SMARTCIRCUITS
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Smartcircuits Innovation supports the Sustainable Development Goals

SUSTAINABLE DEVELOPMENT GOALS

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CLASS 3RD

No. of Activities : 15
Average Time for an activity : 8-12 minutes
How many activities per month : 1-2
Manuals and Videos
Teacher Demo Kit
Take Away kits for Students
Teacher Training
Student Assessment

CLASS 4TH

No. of Activities : 15
Average Time for an activity : 8-12 minutes
How many activities per month: 1-2
Manuals and Videos
Teacher Demo Kit
Take Away kits for Students
Teacher Training
Student Assessment

CLASS 5TH

No. of Activities : 15
Average Time for an activity : 8-12 minutes
How many activities per month: 1-2
Manuals and Videos
Teacher Demo Kit
Take Away kits for Students
Teacher Training
Student Assessment

CLASS 6TH

No. of Activities : 26
Average Time for an activity : 8-15 minutes
How many activities per month : 2
Manuals and Videos
Teacher Demo Kit
Take Away kits for Students
Teacher Training
Student Assessment

CLASS 7TH

No. of Activities : 27
Average Time for an activity : 8-15 minutes
How many activities per month : 2
Manuals and Videos
Teacher Demo Kit
Take Away kits for Students
Teacher Training
Student Assessment

CLASS 8TH

No. of Activities : 28
Average Time for an activity : 8-15 minutes
How many activities per month : 2
Manuals and Videos
Teacher Demo Kit
Take Away kits for Students
Teacher Training
Student Assessment

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CLASS 9TH

No. of Activities : 26
Average Time for an activity : 8-12 minutes
How many activities per month : 2
Manuals and Videos
Teacher Demo Kit
Take Away kits for Students
Teacher Training
Student Assessment

CLASS 10TH

No. of Activities : 29
Average Time for an activity : 8-12 minutes
How many activities per month: 2
Manuals and Videos
Teacher Demo Kit
Take Away kits for Students
Teacher Training
Student Assessment

ADVANTAGES

1. Aligned to curriculum
2. Practical Learning
3. STEM Focused
4. Individual kit for students and teachers
5. Hands-on learning making hands and mind busy
6. Develops Scientific Temperament, Higher Order Thinking Skills.
7. Develops Creativity, Innovativeness, and Application of Concepts.
8. Provides experience for deeper understanding of concepts
9. Productive engagement – build, think, apply, play and explore
10. Encourages self learning

TAKE AWAYS FROM SCIENCE KITS

1. Individual Kits for Teachers
2. Individual Kits for Students
3. Instructor Manual
4. Assessment report card for students

SmartTrek Activity Box - Class 3rd

S.No.	Activity Name	Components	Learning Objectives
1	**Formation of shadows**	EVA Sheet	1. What are the different souces of light ? 2. Understanding how shadow forms ? 3. How different sizes of shadow forms ?
		Torch	
2	**Safety & first aid**	EVA Sheet	1. Understanding the need of First-Aid. 2. How to do a dressing ?
		Cotton	
		Bandid	
		Dettol	
		Bandage	
3	**Mirror halves**	EVA Sheet	1. Understand what mirror is. 2. Understand difference between glass and mirror. 3. How image forms in a mirror. 4. How symmetric objects forms images
		Images sheet	
		Mirror	

SmartTrek Activity Box - Class 3rd

S.No.	Activity Name	Components	Learning Objectives
4	**Weighing balance**	EVA Sheet Thread Bamboo Stick	1. Understanding about different weights 2. Understand how to weight something 3. How to balance something while weighing
5	**Make your own windmill**	EVA Sheet Motor Fan Battery Battery Cap	1.Understanding concept of Windmill 2. How windmill rotates in air. 3. Understanding how windmill uses in general use.
6	**Balloon car activity**	EVA Sheet Balloon Straw Bamboo Stick Vial	1. Speed 2. Disance 3. Time 4. How car runs by inflating a balloon ?

SmartTrek Activity Box - Class 3rd

S.No.	Activity Name	Components	Learning Objectives
7	**Skeleton structure**	Skeleton Sheet Thread	1. Understanding different body parts. 2. Assemble different body parts to make a skeleton structure.
8	**Germinate a seed**	Transparent Glass Cotton Seeds	1. Understanding plantation basics. 2. Understanding about stem,roots and other diff parts of plants. 3. Planting a seeds.
9	**Toy telephone**	Paper cup Thread	1. Understand that sound is caused by vibration 2. Understand the propagation of sound in liquids and solids 3. Acquire knowledge whether sound required a medium for propagation 4. Making of toy telephone
10	**Phases of moon**	Sheet Tich Botton	1. Understanding day wise phases of moon 2. Performimg the activity

SmartTrek Activity Box - Class 3rd

S.No.	Activity Name	Components	Learning Objectives
11	**Colouring robot**	Base Colors Motor Fan Battery Battery Cap	1. Understanding Basics of motor. 2. How to rotate a motor. 3. Understand the propellor and its movement. 4. Making a coloring robot.
12	**To make a rainbow**	Mirror Bowl	1.Understanding a VIBGYOR pattern. 2. Formation of a Rainbow.
13	**Identification of rocks & soil**	Different rocks Different Soils worksheet	1. Identification of diff type of rock and soil, its features 2. Geographical regions

