropipette, motor and pestle, rubber stopper, watch glass, wire gauze  |
| 442 | Title      | Prevent Hypothermia   |
|     | Material's | Foam, rubber bands, Styrofoam, cardboard, bubble wrap, wood, glue, duct tape, tin foil, cotton fabric, wool fabric, racing/emergency blankets, newspaper, perlite, clay, ice. |
| 443 | Title      | Water Contamination   |

|            |                   |  |
|------------|-------------------|--|
|            | <b>Material's</b> | Silt Density Index (SDI) Testers, Pocket TDS Testers, Pocket pH Meters, Digital Thermometers for Testing Water Temperature, Pocket Combo-Meters Multi-Measurement Water Quality Testers, Pocket ORP Meters, Myron L Digital Water Quality Test Instruments, Myron L Analog Test Meters.  |
| <b>444</b> | <b>Title</b>      | Automatic Staircase Lights using PIR Sensor and Relay  |
|            | <b>Materials</b>  | <ul style="list-style-type: none"> <li>o PIR Sensor</li> <li>o Relay Module (Relay Board)</li> <li>o LED</li> <li>o 1000Ω Resistor</li> <li>o BC547 IC</li> <li>o Connecting Wires</li> <li>o Breadboard</li> <li>o Power Supply</li> </ul>  |
| <b>445</b> | <b>Title</b>      | Cell Phone Detector  |
|            | <b>Materials</b>  | <ul style="list-style-type: none"> <li>o CA3130 Op-Amp</li> <li>o Resistors – 2.2MΩ x 2, 100KΩ, 1KΩ</li> <li>o Capacitors – 22pF x 2, 0.22nF, 47pF, 100μF</li> <li>o BC548 NPN Transistor</li> <li>o LED</li> <li>o Antenna</li> <li>o Connecting Wires</li> <li>o Breadboard</li> <li>o 9V Battery</li> </ul>   |
| <b>446</b> | <b>Title</b>      | Digital thermometer circuit.   |
|            | <b>Materials</b>  | <ul style="list-style-type: none"> <li>o The circuit can be assembled on a vero board or on a PCB.</li> <li>o Use 5V DC for powering the circuit.</li> <li>o POT R2 can be used for Zero adjustment.</li> <li>o IC2 and IC1 must be mounted on holders.</li> <li>o Capacitor C1 must be placed as close as possible to the power and ground pins of the CA3162.</li> </ul> |

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|-----|-----------|---|
|     |           | <ul style="list-style-type: none"> <li>o Capacitor C2 could be a polyester type while C1 can be a ceramic capacitor.</li> </ul>   |
|     |           | <ul style="list-style-type: none"> <li>o The DC power supply used for powering this circuit must be well regulated and free from any sort of noise.</li> </ul>  |
|     |           | <ul style="list-style-type: none"> <li>o The type numbers of the driver transistor are not critical and you can make suitable substitutions.</li> </ul>   |
|     |           | <ul style="list-style-type: none"> <li>o Hold function can be enabled by providing the pin 6 with 1.2V using a voltage divider network.</li> </ul>  |
| 447 | Title     | Effectiveness of wearing face mask to control the transmission of infectious diseases   |
|     | Materials | <ul style="list-style-type: none"> <li>o Bacterial growth medium (Blood agar)</li> <li>o Petri plates</li> <li>o Autoclave</li> <li>o Incubator (temperature maintained at 37°C) for culture plates</li> <li>o Face masks</li> <li>o Bunsen burner and laminar flow hood</li> <li>o Two persons as participants of the study</li> </ul>   |
| 448 | Title     | Urease based model colorimetric enzyme inhibition assay to solve an environmental and health problem  |
|     | Materials | <p><b><u>Chemicals:</u></b>(How to make these stocks is given in a separate sheet, instructions to the lab)</p> <ol style="list-style-type: none"> <li>1. Reagent A: Phosphate buffer (pH 7.4)</li> <li>2. Reagent B: Jack bean Urease</li> <li>3. Reagent C: Thiourea/inhibitors of choice</li> <li>4. Reagent D: Urea</li> <li>5. Reagent E: Phenol reagent</li> <li>6. Reagent F: Alkali reagent (pH greater than 7)</li> </ol> <p><b><u>Instruments:</u></b></p> <ol style="list-style-type: none"> <li>1. Weighing balance</li> <li>2. Centrifuge</li> <li>3. Incubator</li> </ol> |

