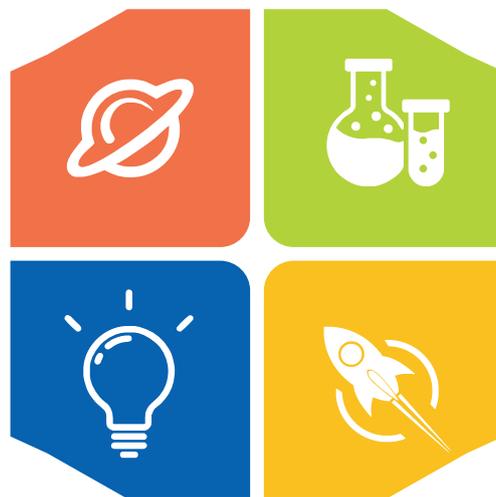


STEM Activity Program

(Age - 5 yrs. and above)



Engage - Create - Innovate - Inspire

Box of Science

Share your activity pictures or activity notes with us
and get a digital certificate for completion of this program



Indoor model of Planetary System



Objectives:

To understand relative sizes of planets and the Sun
Knowing interplanetary distances, vastness of the space
Understanding different units for large scale distances

Procedure:

1. Refer the chart given below
2. The 6th column represents relative sizes of different planets and the Sun.
3. Draw circular planets of the given diameters on plain paper. The scale is in millimeters. Cut these planets, name and color them.
3. Once the system is ready, check the 4th column.
4. Arrange planets (starting from the Sun) in an order. Keep them at given distance (As mentioned in 4th column) the scale here is in centimeters.
5. Once your solar system is ready, write a report on the activity. Do share your observations and photos of your solar system with us.

Key concepts: (Units for astronomical distances)

1. A.U. (Astronomical Unit): 1 AU = Distance between our Earth and the Sun
= 150,000,000 (rounded off value)
2. Light year: Distance covered by light ray in given year. It can be measured like 1 light second, 1 light day and so on... Speed of light 3,00,000 km/sec

Planet	Distance From Sun (AU)	Distance to Planet (km)	Scale Distance From Sun (cm)	Actual Diameter (km)	Model Diameter (mm)
Sun (a star)	0			1,391,980	139
Mercury	0.39	58,000,000	3.9	4,880	0.5
Venus	0.72	108,000,000	7.9	12,100	1.2
Earth	1.00	150,000,000	10	12,800	1.3
Mars	1.52	228,000,000	15.2	6,800	0.7
Jupiter	5.20	778,000,000	52.0	142,000	14.3
Saturn	9.54	1,430,000,000	95.4	120,000	12.0
Uranus	19.2	2,870,000,000	192	51,800	5.2
Neptune	30.1	4,500,000,000	301	49,500	4.8
Pluto	39.4	5,900,000,000	394	2,300	0.2



Kitchen Chemistry

Chemicals in our houses



Objectives:

To understand about different chemicals that we use in our daily lives
Knowing about soluble insoluble chemicals
Understanding food chemistry

Procedure:

Solubility tests:

Things required - Salt, sugar, baking soda, ground nuts, any of the pulses etc.

Take a small cup of water, and try mixing collected entities in water. Make a note of soluble and insoluble materials. Do share you observations with us.

Useful chemicals in our daily lives:

Things required - Writing pad, A4 size paper or notebook, pen/pencil

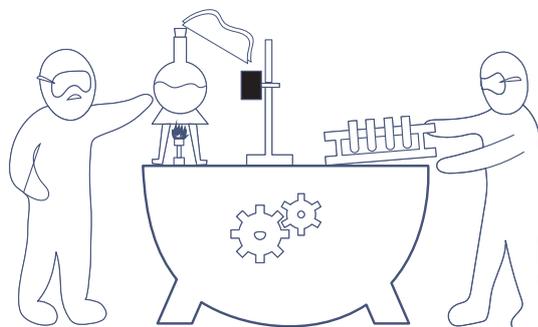
Make a list of chemicals that are being used in daily lives. e.g. chemicals in your toothpaste, chemicals in soap, shampoo etc. read ingredients on these products and write them down.