SmartTrek Activity Box - Class 3rd			
S.No.	**Activity Name**	**Components**	**Learning Objectives**
14	**Make your own Constellation**	Constellation sheet Cardboard Roll	1. Identification of diff types of constellation.
15	**Traffic Signals**	Traffic light and signal cards	1. Understand the concept of traffic light and signals

SmartTrek Activity Box - Class 4th

S.No.	Activity Name	Components	Learning Objectives
1	**Drip irrigation.**	Bottle	1. Understanding the advantages of irrigation 2. what are the methods of irrigation ? 3. Use drip irrigation for your plants.
2	**Working of lever – Pulley arrangement**	EVA Sheet	1.Understanding the concept of Lever. 2. What is Pulley ? 3. What is the use of pulley ? 4. How pulley makes work easy and lift heavy objects ? 5. Making pulley arrangement.
		Bamboo	
		Thread	
3	**Windmill**	EVA Sheet	1.Understanding concept of Windmill 2. How windmill rotates in air. 3. Understanding how windmill uses in general use.
		Thread	
		bamboo	
		Sheet	
4	**Weaving a thread**	EVA Sheet	1. Understanding the concept of weaving ? 2. How weaving done ? 3. Making arrangements for Weaving.
		Thread roll	
		bamboo Sticks	

SmartTrek Activity Box - Class 4th

S.No.	Activity Name	Components	Learning Objectives
5	**Balloon car activity**	EVA Sheet Balloon Straw Bamboo Stick Vial	1. Speed 2. Disance 3. Time 4. How car runs by inflating a balloon ?
6	**Traditional dresses**	Sheet Chart	1. Knowing different states of INDIA 2. Culture of different states 3. Different dresses of different states.
7	**Day & night model of earth**	EVA Sheet Torch Ball Globe Sticker Bamboo Sticks	1.Students will understand the concept of Globe 2. Imaginary Axis 3. Poles 4. Why Day and Night happen 5.Source of light

SmartTrek Activity Box - Class 4th

S.No.	Activity Name	Components	Learning Objectives
8	**Solar eclipse**	Small Ball Bamboo Sticks	1. Understanding what Eclipse is ? 2. How Eclipse forms ? 3. Understand the basic position of SUN, Earth,Moon in Solar Eclipse
9	**Lunar eclipse**	Same material used as above in activity no. 8	1. Understanding What Eclipse is ? 2. How Eclipse forms ? 3. Understand the basic position of SUN,Earth,Moon in Lunar Eclipse.
10	**Food web**	Food web sheet A4 Sheet	1. Understand about food chain. 2. Understand which animal eats what ? 3. Combining food chain to understand Food Web.
11	**Concept of halves.**	EVA Sheet Images sheet Mirror	1. Understand what mirror is. 2. Understand difference between glass and mirror. 3. How image forms in a mirror. 4. How symmetric objects forms images
12	**Fun with magnets - Pen spinning**	EVA Sheet pencil Big magnets small magnet Sheet	1. Understand about magnetic property 2. Understand about attaction and Repulsion 3. Balancing a pencil with magnet by use of attaction property 4. Making a Pen Spinning. 5. Spin a Pencil on flat surface

SmartTrek Activity Box - Class 4th

S.No.	Activity Name	Components	Learning Objectives
13	**Toy telephone**	Paper cup	1. Understand that sound is caused by vibration 2. Understand the propagation of sound in liquids and solids 3. Acquire knowledge whether sound required a medium for propagation 4. Making of toy telephone
		Thread	
14	**Test your daily food- fats & Carbohydrates**	Iodine solution	1. Study about Carbohydrates in Food and Starch presence in different food. 2. Change in color when Iodine is added in Starch 3. Identification of different foods containing starch or non-starch. 4. To test thepresence of fats in food.
		Plastic Test tube	
		Starch Powder	
		Butter paper	
		sunflower seeds	
15	**Thumb painting & thread painting**	Water Color	1. To bring out the creativity amongst students. 2. Electronic Papercraft
		Brush	
		Scrap book	
		3V Cell	
		Cell Adaptor	
		LED	

SmartTrek Activity Box - Class 5th

S.No.	Activity Name	Components	Learning Objectives
1	**See saw, inclined plane, screw, wedge – Lever Activity**	EVA Sheet Straw Poster tape small Screws	1.How movement can be described in many ways 2.How levers, pivot point, weight and loads affect balancing 3.How cause and effect can be explored in mechanical systems
2	**Anemometer**	EVA Sheet Cups Straw Bamboo Sticks	1.To construct and use an anemometer 2.To investigate wind speed
3	**Make a parachute**	EVA Sheet Thread polybag	1. Area 2. Wind 3. Weight
4	**Stethoscope**	Small Funnel 50mm Y-tube connecting pipes	1.students explore their heartbeats and learn about blood circulation. 2.They will make their own stethoscopes, use them to measure their heart rates and investigate how heart rate is affected by exercise.