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|                               |                  | 4. Micro centrifuge  |   |
|                               |                  | 5. Spectrophotometer   |   |
|                               |                  | <b><u>Glass/Plastic ware:</u></b>  |   |
|                               |                  | 1. Falcons (15 mL) x 3   |   |
|                               |                  | 2. Glass Test tubes x 5 + racks  |   |
|                               |                  | 3. Eppendorf x 3 + rack (2 mL)   |   |
|                               |                  | 4. Micropipettes + tips (200 µL, 1000 µL)  |   |
|                               |                  | 5. Spectrophotometer glass/plastic cuvettes  |   |
|                               |                  | o  |   |
| 449                           | <b>Title</b>     | Identifying Potential Inhibitor for HIV Protease using Computational Drug Discovery Approach   |   |
|                               | <b>Materials</b> | o Computer/Laptop (for beginners, windows OS will work). Minimum requirement:  |   |
|                               |                  | o core i5, 500 GB HDD, 6 GB RAM.   |   |
| 450                           | <b>Title</b>     | What happens with the e-waste we produce?  |   |
|                               | <b>Materials</b> | Computer, paper, and printer to create surveys, people to distribute the survey to (minimum of 10 households; see the Experimental Procedure for details) and lab notebook |   |
| <b>Experiments of Biology</b> |                  |  |   |
| 451                           | <b>Osmosis</b>   | 1 L Distilled water  | Instead of paper sheet for writing measurements, please provide A4 size erasable white board in kit.                            |
|                               |                  | 1 Measuring cylinder 1000ml  | Boiling tubes, measuring Cylinders, Beakers etc. shall make of plastic and no glassware shall use to ensure safety of students. |
|                               |                  | Several potatoes   |   |
|                               |                  | 1 Apple corer  |   |
|                               |                  | Sucrose/Glucose 500g   |   |
|                               |                  | 1 Scale with gram measurements,  |   |
|                               |                  | 6 Boiling tubes/beakers 100ml  |   |
|                               |                  | 3 Spoons, Ruler,   |   |
|                               |                  |  |   |

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|     |                        | 1 Erasable white board, 1 Pen/Pencil, 1 Timer  |   |
|     |                        | 1 box Paper towels, 6 Graph paper, 3 Wax pencil  |   |
|     |                        | 1 Potato peelers   |   |
| 452 | Rate of photosynthesis | 1 Aquatic plant  | Made this project kit using the photometer.   |
|     |                        | 1 Light source (lamp)  | Boiling tubes, measuring Cylinders, Beakers etc. shall make of plastic and no glassware shall use to ensure safety of students  |
|     |                        | NaHCO <sub>3</sub> 100g  |   |
|     |                        | 1 Water bath   |   |
|     |                        | 3 Syringes   |   |
|     |                        | 1 Meter ruler  |   |
|     |                        | 1 Medical Thermometer  |   |
|     |                        | 1 Beaker   |   |
|     |                        | 6 Boiling tube   |   |
|     |                        | 6 Stopper  |   |
|     |                        | Pipe (as show in video), rubber tube   |   |
|     |                        | Stopwatch  |   |
|     |                        | 1L Distilled water   |   |
|     |                        | 1 Photometer   |   |
|     |                        |  |   |
|     |                        |  |   |
|     |                        |  |   |
| 453 | Scientific Method      | All the items mentioned in the given video links are required to perform these activities. | The kit shall contain items from all the 4 links in separate Ziploc bags.   |
|     |                        |  | Boiling tubes, measuring Cylinders, Beakers etc. shall make of plastic and no glassware shall use to ensure safety of students. |
|     |                        |  |   |



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| 454 | Transport in Plants | Photometer  | The kit must contain a photometer along with all other items mentioned in materials.  |
|     |                     | Lamp  | Boiling tubes, measuring Cylinders, Beakers etc. shall make of plastic and no glassware shall use to ensure safety of students.   |
|     |                     | Ruler,  |   |
|     |                     | Plant shoot   |   |
|     |                     | Scalpel,  |   |
|     |                     | Beaker 100 ml   |   |
|     |                     | Capillary tube  |   |
|     |                     | Stopwatch   |   |
|     |                     | Vaseline  |   |
| 455 | Mitosis and meiosis | Make a kit containing multiple shaped chromatids which can be joined to form a chromosome, different cells, attachable and detachable nuclear membranes, thread like structure for spindle formation etc. Make a kit which a student can use to describe and learn all the stages of mitosis and meiosis. The components of kit shall be attachable and detachable. The material used for making kit shall be good quality plastic and acrylic plates for representing cell and different structures. | This video link is just for reference. Mitosis & meiosis models are not required but all the components which a student can assemble to describe all stages of mitosis and meiosis. |
|     |                     |   |   |
|     |                     |   |   |
|     |                     |   | Make a kit containing at least following items:   |

|     |                  |   |   |
|-----|------------------|---|---|
|     |                  |   | Multiple shaped chromatids which can be joined to form a chromosome, different cells made of acrylic plates, attachable and detachable nuclear membranes made of plastic, thread like structure for spindle formation etc. Make a kit which a student can use to describe and learn all the stages of mitosis and meiosis. The components of kit shall be attachable and detachable. The material used for making components of kit shall be durable i.e. plastic |
| 456 | Photosynthesis   | Electricity generating microbial fuel cells based working kits.   | Provide kits on both links given as reference based on Microbial fuel cells.  |
| 457 | Deforestation    | <div>Materials used:</div> <div>Acrylic sheet for making platform of robot.</div> <div>Arduino based project.</div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> | Make the simplest seed sowing Robot which incur the least cost.   |
| 458 | Nutrition in man | <div>Acrylic sheet.</div> <div>Metallic ruler for percentage representation.</div>  | Instead of using cardboard, please use acrylic sheet for  |

|     |   |   |  |
|-----|---|---|--|
|     |   | Plastic made shapes of different food items   | making wheel. The lines for making portion for different food compartments shall be adjustable by moving so that students can adjust the percentage of different food components as per their choice and understanding. Provide pictures/shapes of food items in durable form i.e. plastic to paste on the diet wheel. |
| 459 | Microscopy and structure of plant and animal cell | Forceps<br>Scalpel<br>Coverslip<br>Slides<br>Safety goggles<br>lab coat<br>microscope<br>toothpicks<br>iodine stain<br>onion<br>Marker pen<br>Sterile cotton swab<br>Methylene Blue<br>Paper towels<br><br>The kit shall also contain well prepared specimens of plant and animal cell so that students can compare their own prepared slides with the specimens. | Please provide microscope, slides, dyes and other related items for visualizing the plant and animal cell. The kit shall also contain well prepared specimens of plant and animal cells so that students can compare their own prepared slides with the specimens.   |
| 460 | Transportation of food and water                  | Plant shoot with and without leaves<br><br>3 Beakers 100ml  | Use food color as dye.<br><br>Please provide well prepared slides of xylem vessel as reference for students in the kit.  |