What and Why?

Check over internet for other applications of these chemicals. For example sorbitol is a chemical used in our toothpastes. Find out about this chemical. Let the kids understand the importance of extensive research in the field of Chemistry.,

Food chemistry:

Make a separate list of ingredients that are edible. Parental guidance is expected here. Let the kids know about harmful and edible entities. List out different spices, sweet and sour chemicals (food items). Ingredients in chocolates, biscuits, energy drinks etc.





Capillarity Effect

Maintenance free watering system



Objectives:

Knowing surface properties of liquids, capillarity, water flow, gravity
Understanding how plants transports the water

Procedure:

Activity 1- Wick motor

Materials - A cup full of water, cotton wick

Procedure - Keep the wick at the edge of the cup and immersed in water. Wait for 1-2 minutes. The wick will soak water and once saturated, will transport it drop by drop outside the cup. Find out how? Also share picture of your wick motor.

Activity 2: Color mixer

Materials: cotton handkerchief or any cloth, food color (if unavailable use haldi), 2 cups with water.

Procedure: Keep one cup at slightly higher level than the other. Add food color or a pinch of haldi in one cup. Let the other colorless. Soak cloth in tap water. Put one end of the cloth in colored water while other end in colorless water. Keep this arrangement for few minutes. Observe what happens...and take picture..share with us... Note down your results.

Visit this link for video assistance:

<https://www.youtube.com/watch?v=hZ-44n2OtCg>

Activity 3: Plant watering mechanism

Materials: woolen or thick cotton thread, Empty pet bottle, screwdriver

Procedure:

Make a hole in the lid of the bottle. Fill this bottle with water.

Keep it near the plant vase at a height.

Insert thick thread through the hole into water.

The other end should be kept at lower heights near plant root.

Water will flow slowly due to height difference and plant soil will be moist for a longer period of time. You don't have to water it every day.