SmartTrek Activity Box - Class 5th			
S.No.	**Activity Name**	**Components**	**Learning Objectives**
5	**Filtration Process**	EVA Sheet	1.Define water filtration 2.Identify advantages and disadvantages to sterilization for water filtration 3.Describe how a water filtration system works
		Funnel 75mm	
		Beaker	
		Cups	
		Filter paper	
		Bamboo Sticks	
		Sand Pouch	
6	**Poke a plastic bag**	Polybag	1.Water 2.Molecules
		Pencil	
7	**Day & night model of earth**	EVA Sheet	1.Students will understand the concept of Globe 2. Imaginary Axis 3. Poles 4. Why Day and Night happen 5.Source of light
		Torch	
		Ball	
		Globe Sticker	
		Bamboo Sticks	

SmartTrek Activity Box - Class 5th			
S.No.	**Activity Name**	**Components**	**Learning Objectives**
8	**Identification and testing of rocks**	Lime stone	1. Identification of different rocks 2. Testing of rocks and its features
		sand stone	
		Test tube	
		vinegar	
9	**What floats and what sinks?**	boat, marble,Cups	1.Students will investigate floating and sinking with a range of materials and objects. 2.Students should make and test predictions about objects that will sink or float and group objects based on these criteria. 3.Students will also develop an understanding of how fish swim in the ocean.
		Aluminium foil	
		Small Marble	
10	**Dissolve or not in water**	Beaker	1. Homogeneous and Hetrogeneous 2. Miscible and Non-Miscible 3. To explore the relationship between the structures of common household substances and the kinds of solvents in which they dissolve.
		Spatula	
		Salt	
		Sugar	
		Chalk powder	

SmartTrek Activity Box - Class 5th			
S.No.	**Activity Name**	**Components**	**Learning Objectives**
11	**Make your own wind sock**	EVA Sheet Napkene paper Screw Bamboo Stick Straw	1. Understand what wind is. 2. Understand the movement of an object in relation to the wind direction. 3. Be able to decide if an object will move due to wind.
12	**Study the direction of wind using wind vane**	Sheet All pins Bamboo Sticks Straws	1.The students will learn how to construct a wind vane by using materials supplied by an instructor. 2.The students will predict which way the wind is blowing by looking at the direction the arrow of their wind vane is pointing.
13	**Volcanic eruption**	Clay Vinegar Baking Soda	1.become familiar with the processes involved in volcanic eruptions; 2.become familiar with the way eruption types form volcanic cones; 3.become familiar with the differences in magma viscosity and how it relates to eruption explosiveness.

SmartTrek Activity Box - Class 5th			
S.No.	**Activity Name**	**Components**	**Learning Objectives**
14	**Play with motor**	EVA Sheet Base Motor Fan Battery Battery cap	1. Understand the concept of motor 2. Battery
15	**Glowing a light**	EVA Sheet Base Bulb and bulb holder Battery Battery Cap	1. Understand the concept of bulb and bulb holder 2. How bulb glow

SmartTrek Activity Box - Class 6th

S.No.	Activity Name	Components	Learning Objectives
1	Do all objects form shadows?	EVA Sheet Torch Transparent Sheet Translucent Sheet Opaque Sheet Pins	1. Transmission of light through objects 2. Opaque object 3. Transparent object 4. Translucent object
2	Identification of different Objects	Same material used as above in activity no. 1	1. Type of shadow formed
3	Can you guess size of an object from its shadow?	Same material used as above in activity no. 1	1. Object positions 2. Size of shadow
4	Mirror reflects a beam of light	EVA Sheet Mirror Piece Torch Ambulance Sticker	1. Know about plane mirror and glass 2. Understand about reflection of light 3. predict the position of the image of some object in a plane mirror

SmartTrek Activity Box - Class 6th			
S.No.	**Activity Name**	**Components**	**Learning Objectives**
5	Pin hole camera	EVA Sheet Butter paper Pins	1. Describe formation of images through a pinhole. 2. Explain working of a Pinhole Camera. 3. State advantages and disadvantages of using a pinhole camera. 4. Light travels in a straight line/path
6	Periscope	EVA Sheet Mirrors Cardboard Pipe	1. Observe reflection of light by multiple mirrors. 2. Conclude experimentally how a periscope works.
7	Sedimentation Process	EVA Sheet Beaker 100 ml Funnel 75 mm Filter paper Paper cup Bamboo Sticks Sand Pouch	Sedimentation is a physical water treatment process using gravity to remove suspended solids from water.

SmartTrek Activity Box - Class 6th			
S.No.	**Activity Name**	**Components**	**Learning Objectives**
8	Decantation Process	Same material used as above in activity no. 7	Decantation is a process for the separation of mixtures, by removing a layer of liquid, generally one from which a precipitate has settled.
9	Separation of impurities using filtration	Same material used as above in activity no. 7	1. Discuss importance of hygiene water. 2. Discuss how to filter and purify water. 3. Importance of filter paper and how to use it. 4. Explain the importance of waste harvesting method.
10	Electric torch with switch	EVA Sheet	1. Know about several components in a simple circuit. (Flow of electricity, Bulb, Filament, Terminals, Battery) 2. Demonstrate working of simple circuit. 3. Construct a torch and understand the function of a switch in circuit.
		Bulb and Bulb Holder	
		Battery cap	
		Screws	
		Al Strip as switch	
		Battery 9V	
		Connecting Wire	
11	Conductors and insulators	Aluminium Strip	1. Classify different materials as conductors and insulators. 2. Explain working of model based on open and closed circuits.
		Wood	
		Rubber Foam	

SmartTrek Activity Box - Class 6th			
S.No.	**Activity Name**	**Components**	**Learning Objectives**
12	Traffic light	EVA Sheet	1. Working of traffic light 2. Traffic signals
		LED's (Red, Yellow, Green) 1 each	
		Resistor	
		Aluminium Strip	
		Screws	
		Battery 9 V	
		Battery Cap	
		connecting wire	
13	Hydraulic lift	EVA Sheet	States of matter (Solid, Liquid and Gas) Make your own Hydraulic Lift Pressure and force
		Syringe	
		connecting pipe	
14	Soluble or insoluble	Spatula	1. Homogeneous and Hetrogeneous 2. Miscible and Non-Miscible 3. To explore the relationship between the structures of common household substances and the kinds of solvents in which they dissolve.
		Sugar	
		Salt	
		Chalk powder	
		Test Tube	