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|     |  | 3 Graduated cylinder 100ml  | Boiling tubes, measuring Cylinders, Beakers etc. shall make of plastic and no glassware shall use to ensure safety of students. |
|     |  | 2L Water  |   |
|     |  | 6 Teaspoons   |   |
|     |  | Food coloring (red, blue, and green), Timer   |   |
|     |  | Sharp knife, Microscope   |   |
|     |  | 50 Microscope slide,  |   |
|     |  | 50 Cover slips  |   |
|     |  | Pipette or water dropper  |   |
|     |  | Tweezers  |   |
|     |  |   |   |
| 461 | <b>BREATHING MOVEMENT</b>                            | 2-liter plastic bottle with cap   | Also provide one working model in the kit in prepared form for reference.   |
|     |  | 2 plastic drinking straws   |   |
|     |  | Two 9-inch balloons   |   |
|     |  | 1 larger balloon/stretchable plastic sheet  |   |
|     |  | 2 rubber bands  |   |
|     |  |   |   |
| 462 | <b>WORKING OF BICEPS AND TRICEPS TO MOVE THE ARM</b> | 6 rubber bands (a few different sizes)  | Provide durable and good quality material that can last for long time in the kit.   |
|     |  | thin rope, 2.5 m  |   |
|     |  | string, .5 m  |   |
|     |  | scissors  |   |
|     |  | paper, 1 sheet  |   |
|     |  | springs   |   |
|     |  | one 20-Newton spring scale  |   |
|     |  | ruler 12-inch   |   |
| 463 | <b>WRISTWATCH DESIGN FOR VISUALLY IMPAIRED</b>       | Arduino based smart glasses working project. Provide one assembled kit along with unassembled kits. | Please make Arduino based smart glasses for blind.  |
| 464 | <b>Germination</b>                                   | 12 Petri dishes   | Made a kit by which student can investigate conditions needed for seed germination as given in the video links 1 & 2            |
|     |  | Viable Seeds (6 different types)  |   |
|     |  | 1 roll of Cotton wool/  |   |
|     |  | 1L Sterile water  |   |

|     |  |  |  |
|-----|--|--|--|
|     |  | 0.5 L Oil  | Also make a kit on video 3. Build an Arduino Clinostat to Simulate Microgravity for Plants   |
|     |  | Arduino Clinostat based Microgravity project for plants.   |  |
|     |  |  |  |
| 465 | DNA extraction                               | 1-3 strawberries.  | These videos are for reference.  |
|     |  | 10 ml DNA Extraction Buffer                                |  |
|     |  | About 20 ml ice cold 91% or 100% isopropyl alcohol         |  |
|     |  | Large Ziploc bags  |  |
|     |  | 1 test tube  |  |
|     |  | 1 beaker 100 ml  |  |
|     |  | 1 funnel lined with a moistened paper towel/filter paper   |  |
|     |  | 1 coffee stirrer or transfer pipet                         |  |
|     |  | <b><u>DNA Extraction Buffer</u></b>                        |  |
|     |  | 100 ml shampoo   |  |
|     |  | 15 grams sodium chloride                                   |  |
|     |  | Water up to 1 liter  |  |
|     |  |  |  |
|     |  |  |  |
| 466 | YEAST RESPIRATION                            | 1 large test tubes, about 15 cm long and 20 mm in diameter | Make a kit which students can use to quantify the amount of respiration occurring in yeast-molasses cultures. Provide plastic made test tubes, beakers, flask cylinders instead of glass-made. |
|     |  | 1 small test tube, about 10 cm long and 8 mm in diameter   |  |
|     |  | squares cut from plastic wrap, about 8 cm on a side        |  |
|     |  | 12 rubber or cork stoppers, size 2                         |  |
|     |  | 1 test tube racks to hold large test tubes                 |  |
|     |  | 12 dropping pipettes                                       |  |
|     |  | five 300-ml beakers  |  |
|     |  | 1-liter flask  |  |
|     |  | 1-liter graduated cylinder                                 |  |
|     |  | 1 lab thermometer  |  |
|     |  | 1 kg (package) dry baking yeast                            |  |
|     |  | 12-ounce bottle molasses (unsulphured)                     |  |
|     |  | Graph paper  |  |
| 467 | GASEOUS EXCHANGE DURING VENTILATION OF LUNGS | 2 boiling tubes/conical flasks                             | Provide all the material required to perform this experiment in this kit as shown in the video. Provide  |
|     |  | 2 glass and 2 plastic delivery tubes                       |  |
|     |  | rubber bungs each with two holes                           |  |
|     |  | 1 stop watch   |  |
|     |  | short lengths of rubber tubing                             |  |