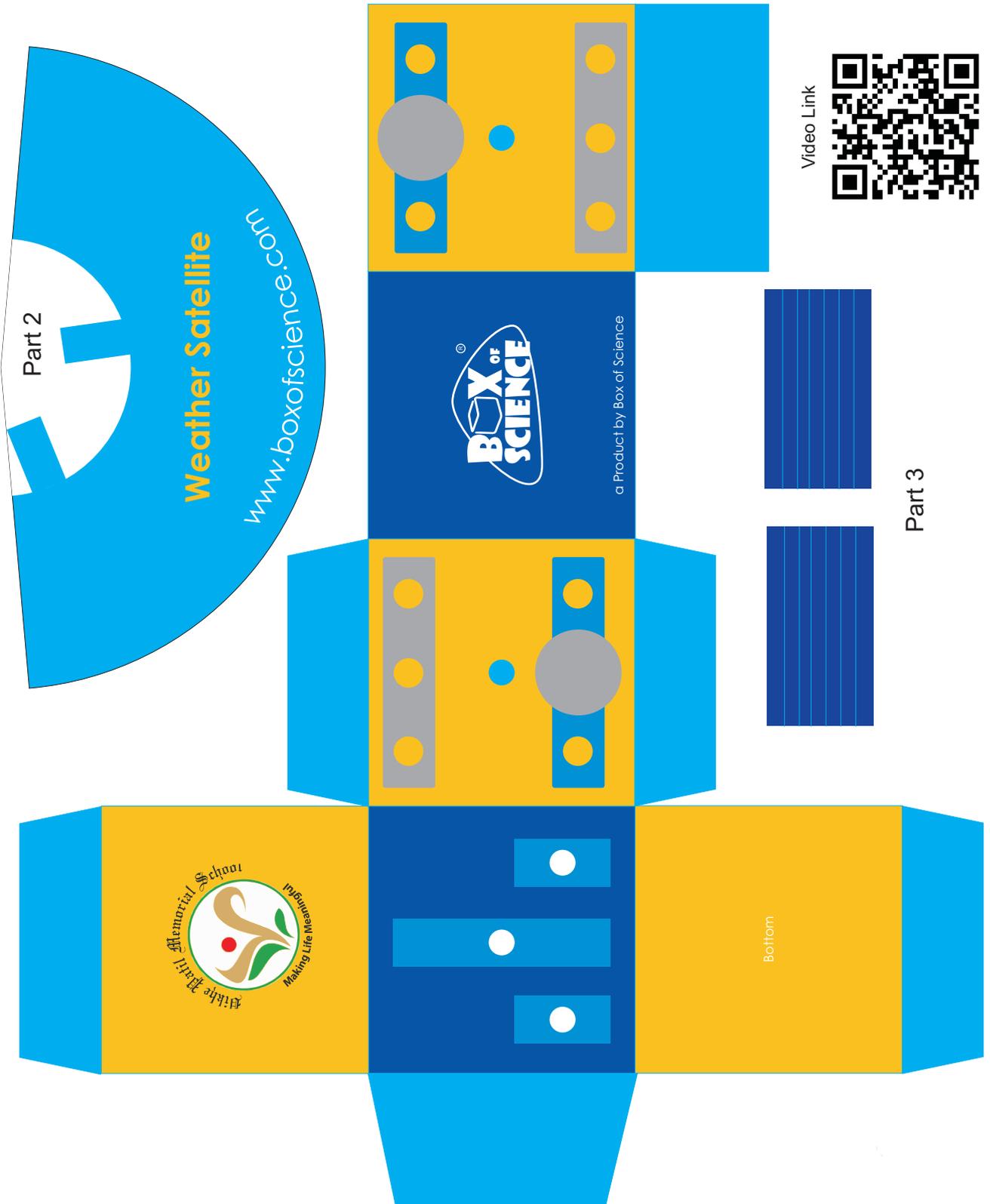
Video Link





3D model of Satellite

Applications of space technology



Instructions:

1. Take a print or draw shape like above.
2. Cut out the paper in the given shape. Paste it on cardsheet. Make a box out of it.
3. Make a cone from the 'Part 2' template. This cone will serve as a stand for your satellite
4. Cut out 'Part 3'. They represent solar panels. Attach them with tooth picks or any other sticks to the central box.
5. Your satellite model is ready. Share picture and write a note on applications of satellites.



Atoms, molecules

World of tiny particles



Objectives:

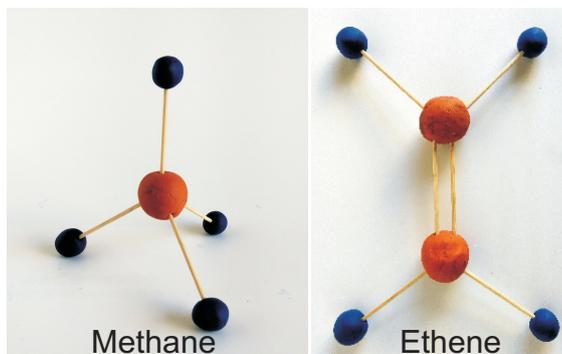
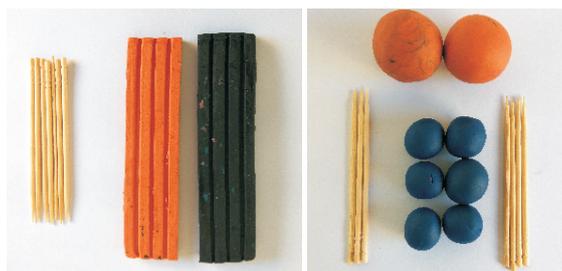
Knowing about atoms and molecules
Solid, liquid and gases
Molecular structures and types

Materials:

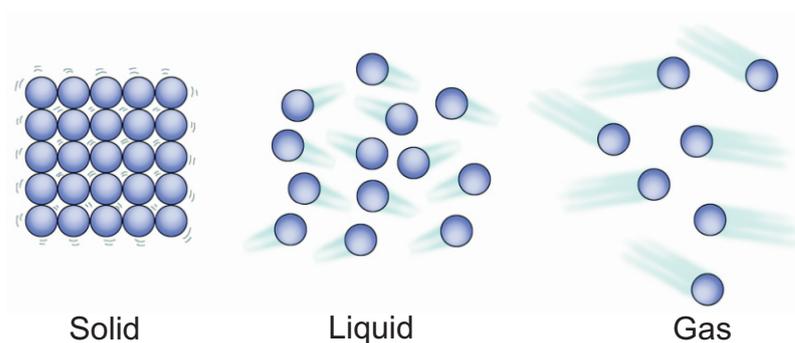
Clay (If unavailable use dough), toothpicks or broom sticks or any available sticks, notebook and pen

Procedure:

Make small balls of clay or dough. Use sticks to connect them.
Make different molecular models out of it.



Represent solid, liquid gases in form of molecular distances,
with the help of small balls of clay or dough



Click pictures of your molecules and share with us



Air pressure pump

Miracles of atmospheric pressure



Objectives:

Understanding concept of air pressure
Knowing atmospheric pressure
Physics of pressure

Materials:

A balloon, straw, pet bottle, clay or dough

Procedure:

1. Make a hole in the lid of a bottle and on any side of it
2. Insert small piece of straw in balloon and tie with rubber band or thread
3. Fill bottle with water. 3/4th of its capacity
4. Insert a longer straw from the other hole which is made on the side of a bottle
5. Put clay or dough around these holes to stop leakage
6. Inflate the balloon and insert the straw in the hole at lid.
7. Observe and infer. Share pictures with us.

Video Link



Facts about atmospheric pressure

1. Air pressure is the weight of air molecules pressing down on Earth
2. The barometers are used to measure the air pressure at different places and different times of day.
3. Average air pressure per square centimeter is 1 Kg.
4. That means on your head (varies according to surface area) you have 80 Kgs
5. On weather maps, air pressure is shown with line called isobars. These lines join places of equal pressure together.
6. Breathing is difficult on high peaks because the air pressure is low and oxygen present in the air is more difficult to be absorbed in the blood.

Find more such facts and enjoy learning by doing !



Sinking and Floating

Buoyancy and Archimedes Principle



Objectives:

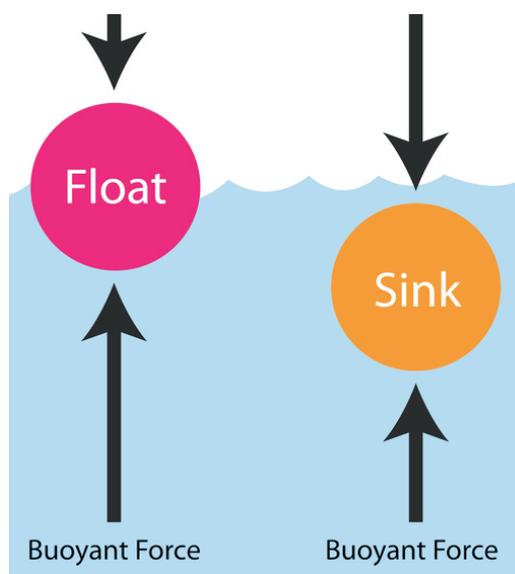
Understanding concepts of density, sinking and floating
Knowing buoyancy and Archimedes principle

Materials:

A bowl with water, piece of paper, a coin, rice, wooden stick, aluminum foil (if available), few drops of oil etc.

Procedure:

1. In a bowl filled with water, add above things one by one
2. Observe what sinks and what floats
3. Find out why wooden sticks float easily on water
4. Observe what happens with oil
5. Take a pet bottle and push it into this bowl full of water
6. See if height of water in the bowl changes, if yes find out why?