SmartTrek Activity Box - Class 6th

S.No.	Activity Name	Components	Learning Objectives
15	Solubility of some common liquid in water	Oil Lemon Solution Vinegar Test Tube	1. solubility of a liquid 2. Desnity and Molecules 3.Which solvent was able to dissolve most or all of the solutes? 4.Which solute was the most soluble in the solvents tested?
16	Saturation point	Sugar Salt Cups	1. Solute 2. Solvent 3. Solubility
17	Density of different liquids	oil vinegar test tube test tube brush	1. concept of density
18	Anemometer	cups Strips Pencil	1.To construct and use an anemometer 2.To investigate wind speed

SmartTrek Activity Box - Class 6th			
S.No.	**Activity Name**	**Components**	**Learning Objectives**
19	Effect of magnet	metal clip thread paper cup ring magnet	1. Magnetism 2. Observe the properties of magnet
20	Making your own magnet	Bar Magnet Needle	1. Temporary and permanent magnet
21	Test for the presence of starch	Iodine Solution Starch Powder Empty Vial Non Starch Powder	1. Study about Carbohydrates in Food and Starch presence in different food. 2. Change in color when Iodine is added in Starch 3. Identification of different foods containing starch or non-starch
22	Making your own compass	Ring Magnet Needle Paper bowl	Study of compass, different directions, make your own compass using needle

SmartTrek Activity Box - Class 6th			
S.No.	**Activity Name**	**Components**	**Learning Objectives**
23	Conductivity test using different liquid	Battery 9v Battery Cap Aluminium electrode/ strips Beaker 100ml salt	1. Establish that salt-water solution conducts electricity. 2. Relate that ions are responsible for conductivity in liquids. 3. Conductivity test using salt water, pure water, lime solution, vinegar and make their data sheet
24	Introduction to bar magnet & magnetic lines	Bar magnet Iron fillings	1. Introduction to magnet 2. Different types of magnet 3. Concept behind Attraction and repulsion property of magnet 4 Formation of Magnetic line of force 5. Magnetic field 6. Properties of magnetic line of force
25	How do we name the poles of magnet?	Thread	1. Study of poles 2. Earth Magnetic field
26	Magnet loss its magnetic property when heated	Candle	1. Properties of magnet

SmartTrek Activity Box - Class 7th			
S.No.	**Activity Name**	**Components**	**Learning outcomes**
1	**Electromagnetic crane**	EVA Sheet copper wire Long nail Circular Reel Battery Battery Cap Bamboo sticks Thread small nails	1. Electricity and magnetism 2. Strength of electromagnet 3. Magnetic field
2	**Propeller car and find its speed**	EVA Sheet Heavy Motor Battery 9V Battery Cap Propellor fan Straw Bamboo sticks	1. Distance 2. Speed 3. Time 4. Propeller mechanism

SmartTrek Activity Box - Class 7th

S.No.	Activity Name	Components	Learning outcomes
3	**Filtration Process**	EVA Sheet Beaker 100 ml Funnel 75 mm Filter paper Paper cup Bamboo Sticks Sand Pouch	1. Discuss importance of hygiene water. 2. Sedimentation, decantation. Discuss how to filter and purify water. 3. Explain the importance of waste harvesting method. 4. Analyze importance of water conservation.
4	**Steady hand testing electric game**	EVA Sheet Copper Wire non Insulated Battery 9 V Battery Cap Buzzer	1. Basic electronics 2. Close loop and open loop 3. Electric circuit 4. electric concept using Buzzer
5	**Introduction to electric circuit & switch**	EVA Sheet Bulb and Bulb Holder Battery cap Screws Al Strip as switch Battery 9V connecting wire	1. Know about several components in a simple circuit. 2. Demonstrate working of simple circuit. 3. Construct a torch and understand the function of a switch in circuit.

SmartTrek Activity Box - Class 7th			
S.No.	**Activity Name**	**Components**	**Learning outcomes**
6	**Newton's disc**	EVA Sheet Motor Battery Cap Battery 7 color circular sheet	1. Primary and secondary colors 2. Visible light is made of seven colors 3. Dispersion of white light
7	**Formation of carbon dioxide**	Test tube Acetic Acid Baking soda Test tube brush balloon	1. Chemical reaction using acetic acid (Vinegar) and Sodium Bicarbonate (Baking Soda) 2. Fire extinguisher Concept
8	**Convergent and divergent activity**	EVA Sheet Mirror Torch	1. The anatomy of curved mirrors 2. Introduction to Spherical mirror 3. Introduction about convergent and divergent ray 4. Ray formation
9	**Hot air rises up**	paper cup Thread Bamboo sticks Candle	1. When air is warmed, it rises and takes up more space 2. Density of hot and cold air