|     |  |  |   |
|-----|--|--|---|
|     |  | antiseptic solution 500 ml   | plastic made test tubes, beakers, flask cylinders instead of glass-made.                        |
|     |  | hydrogen carbonate indicator 500ml   |   |
|     |  |  |   |
| 468 | <b>ZOMBIE GOT MY LEG</b>                               | 1 package of cardboard interlocking packing pieces, such as the 1 cu ft. package | The videos contain different ideas from simple to advance for making prosthetic leg.            |
|     |  | 1 moving glass divider kit (cardboard interlocking divider pieces),              |   |
|     |  | ~4 pieces of PVC pipe, 6-in and 4-in lengths                                     |   |
|     |  | ~20 wooden dowel rods; ½ in diameter and ~16 in long                             |   |
|     |  | ~7 wooden flat sticks; ¼ in thick x 2 to 4 in wide and ~16 in long               |   |
|     |  | ~10 ft. vinyl tubing; ½ in x 3/8 in size   |   |
|     |  |  |   |
| 469 | <b>INVESTIGATE ALIEN GENETICS</b>                      | Printout of Physical Traits Images   | Provide all the material required to perform this experiment in this kit as shown in the video. |
|     |  | Printout of Sibling Images   |   |
|     |  | Printout of the Alien Genotype and Phenotype Table                               |   |
|     |  | Construction paper, different colors (orange and green must be included)         |   |
|     |  | Scissors   |   |
|     |  | Tape   |   |
|     |  | Glue   |   |
|     |  | Markers, crayons, and coloring pens  |   |
|     |  | Pencils  |   |
|     |  | Two coins  |   |
|     |  |  |   |
| 470 | <b>ENGINEERING AN IMPROVED MEDICAL DELIVERY SYSTEM</b> | Strings,   | Provide all the items mentioned in the link in one kit.   |
|     |  | Cloth,   |   |
|     |  | Shelf liner  |   |
|     |  | Zip ties,  |   |
|     |  | Pipe   |   |
|     |  | cleaners   |   |
|     |  | party favors with tubes  |   |
|     |  | Bulbs, bottle,   |   |
|     |  | Caps, plastic  |   |
|     |  | Pencil sharpener,  |   |
|     |  | Paper clips  |   |
|     |  | adhesives (tape, glue, wire), Disposable pipettes, Clams                         |   |
|     |  |  |   |
|     |  | 6 – 12 feet medical tubing, IV Clamps  |   |

|     |  |   |  |
|-----|--|---|--|
|     |  | Disposable syringe, wooden sticks                                     |  |
|     |  | Gauze, fly swatter, plastic cups, bowls                               |  |
|     |  | strainer, play dough, tape, Styrofoam                                 |  |
|     |  | icing tube with tips  |  |
|     |  |   |  |
| 471 | <b>STARCH<br/>DIGESTION BY<br/>SALIVARY ENZYME</b> | Safety goggles  |  |
|     |  | Starch solution in a beaker (can prepare your own with cornstarch)    |  |
|     |  | Test tubes - 4  |  |
|     |  | Test tube rack  |  |
|     |  | Benedict's solution   |  |
|     |  | 400 ml beaker   |  |
|     |  | Iodine solution   |  |
|     |  | Bunsen burner   |  |
|     |  | Tripod stand and gauze  |  |
|     |  | Syringe/graduated dropper   |  |
|     |  | Amylase solution  |  |
| 472 | <b>TECHNIQUES<br/>USED IN CELL<br/>BIOLOGY</b>     | Microscope with light options: black light, base white light, or both |  |
|     |  | 4 slides  |  |
|     |  | 4 slide cover slips   |  |
|     |  | 4 onion membrane samples  |  |
|     |  | scalpel   |  |
|     |  | tweezers  |  |
|     |  | 1 Onion Cell Lab Sheet  |  |
|     |  | 1 graph paper   |  |
|     |  | 2 sets of personal protection equipment                               |  |
|     |  | 2 pairs of rubber gloves  |  |
|     |  | 6 - 50 mL beakers   |  |
|     |  | 6 pipettes  |  |
|     |  | 2 fl. oz. iodine solution (laboratory grade)                          |  |
|     |  | 1 tbsp. turmeric  |  |
|     |  | 20 mL isopropyl alcohol   |  |
|     |  | 2 fl. oz. tonic water   |  |
|     |  | 2 fl. oz. energy drink  |  |
|     |  | 2 fl. oz. soft drink  |  |
|     |  | box of food coloring samples (0.3 fl. oz.; box of 4 colors)           |  |
|     |  | 10 fluorescent markers (all same color)                               |  |
|     |  | 2 pairs of rubber gloves for the teacher                              |  |
|     |  | pliers (for teacher to remove fluorescent marker ink pad)             |  |
|     |  | kitchen cutting knife (optional; for teacher only)                    |  |
|     |  | tablespoon  |  |
|     |  | box of tissues  |  |
|     |  | 3-5 black lights  |  |

Provide different chemicals in the kit which students can use or mix them to form a stain for staining their slides.