SmartTrek Activity Box - Class 7th

S.No.	Activity Name	Components	Learning outcomes
10	**Preparation of magnesium oxide***	Magnesium oxide strip candle Test tube holder	1. Alkaline earth metals 2. Reaction with oxygen
11	**Testing the nature of oxide of a metal**	Same material used as above in activity no. 6	1. Acidic or Basic nature of oxide
12	**Red and blue litmus test**	Red litmus paper strip Blue Litmus paper strip Acetic Acid Soap Solution Lime Solution	1. Test for an acid and Base 2. How does litmus paper works 3. How litmus paper is made
13	**PH test**	pH Strip	1. Nature of solution 2. Study of acids, base and neutral 3. Extent of acid, base and neutral
14	**Turmeric act as a natural indicator**	Turmeric Filter paper Soap Solution	1. Natural Indicator

SmartTrek Activity Box - Class 7th

S.No.	Activity Name	Components	Learning outcomes
15	**Mechanism of breathing**	plastic can Y-Tube Small Balloon Big balloon	1. Identify major parts of the respiratory system. 2. Describe the functions of the respiratory system. 3. Define the terms "expand", "contract", "inhale", and "exhale" as they 4. Relate to the diaphragm and the lungs during respiration.
16	**Heating effect of current**	Nichrome wire Battery 9V Battery Cap	1. Study of heating effect of current and its factors 2. Study about Nichrome wire
17	**Image formed by concave mirror**	Concave Mirror 15 cm FL Mirror Stand Candle	1. Anatomy of concave mirror 2. Reflection and formation of image 3. Image characterizes
18	**Image formed by convex mirror**	Convex mirror 15 cm FL	1. Anatomy of convex mirror 2. Reflection and formation of image 3. Image characterizes
19	**Image formed by concave lens**	concave lens - 25cm FL	1. Observation of concave lens 2. Focal length of lens 3. Image formation using concave lens
20	**Image formed by convex lens**	convex lens- 25 cm FL	1. Observation of convex lens 2. Focal length of lens 3. Image formation using convex lens

SmartTrek Activity Box - Class 7th

S.No.	Activity Name	Components	Learning outcomes
21	**Conduction in solids**	Aluminium rod	Conduction of heat in solid
		Nails	
		Wax	
		Candle	
22	**Finding directions using compass**	Compass 38mm	1. develop an understanding of the impact of the magnetic compass 2. Identification of directions using compass 3. Geographical and Magnetic Directions using compass
23	**Magnetic effect of current**	wire	1. magnetic field produces by flow of current in a wire
24	**Effect of saliva on starch**	Starch Powder	Salivary glands, Amylase, hydrolysis of starch in to sugar
		Iodine solution	
		Test tube	
25	**Make your own galvanoscope**	Copper wire	A device used to detect electric currents using the deflection of a magnetic needle.
		Small Needle	
		Battery Cap	
		Battery 9V	
26	**Change in the colour of the copper sulphate solution due to reaction with iron***	Copper sulphate	1. Reactive series 2. Displacement reaction
		Iron Nail	
27	**Measure temperature using thermometer**	Thermometer	Temperature mesaurement

SmartTrek Activity Box - Class 8th

S.No.	Activity Name	Components	Learning Outcomes
1	**Glowing a bulb & how switch works?**	EVA Sheet Bulb and Bulb Holder Battery cap Screws Al Strip as switch Battery 9V connecting wire	1. Know about several components in a simple circuit. 2. Demonstrate working of simple circuit. 3. Construct a torch and understand the function of a switch in circuit.
2	**DIY Projector**	EVA Sheet Convex Lens pins Transparent sheet Torch	1. Know about convex lens and image formed using lens 2. Focal length 3. Working of projector

SmartTrek Activity Box - Class 8th

S.No.	Activity Name	Components	Learning Outcomes
3	**Calculate angle of incidence and angle of reflection.**	EVA Sheet Protactor Mirror Pins Torch Pencil Scale	1. Know about plane mirror and glass 2. Understand about reflection of light 3. Concept of incident, normal and reflected rays. 3. Calculate angle of incidence and angle of reflection
4	**Study the formation of image in plane mirror**	Same material used as above in activity no. 3	1. How image formed in a plane mirror 2. Calculate how far image is formed in a mirror from an object
5	**Convergent and divergent rays**	Same material used as above in activity no. 3	1. The anatomy of curved mirrors 2. Introduction to Spherical mirror 3. Introduction about convergent and divergent ray 4. Ray formation

SmartTrek Activity Box - Class 8th

S.No.	Activity Name	Components	Learning Outcomes
6	**Friction using different lubricants**	EVA Sheet Greece Powder	1. Recognize friction as a force 2. Differentiate static friction and sliding friction 3. Advantage and disadvantages of friction 4. Describe the methods of diminishing friction
7	**Heating water in a paper cup**	Candle Paper cup balloon	1. Boiling point 2. Concept of Convection heat transfer
8	**Non-contact force & magnetic lines**	Bar Magnet Iron Fillings	1. Introduction to magnet 2. Different types of magnet 3. Concept behind Attraction and repulsion property of magnet 4. Formation of Magnetic line of force 5. Magnetic field 6. Properties of magnetic line of force
9	**Testing the nature of rust**	Rust Red Litmus Blue Litmus Test tube	1. Reaction between iron, water and oxygen and its nature

SmartTrek Activity Box - Class 8th

S.No.	Activity Name	Components	Learning Outcomes
10	**Identification of battery terminals using potato**	Battery Battery cap	1. Polarity of battery 2. Conductor 3. Electrolyte
11	**Atmospheric pressure activity in a tumbler**	Paper cup Card	1. Air pressure 2. Gravity
12	**Multiple images using mirror**	Mirrors Tape	1. Formation of multiple images 2. The angle between the two mirrors and the number of images formed will differ 3. Formula for multiple images
13	**Factor affecting friction**	Spring Balance, Thread, Bob	1.Describe the effects of weight on normal friction, that is, the friction due to surface roughness. 2.Describe the effects of contact area on the friction that occurs as a result of molecular attraction.
14	**Cross linked polymer**	Borax Cups Glue Pair of Gloves	1. Define 'Polymers'. 2. Identify various polymers and their uses. 3. Outline the concept of 'linear' and 'cross-linking' polymerization. 4. Make your own cross linked polymer

SmartTrek Activity Box - Class 8th

S.No.	Activity Name	Components	Learning Outcomes
15	**Electroscope**	EVA Sheet Copper wire Transparent sheet paper clips balloon	1. Demonstrate the process of electroplating. 2. Identify the electrodes and electrolytes used for electroplating. 3. Outline the significance of electroplating
16	**Static Electricity activity**	Ebonite Rod pieces of aluminium foil sheets	1. Different types of forces 2. Activity using ebonite rods
17	**Toy telephone**	Paper cup Thread	1. Understand that sound is caused by vibration 2. Understand the propagation of sound in liquids and solids 3. Acquire knowledge whether sound required a medium for propagation 4. Making of toy telephone
18	**Demonstrating friction using ball**	Ball Bamboo stick Thread	1. Force 2. Friction

SmartTrek Activity Box - Class 8th

S.No.	Activity Name	Components	Learning Outcomes
19	**Persistence of vision**	Printed sheets Bamboo stick	1. optical illusion 2. Light and perception
20	**Air is essential for burning**	Candle Plate Cup	1. Why air is necessary for burining 2. Why Level of water rises
21	**Build wave generator and learn about sound wave**	EVA Sheet Motor Thread Battery Battery cap Pulley	1. Understand about amplitude, Frequency 2. Trough and Crest of a wave
22	**Kaleidoscope**	Mirrors	1. Define reflection. 2. Describe formation of image by plane mirrors. 3. Explain working of the Kaleidoscope.

SmartTrek Activity Box - Class 8th

S.No.	Activity Name	Components	Learning Outcomes
23	**What happens when zinc reacts with hot water?**	Zinc Granules Test tube Test tube holder Candle	1. Chemical reactivity 2. Metal and Non Metal
24	**Force and energy – Build a projectile**	EVA Sheet Syringe (5 ml) Syringe (20 ml) Pipes	Concept of force, energy and projectile
25	**Electroplating***	Copper sulphate Battery cap Battery Copper plate steel rod/plate	1. Demonstrate the process of electroplating. 2. Identify the electrodes and electrolytes used for electroplating. 3. Outline the significance of electroplating

SmartTrek Activity Box - Class 8th

S.No.	Activity Name	Components	Learning Outcomes
26	**Fermentation process**	Yeast, Sugar, Test Tube, Balloon	1.explain the process of fermentation in making beer, wine, and liquors. 2.distinguish similarities and differences in yeast fermentation. 3.explain how distillation is used to create a higher alcohol content in liquors. 4.demonstrate how yeast releases CO2.
27	**Chemical effect of electric current**	Buzzer, battery cap, electrodes, vinegar, salt, cup	1. Establish that salt-water solution conducts electricity. 2. Relate that ions are responsible for conductivity in liquids. 3. Conductivity test using salt water, pure water, lime solution, vinegar and make their data sheet
28	**Conductor and Insulator**	Wood, Rubber,Aluminium	1. Classify different materials as conductors and insulators. 2. Explain working of model based on open and closed circuits.

SmartTrek Activity Box - Class 9th

S.No.	Activity Name	Components	Learning Outcomes
1	**Separation of impurities using filtration**	EVA Sheet	1. Process of sedimentation, decantation and filtration
		Beaker 100 ml	
		Funnel 75 mm	
		Filter paper	
		Paper cup	
		Bamboo Sticks	
		Sand Pouch	
2	**Magnetic levitation**	EVA Sheet	1. Describe Magnetic Forces. 2. Distinguish between stable and unstable equilibrium. 3. Achieve levitation of a pencil using magnetic repulsion and by establishing stability.
		Small Magnets	
		Pencil	
		Sheet	
3	**Centrifugal and centripetal force**	Zinc wire	1. Observe centripetal force in action 2. Centripetal acceleration 3. distinguish between centripetal force and centrifugal forces 4. Gravity
		small balls	
		thread	

SmartTrek Activity Box - Class 9th

S.No.	Activity Name	Components	Learning Outcomes
4	**Estimating how small are the particles of matter**	Test Tube Test Tube stand dropper Potassium permanganate	1. Matter in our surroundings
5	**Law of inertia activity**	Cup sheet	1. Newton's first law of motion
6	**Simple pendulum and its time period**	EVA Sheet Pendulum bob Thread bamboo sticks	1. Motion and Time 2. Periodic motion 3. Time period of an oscillation 4. Acceleration due to gravity
7	**Newton’s Law of motion activity**	EVA Sheet Big marble Small marble	1. Conservation of momemtum factors 2. Calculation momemtum before and after collision