|     |   |   |  |
|-----|---|---|--|
| 473 | <b>FACTORS<br/>AFFECTING THE<br/>RATE OF<br/>ENZYMATIC<br/>REACTION</b> | Test tubes, at least 1.5 cm ID and 10 cm long (6)   | Design this kit in a way that students can investigate effects of substrate concentration, enzyme concentration, temperature and Ph. on enzyme activity.   |
|     |   | 1 Test tube rack  |  |
|     |   | Graduated Pipettes, 3-ml (3)  |  |
|     |   | Access to sink  |  |
|     |   | Dishwashing liquid (detergent) (1/2 cup)  |  |
|     |   | 3% hydrogen peroxide  |  |
|     |   | Dried yeast (1 package)   |  |
|     |   | Cups (5)  |  |
|     |   | 6 Measuring spoons (teaspoon and tablespoon)  |  |
|     |   | Spoons or spatula for mixing  |  |
|     |   | Metric ruler  |  |
|     |   | Timer   |  |
|     |   | Calculator  |  |
|     |   | Graph paper   |  |
|     |   | Paper   |  |
|     |   | Pen   |  |
|     |   | Paper towels  |  |
| 474 | <b>PROTEINS:<br/>MAKING AND<br/>TESTING MODEL<br/>PROTEINS</b>          | masking tape, 1 roll  | Design a kit which students can use to demonstrate structural and functional proteins as well as 4 levels of protein structures. i.e. Primary, secondary, tertiary and quaternary. These videos are for reference. |
|     |   | string, 2 feet (~61 cm)   |  |
|     |   | 2 paper plates, any size  |  |
|     |   | construction or brown wrapping paper  |  |
|     |   | 1 paper lunch bag   |  |
|     |   | saran/plastic wrap, 2 feet (~61 cm)   |  |
|     |   | 10 Popsicle/craft sticks or wooden cocktail sticks  |  |
|     |   | 10 wooden toothpicks, either flat or round style  |  |
|     |   | 4 mini marshmallows   |  |
|     |   | 3 scissors,   |  |
|     |   | 1 bag mini marshmallows   |  |
|     |   | a three-stage testing area composed of an oxygen (mini marshmallow) dispenser, dispensing station (lungs) and dumping station (cells), such as four cardboard boxes: a smaller one with holes (to hold the marshmallows and shake them out), a bigger “lungs” box underneath it (to catch stray marshmallows), a smaller box inside the big box to serve as an elevated stand, and a fourth “cells” box |  |
| 475 |   | 6 different types of plant seeds  |  |



|            |  |  |  |
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|            | <b>GROWTH<br/>RESPONCES IN<br/>PLANTS</b>      | A growing plant<br><br>Plastic zip-lock bags (3)<br>Permanent pen (1) or a pen and tape<br>6 Paper towels<br>Radish seeds (15)<br>Strong tape<br>Large cardboard box (1)   |  |
| <b>476</b> | <b>DIGESTIVE<br/>SYSTEM OF A MAN</b>           | scissors<br>white glue<br>tape (cellophane, masking, etc.)<br>pens and pencils<br>paper sheets 10<br>rulers<br>assorted building materials such as:<br>o balsa wood<br>o construction paper<br>o toothpicks<br>o popsicle sticks<br>o white paper<br>o string<br>o aluminum foil<br>o paper clips<br>o Styrofoam<br>o foam core<br>o film canisters, etc.<br>markers and crayons<br>hot glue gun | The last two videos are for giving concept that what type of food is used in space.                              |
| <b>477</b> | <b>BACTERIOPHAGE</b>                           | Styrofoam blocks<br>Styrofoam spheres,<br>Velcros different types<br>double sided tape<br>string, toothpicks<br>straws<br>pipe cleaners<br>paper<br>fuzzy pom-poms<br>Velcro squares<br>paper squares<br>  | Make different components of virus from durable material which can be attached to make a complete bacteriophage. |
| <b>478</b> | <b>BLOOD<br/>CIRCULATORY<br/>SYSTEM OF MAN</b> | 4 paper cups<br>4 wooden stirrers<br>clear, flexible tubing (3/4-inch diameter X 5/8-inch interior diameter X 4-inch length)<br>rubber stopper, a size that temporarily fits and blocks the tubing   | IF you have any better idea related to this topic, please incorporate it to make it better.                      |

|     |   |  |  |
|-----|---|--|--|
|     |   | white glue, 60 ml<br>1 cup (~237 ml) of 4% borax solution (50 ml)<br>graduated cylinder (50 ml)<br>water<br>marker, for labeling<br>1 cup (237 ml) of 1 M HCl (hydrochloric acid)<br>1 cup (237 ml) of 1 M NaOH (sodium hydroxide)<br>1 cup (237 ml) of enzyme solution,<br>1 cup (237 ml) of NaCl solution<br>1 cup (237 ml) of glucose solution<br>1 cup (237 ml) liquid dish or laundry detergent<br>6 test tubes<br>6 droppers or pipettes<br>safety goggles,<br>lab apron<br>gloves |  |
| 479 | <b>DISORDERS OF THE IMMUNE SYSTEM</b>                         | Bowls (8)<br>M&M's candies (24 of each color: red, green, yellow, blue)<br>Six-sided dice (6)<br>Pencil or pen<br>Clear tape   | This is a link to the site where complete procedure for doing this activity along with materials is given. |
| 480 | <b>STRUCTURE OF THE HUMAN HEART</b>                           | <ul style="list-style-type: none"> <li>▪ 1 sheep heart</li> <li>▪ dissection kit (scalpel, pins, probe, scissors)</li> <li>▪ dissection tray</li> <li>▪ protective gear</li> <li>o aprons,</li> <li>o disposable gloves,</li> <li>o lab goggles,</li> <li>▪ vinyl tablecloth</li> <li>▪ small kitchen trash bag</li> <li>▪ paper towels</li> <li>▪ 1-2 50-gallon lawn and leaf/trash bags</li> </ul>   | ▪  |
| 481 | <b>Design and build prototype face mask pollution filter.</b> | <ul style="list-style-type: none"> <li>▪ two-liter plastic bottle with cap,</li> <li>▪ 2 plastic drinking straws or 6 inches (15 cm) of tubing (clear flexible tubing works well, 0.5-1.0 cm in diameter)</li> </ul>   | You may also add the designing of pollution filter in face mask.   |