SmartTrek Activity Box - Class 9th

S.No.	Activity Name	Components	Learning Outcomes
8	**Sublimation process**	Test tube Test tube holder camphor candle cotton	1. Intermolecular forces 2. Activity to demonstarte Sublimation process
9	**Object may float or sink & Archimedes principle**	Overflow vessel marble silver foil	1. Identify the relationship between buoyancy and density, up thrust force. 2. Use Archimedes' principle to calculate buoyant force. 3. Determine what fraction of a floating object will submerge in a fluid 4. Mathematical calculation
10	**Balloon plane – Newton's 3rd Law**	Balloon Straw Thread	1. Newton's third law and observation using spring balance
11	**States of matter**	Syringe Oil Chalk powder	1. Intermolecular forces of Solid, Liquid and Gas 2. Compressibility

SmartTrek Activity Box - Class 9th

S.No.	Activity Name	Components	Learning Outcomes
12	**Separation of mixture using Chromatography**	Filter paper sketch colors paper cup	1. Capillary action of the solvent through filter paper 2. Solubility differences of the individual components in the mixture
13	**Tyndall effect**	Torch Transparent cups chalk powder soap solution salt spatula	1. Study of solution, suspended solution and collidal solution 2. Tyndall effect concept and experiment
14	**Model to simulate Rutherford's model**	EVA Sheet Magnets Rutherford model sheet	1. Atoms and Molecules 2. Covalant Bond and Ionic Bond 3. Bohr's Model of an Atom 4. Rutherford Model of an atom 5. Gold foil experiment and simulation

SmartTrek Activity Box - Class 9th

S.No.	Activity Name	Components	Learning Outcomes
15	**Photo resistor activity using Light sensor**	Light sensor base Light sensor Battery Cap Battery wires	1. Resistor 2. Light dependent resistor 3. Light intensity 4. Photons and Emission of electrons
16	**Charge particle in matter**	Ebonite rod Thread Fur Balloon	1. Electrostatic force
17	**Transverse wave using slinky**	Slinky	1. Crest 2. Trough 3. Incident and Reflected wave
18	**Longitudinal wave using slinky**	**Same material used as above in activity no. 6**	1. Compression 2. Rarefaction

SmartTrek Activity Box - Class 9th

S.No.	Activity Name	Components	Learning Outcomes
19	**Wireless power transmission**	Copper wire Resistor Transistor LED Dry cell	1. Electricity through magnetism 2. Wireless current transmission
20	**Tuning forks and Vibration (3)**	Tuning fork paper cup Base	1. Tuning fork's vibrations to make sound. 2. water vibrate using sound.
21	**Separation of immiscible liquids**	Plastic transparent cup Oil Straw Cup	1. Density 2. Separation of two liquids

SmartTrek Activity Box - Class 9th

S.No.	Activity Name	Components	Learning Outcomes
22	**Osmosis Process**	Transparent glass Starch Iodine Plastic pouch	1. Investigate the processes of diffusion and osmosis. 2. Describe how diffusion and osmosis relate to the movement of substances into and out of cells. 3. Differentiate between hypo-tonic, isotonic, and hyper-tonic environments
23	**Study of animal cell & plant cell**	Plane slides Methyl Orange Methyl Blue	1. To create a slide for animal cell and plant cell. 2. Microscopic study of animal cells and plant cells.* * Microscope not included as a part of kit. Microscope to be provided by school.
24	**Kinetic energy of matter**	Potassium permanganate Transparent cup	The temperature of a substance is a measure of the average kinetic energy of the particles
25	**Law of conservation of mass**	Spring balance, vinegar, baking soda, thread, test tube, cork	1.Make predictions about the starting mass of the reactants vs. the ending mass of the products in a chemical reaction based on the Law of Conservation. 2.Explain how Lavoisier came to discover the Law of Conservation. 3.Describe implications of the Law of Conservation.

26	**Propagation of Sound**	Cup, mirror, butter paper	1. Describe production of sound 2. understand propagation of sound 3. analyse sound needs a medium to travel 4.explain reflection of sound

SmartTrek Activity Box - Class 10th

S. No.	Activity Name	Components	Learning Objective
1	**Observation of incident, reflected & normal ray**	EVA Sheet	1. Know about plane mirror and glass 2. Understand about reflection of light 3. predict the position of the image of some object in a plane mirror 4. Total internal reflection 5. Understand about Incident ray, reflected ray and normal ray
		Mirror	
		Torch	
2	**Electric torch with switch**	EVA Sheet	1. Know about several components in a simple circuit. 2. Demonstrate working of simple circuit. 3. Construct a torch and understand the function of a switch in circuit.
		Bulb and Bulb Holder	
		Battery cap	
		Screws	
		Al Strip as switch	
		Battery 9V	
		connecting wire	
3	**Make your own electric motor (Fleming's left hand rule)**	EVA Sheet	1. Investigate about different motors 2. Create a simple motor 3. Describe how a motor uses an electromagnet and magnetic forces to work
		Al strips	
		Ring Magnet	
		Copper wire	
		Cell	
		Wires	

SmartTrek Activity Box - Class 10th

S. No.	Activity Name	Components	Learning Objective
4	**Working of variable resistor**	EVA Sheet variable resistor Bulb and Bulb Holder Battery Battery cap wires	1. Conclude that resistance of a conductor in inversely proportional to its length. 2. Apply and verify the Ohm's law. 3. Study about fixed and variable resistor
5	**Lime water turns into milky**	Lime solution Test tube Straw	1. Our objective is to show experimentally that carbon dioxide is given out during respiration.
6	**Image formed by concave mirror**	Concave Mirror 15 cm FL Mirror Stand Candle	1. Anatomy of concave mirror 2. Reflection and formation of image 3. Image characterizes 4. Formula and calculations
7	**Image formed by convex mirror**	Convex mirror 15 cm FL	1. Anatomy of convex mirror 2. Reflection and formation of image 3. Image characterizes and calculations involved