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|     |   | <ul style="list-style-type: none"> <li>▪ 3 balloons (1 large enough to stretch over bottom of two-liter bottle; 2 smaller ones, representing lungs)</li> <li>▪ 2 rubber bands</li> <li>▪ 2-inch (5-cm) cube of soft modeling clay</li> <li>▪ scissors</li> <li>▪ drill</li> <li>▪ 1 model lung</li> <li>▪ A variety of materials from which students may select to make a face mask filter, such as white paper, cotton balls, coffee filters, cloth, felt, gauze, foam, cotton batting, string, rubber bands, tape</li> <li>▪ Scissors</li> <li>▪ spray bottle of water</li> <li>▪ timing device</li> </ul> |   |
| 482 | <b>Engineering a hydroponic system to feed a class.</b>                                 | <ul style="list-style-type: none"> <li>▪ Hydroponic solution 5L</li> <li>▪ clean and dried plastic food containers</li> <li>▪ colanders</li> <li>▪ duct tape, and masking tape</li> <li>▪ pipe cleaners</li> <li>▪ plastic containers of different shapes and sizes</li> <li>▪ tubing</li> <li>▪ wooden sticks</li> <li>▪ zip ties</li> </ul>  | The link given at 2, 3 is an alternate activity kit. Our priority is to develop kit on the first link |
| 483 | <b>Create and modify a model virus that can be used safely to deliver gene therapy.</b> | <ul style="list-style-type: none"> <li>o electronic device to show videos</li> <li>o Styrofoam in various shapes such as balls, sticks, or cubes</li> <li>o cotton balls and polyester pom-pom balls, in assorted colors and sizes</li> <li>o pipe cleaners, in assorted colors</li> <li>o toothpicks</li> <li>o magnets</li> <li>o Velcro</li> <li>o scissors</li> <li>o adhesive tape markers</li> </ul>   |   |
| 484 | <b>Build and test replacement legs.</b>   | <ul style="list-style-type: none"> <li>▪ ruler or tape measure</li> <li>▪ scissors</li> <li>▪ 1 roll duct tape</li> <li>▪ plastic pipes,</li> <li>▪ metal pipes,</li> </ul>  | ▪   |

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|     |  | <ul style="list-style-type: none"> <li>▪ metal strips,</li> <li>▪ cardboard tube</li> <li>▪ wooden "2 x 4," thin metal duct material (to be rolled and taped into a tube shape), all generally 1.5 ft. (or .46 m) long</li> <li>▪ large sponges</li> <li>▪ cardboard, etc.</li> <li>▪ bath towels, pairs of pants, shoes</li> <li>▪ string, rope, twine (about 30 ft. [or 10 m])</li> </ul>   |   |
| 485 | <p><b>Explore if rooftop gardens are a viable option for combating the urban heat island effect.</b></p> | <ul style="list-style-type: none"> <li>▪ Foam core board or heavy cardboard (for creating two model buildings), ~15 x 20-inch [38 x 51-cm] sheet (which is half of the 30 x 40-in [~76 x 102-cm] size foam core board sheets)</li> <li>▪ 1-2 pieces of black tar paper, ~ 6 x 6-inch [15 x 15-cm] or use black sandpaper, or black construction paper to represent the black tar surface typically found on city building roofs</li> <li>▪ 1-2 pieces of sod (turf) and/or other sod or moss-like plants, ~ 6 x 6-inch [15 x 15-cm] piece</li> <li>▪ 1 piece of plastic sheeting (for roof deck insulation and waterproofing layer), 30 x 30-cm</li> <li>▪ duct tape and hot glue gun</li> <li>▪ X-ACTO knife, utility knife and scissors</li> <li>▪ 2 thermometers (at least one long thermometer so you can access the interior of the model structures)</li> <li>▪ 1 heat lamp</li> <li>▪ 1 electric fan</li> <li>▪ timer or stop watch</li> <li>▪ 10 paper sheets</li> <li>▪ pencils</li> <li>▪ 4 sheets of graph paper</li> <li>soil</li> <li>▪ Two foam core board (or heavy cardboard), ~</li> <li>▪ Two black tar paper</li> <li>▪ Two pre-cut sod pieces (15 x 15cm), ~</li> </ul> | <ul style="list-style-type: none"> <li>▪</li> </ul> |

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|     |   | <ul style="list-style-type: none"> <li>▪ plastic wrap for more waterproofing membrane material</li> </ul>  |   |
|     |   | <ul style="list-style-type: none"> <li>▪ duct tape</li> </ul>  |   |
|     |   | <ul style="list-style-type: none"> <li>▪ hot glue gun sticks</li> </ul>  |   |
|     |   |  |   |
| 486 | <b>Design and create sensory integration toys for children with developmental disabilities.</b> | <ul style="list-style-type: none"> <li>▪ Pencils, paper rulers</li> </ul>  | Please develop the kit on the link given at 1.  |
|     |   | <ul style="list-style-type: none"> <li>▪ 12 fasteners for fabricating the sensory toy devices, such as various woods, plastics, metals, cardboard, rope, fabric, glue, tape, etc.</li> </ul> |   |
|     |   | <ul style="list-style-type: none"> <li>▪ rulers</li> </ul>   | Link 2 & 3 are alternate links if developing kit at link 1 is not come under your capacity. |
|     |   | <ul style="list-style-type: none"> <li>▪ tape measures,</li> </ul>   |   |
|     |   | <ul style="list-style-type: none"> <li>▪ hand or power saws</li> </ul>   |   |
|     |   | <ul style="list-style-type: none"> <li>▪ drills, scissors, hot glue,</li> </ul>  |   |
|     |   | <ul style="list-style-type: none"> <li>▪ super glue</li> </ul>   |   |
|     |   |  |   |
| 487 | <b>Using Microcontrollers to model homeostasis.</b>   | <ul style="list-style-type: none"> <li>▪ Arduino™ Uno Development Board</li> </ul>   |   |
|     |   | <ul style="list-style-type: none"> <li>▪ breadboard</li> </ul>   |   |
|     |   | <ul style="list-style-type: none"> <li>▪ USB cable, for powering Arduino/uploading code</li> </ul>   |   |
|     |   | <ul style="list-style-type: none"> <li>▪ 10 wires to connect components, such as 6- or 7-inch jumper wires for Arduino boards</li> </ul>   |   |
|     |   | <ul style="list-style-type: none"> <li>▪ 3 LEDs</li> </ul>   |   |
|     |   | <ul style="list-style-type: none"> <li>▪ TMP36 temperature sensor</li> </ul>   |   |
|     |   | <ul style="list-style-type: none"> <li>▪ 3 220 ohm (<math>\Omega</math>) resistors;</li> </ul>   |   |
|     |   | <ul style="list-style-type: none"> <li>▪ 1-megaohm (<math>M\Omega</math>) resistor</li> </ul>  |   |
|     |   | <ul style="list-style-type: none"> <li>▪ IRF510 n-channel MOSFET (metal-oxide-semiconductor field-effect transistor)</li> </ul>  |   |
|     |   | <ul style="list-style-type: none"> <li>▪ 12V computer cooling fan</li> </ul>   |   |
|     |   | <ul style="list-style-type: none"> <li>▪ 12V AC adapter, to power the fan</li> </ul>   |   |
|     |   | <ul style="list-style-type: none"> <li>▪ Circuit Building Instructions Sheet, one per student</li> </ul>   |   |
| 488 | <b>Design and build an improved cast for a broken arm.</b>                                      | <ul style="list-style-type: none"> <li>· PCB cased circuit</li> </ul>  |   |
|     |   | <ul style="list-style-type: none"> <li>· acrylic based</li> </ul>  |   |
|     |   | <ul style="list-style-type: none"> <li>· Arduino Nano/UNO based</li> </ul>   |   |
|     |   | <ul style="list-style-type: none"> <li>· Electronic based</li> </ul>   |   |

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|     |  | Provide kits on both links  |  |
| 489 | <b>How to make robot hand moving using muscle at your home</b>                   | Provide 1 assembled and remaining unassembled kits for each school. | <ul style="list-style-type: none"> <li>· PCB based circuit</li> <li>· acrylic based</li> <li>· Arduino Nano/UNO based</li> <li>· Electronic based</li> </ul> |
| 490 | <b>Investigation of heat production in germinating seeds</b>                     |   | <ul style="list-style-type: none"> <li>· PCB cased circuit</li> <li>· acrylic based</li> <li>· Arduino Nano/UNO based</li> <li>· Electronic based</li> </ul> |
| 491 | <b>DNA model Project Rotating Working DNA Model</b>                              |   | <ul style="list-style-type: none"> <li>· Electronic based</li> </ul>   |
| 492 | <b>How tobacco smoke can affect and change the cells</b>                         |   | <ul style="list-style-type: none"> <li>· Electronic based</li> </ul>   |
| 493 | <b>IOT Paralysis Patient Healthcare Project</b>                                  |   | <ul style="list-style-type: none"> <li>· PCB cased circuit</li> <li>· acrylic based</li> <li>· Arduino Nano/UNO based</li> <li>· Electronic based</li> </ul> |
| 494 | <b>IoT Based Smart Pulse Oximeter with NodeMCU ESP8266 &amp; MAX30100 Sensor</b> |   | <ul style="list-style-type: none"> <li>· PCB cased circuit</li> <li>· acrylic based</li> <li>· Arduino Nano/UNO based</li> <li>· Electronic based</li> </ul> |