SmartTrek Activity Box - Class 10th

S. No.	Activity Name	Components	Learning Objective
8	**Image formed by concave lens**	concave lens - 25cm FL	1. Observation of concave lens 2. Focal length of lens 3. Image formation using concave lens
9	**Image formed by convex lens**	convex lens- 25 cm FL	1. Observation of concave lens 2. Focal length of lens 3. Image formation using concave lens
10	**Refraction of light through prism**	Prism(38mm)	1. Refraction and mathematical calculation
11	**Dispersion of white light by the glass prism**	Pins Sheet Protactor	1. Dispersion of white light into seven colors 2. Wavelength concept
12	**Refraction of light through glass slab**	Glass Slab sheet pins	1. To explore the rules that predicts refraction in materials.

SmartTrek Activity Box - Class 10th

S. No.	Activity Name	Components	Learning Objective
13	**Effect of salivary amylase on food**	Starch	Salivary glands, Amylase, hydrolysis of starch in to sugar
		Sugar	
		Iodine	
		Test tube	
14	**Ph test & Litmus test**	Red litmus paper strip	1. Test for an acid and Base 2. How does litmus paper works 3. How litmus paper is made 4. Nature of solution 5. Study of acids, base and neutral 6. Extent of acid, base and neutral
		Blue Litmus paper strip	
		Acetic Acid	
		Soap Solution	
		Lime Solution	
		pH Strip	
15	**Burning of magnesium ribbon***	Magnesium ribbon	1. Alkaline earth metals 2. Reaction with oxygen 3.Acidic or Basic nature of oxide
		Test tube holder	
		candle	
		Red litmus paper strip	
		Test tube	

SmartTrek Activity Box - Class 10th

S. No.	Activity Name	Components	Learning Objective
16	**Magnetic field lines using a bar magnet**	Bar magnet Iron fillings	1. Introduction to magnet 2. Different types of magnet 3. Concept behind Attraction and repulsion property of magnet 4 Formation of Magnetic line of force 5. Magnetic field 6. Properties of magnetic line of force
17	**Endothermic and exothermic reaction**	Ammonium Chloride Chalk powder/ sodium hydroxide Test tube	1. Explain the different types of chemical reactions. 2. Categorize chemical reactions according to the characteristics they exhibit. 3. Interpret the heat exchanges during chemical reactions. 4. Classify reactions as exothermic and endothermic.
18	**Heating effect in a wire**	Nichrome wire Battery Battery Cap	1. Study of heating effect of current and its factors 2. Study about Nichrome wire
19	**Series circuit**	Series circuit base Bulb and Bulb Holder Battery Battery cap Wires	1. Recognize series circuits. 2. Calculate resultant resistance in series

SmartTrek Activity Box - Class 10th

S. No.	Activity Name	Components	Learning Objective
20	**Parallel circuit**	Parallel circuit base Bulb and Bulb Holder Battery Battery cap Wires	1. Recognize parallel circuits. 2. Calculate resultant resistance parallel circuits.
21	**Electric Generator (Fleming's right hand rule)**	Syringe copper wire LED neudonium magnets	1. Concept of generator 2. Induction 3. Fleming's right hand rule
22	**Glowing an LED using resistor**	Base LED Resistors Battery Cap Battery Wires	1. Information about LED 2. Different type of resistors 3. How to calculate the value of resistors 4. Ohm's law

SmartTrek Activity Box - Class 10th			
S. No.	**Activity Name**	**Components**	**Learning Objective**
23	**Electrolysis of water**	Transparent glass Scews Salt Battery	1. The electrolysis of water yields oxygen and hydrogen gases and simple calculations estimate the charge of the ions.
24	**Formation of micelles**	Test tube Soap Solution Oil	1. Micelles 2. Hydrophobic and Hydrophilic
25	**Current carrying Solenoid coil**	Iron rod Copper wire Battery cap Battery	1. Electromagnet

SmartTrek Activity Box - Class 10th

S. No.	Activity Name	Components	Learning Objective
26	**Displacement and Double Displacement Reaction***	Copper Sulphate Test tube Stand Iron nails Test tube Calcium chloride Sodium carbonate	1.To study a single displacement reaction with the help of iron nails and copper sulphate solution 2.Students understand terms such as double displacement reactions & different types of such reactions like neutralization, precipitation. 3.Students classify the compounds that give double displacement reactions. 4.Students acquire the skill to perform a double displacement reaction using barium chloride and sodium sulphate. 5.Students will be able to distinguish a double displacement reaction from a given set of chemical reactions in future.
27	**Oxidation and Reduction Reaction***	Potassium Permanganate Sodium hydroxide Transparent cup	1. Oxidation 2. Reducation
28	**Decomposition and Thermal Decomposition**	Ferrous sulphate, test tube, handle	1.Students understand the characteristics of a decomposition reaction & different types of such reactions. 2.Students identify the compounds that may give a decomposition reaction. 3.Students acquire skills to perform a decomposition reaction in the lab. 4.Students will be able to distinguish a decomposition reaction from a given set of chemical reactions.
29	**Combination Reaction**	Test tube, quick lime	1.Students acquire knowledge about combination reactions. 2.Students acquire skills to perform a combination reaction using quick lime and water. 3.Students will be able to distinguish a combination reaction from a given set of chemical reactions.