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| 495 | <b>IOT Smart Plant Monitoring System   Smart Irrigation</b>                     |  | Link 1 & 2. IOT based smart plant monitoring system that can monitor irrigation, humidity and temperature. |
|     |   |  |  |
|     |   |  | Link3.   |
|     |   |  | Simple Sensor based automatic irrigation system for agriculture.   |
|     |   |  |  |
|     |   |  | Link 4.  |
|     |   |  | Arduino based irrigation system  |
| 496 | <b>SEE WHAT HAPPENS TO PLANTS WHEN YOU PLACE A MAGNET IN A POT?</b>             |  | Provide all the components in the kit to perform this experiment as shown in the video.                    |
| 497 | <b>Effect of Electricity on Plant Growth</b>                                    |  | · Electronics based  |
| 498 | <b>IoT Based ECG Monitoring with AD8232 ECG Sensor &amp; ESP32</b>              |  | · PCB cased circuit  |
|     |   |  | · acrylic based  |
|     |   |  | · Arduino Nano/UNO based   |
|     |   |  | · Electronic based   |
|     |   |  |  |
| 499 | <b>Pulse/ Heartbeat Rate (BPM) Measurement using Arduino &amp; Pulse Sensor</b> |  | · PCB cased circuit  |
|     |   |  | · acrylic based  |
|     |   |  | · Arduino Nano/UNO based   |
|     |   |  | · Electronic based   |
| 500 | <b>How to Make Working Model of</b>   |  | Electronics Based kit  |

|                                    |   |   |                       |
|------------------------------------|---|---|-----------------------|
|                                    | <b>Human Heart and Circulatory system</b>               |   |                       |
| <b>501</b>                         | <b>How to make human digestive system working model</b> |   | Electronics based kit |
| <b>Chemistry Kits (Additional)</b> |   |   |                       |
| <b>502</b>                         | <b>Hydrogen Fuel Cell</b>                               | 1. one hydrogen fuel cell model car and controller per group                              |                       |
|                                    |   | 2. one water electrolyzer   |                       |
|                                    |   | 3. 2 test tubes   |                       |
|                                    |   | 4. 6 thin wood splints  |                       |
|                                    |   | 5. tape measure   |                       |
|                                    |   | 6. a plastic bottle filled with distilled water (200 mL)                                  |                       |
|                                    |   | 7. balance  |                       |
|                                    |   | 8. paper towels   |                       |
|                                    |   | 9. waste container  |                       |
| <b>503</b>                         | <b>UV detection</b>                                     | 1. Light source (tungsten lamp, deuterium lamp or other ultraviolet visible light source) |                       |
|                                    |   | 2. Monochromatic  |                       |
|                                    |   | 3. Prism  |                       |
|                                    |   | 4. Grating  |                       |
|                                    |   | 5. Absorption tank  |                       |
|                                    |   | 6. Detector   |                       |
|                                    |   | 7. Display, etc.  |                       |
|                                    |   | 8. A group of glucose standard concentration solution                                     |                       |
|                                    |   | 9. Glucose solution to be tested  |                       |
| <b>504</b>                         | <b>Air Quality Control</b>                              | 1. Temperature sensor   |                       |
|                                    |   | 2. Humidity sensor  |                       |
|                                    |   | 3. Laser dust sensor  |                       |
|                                    |   | 4. SO <sub>2</sub> sensor   |                       |
|                                    |   | 5. NO <sub>2</sub> sensor   |                       |
|                                    |   | 6. LCD Display  |                       |
|                                    |   | 7. DuPont Line  |                       |
|                                    |   | 8. SCM Development Boards   |                       |
|                                    |   | 9. Breadboard   |                       |
| <b>505</b>                         | <b>Potato Battery</b>                                   | Battery Jacket  |                       |
|                                    |   | alligator clamps  |                       |
|                                    |   | Wires   |                       |
|                                    |   | bulb/LED  |                       |
| <b>506</b>                         | <b>Galvanic Cell</b>                                    | ZnSO <sub>4</sub>   |                       |



|     |                               |  |  |
|-----|-------------------------------|--|--|
|     |                               | CuSo4  |  |
|     |                               | Zn Electrode   |  |
|     |                               | Cu Electrode   |  |
|     |                               | WATER  |  |
|     |                               | Beakers  |  |
|     |                               | Salt Bridge  |  |
|     |                               | VOLTMETER  |  |
|     |                               | Bulb   |  |
|     |                               | Wires  |  |
| 507 | Rainbow Fire Kit              | Sodium, potassium, barium, strontium salts                     |  |
|     |                               | Plenty of spills soaked in water overnight.                    |  |
|     |                               | Bunsen burners or adjustable commercial blow torch             |  |
|     |                               | Matches  |  |
|     |                               | Dry spills   |  |
|     |                               | 2 heat resistant mats  |  |
|     |                               | 1 spatula  |  |
|     |                               | Match stick  |  |
| 508 | Spherification kit / Worm kit | Sodium Alginate 50g  |  |
|     |                               | Calcium Chloride 50g   |  |
|     |                               | Sodium Citrate 50g   |  |
| 509 | Rate of Reaction KIT          | FALCON TUBE  |  |
|     |                               | Funnel   |  |
|     |                               | dropper  |  |
|     |                               | alka seltzer tablets   |  |
|     |                               | falcon stand   |  |
|     |                               | cups or beaker plastic   |  |
|     |                               | yeast  |  |
|     |                               | hydrogen peroxide, starch, ascorbic acid, and iodine.          |  |
| 510 | Calorimetry Kit               | tin with lid   |  |
|     |                               | Wooden box for cover   |  |
|     |                               | thermometer  |  |
|     |                               | Copper wires   |  |
| 511 | Food Preservation Kit         | Includes 1 canister Natural Preserve, acidic and basic as well |  |
|     |                               | 2 Zip-N-Zap Bag  |  |
|     |                               | 2 Snap-N-Zap Caps,   |  |
|     |                               | and 2 Snap-N-Grip Clips  |  |
| 512 | Distillation Assembly         | Water Distillation assembly in steel small                     |  |