This code will take you to a video for more details on the topic

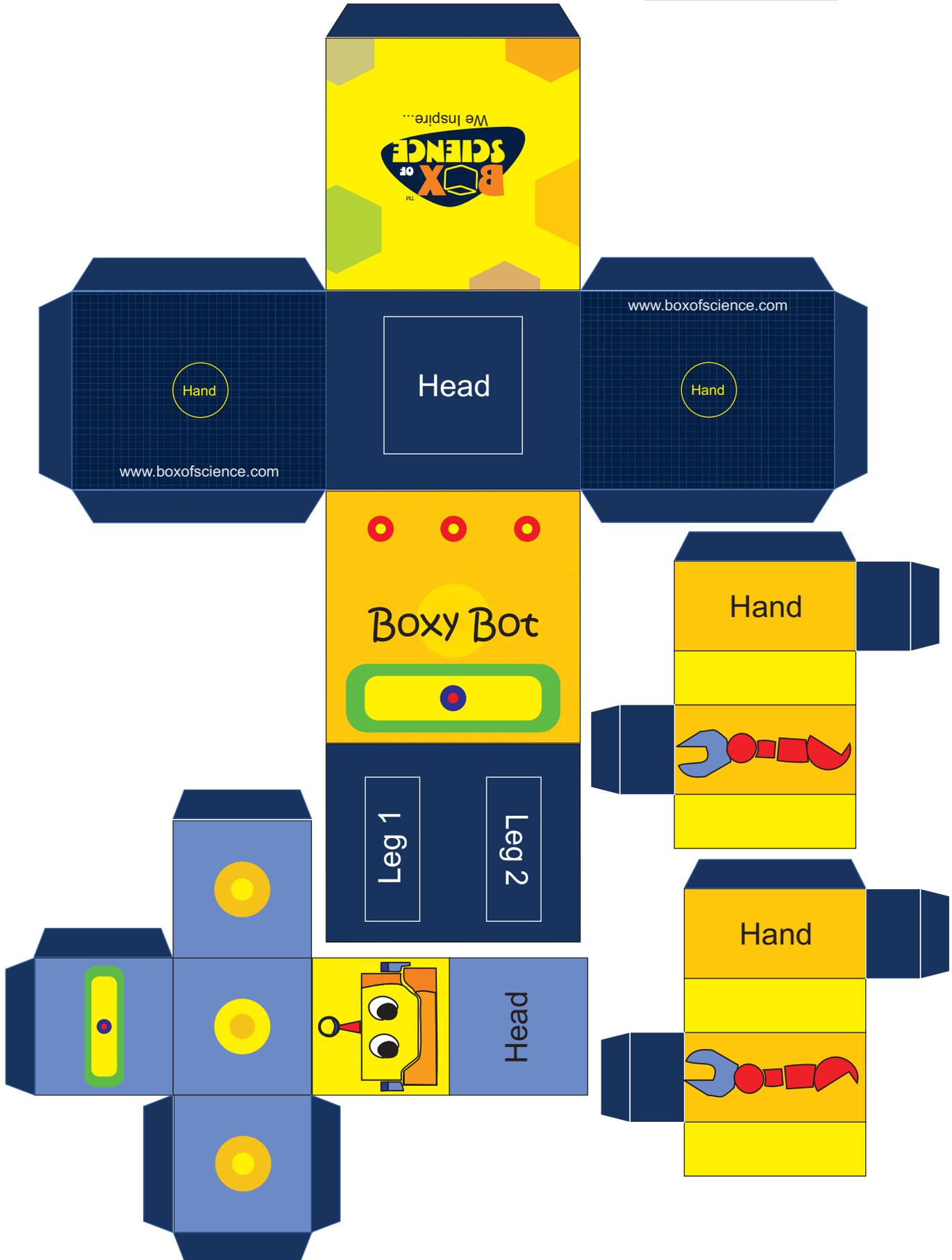


DIY Paper robot

Make your own BoxyBot



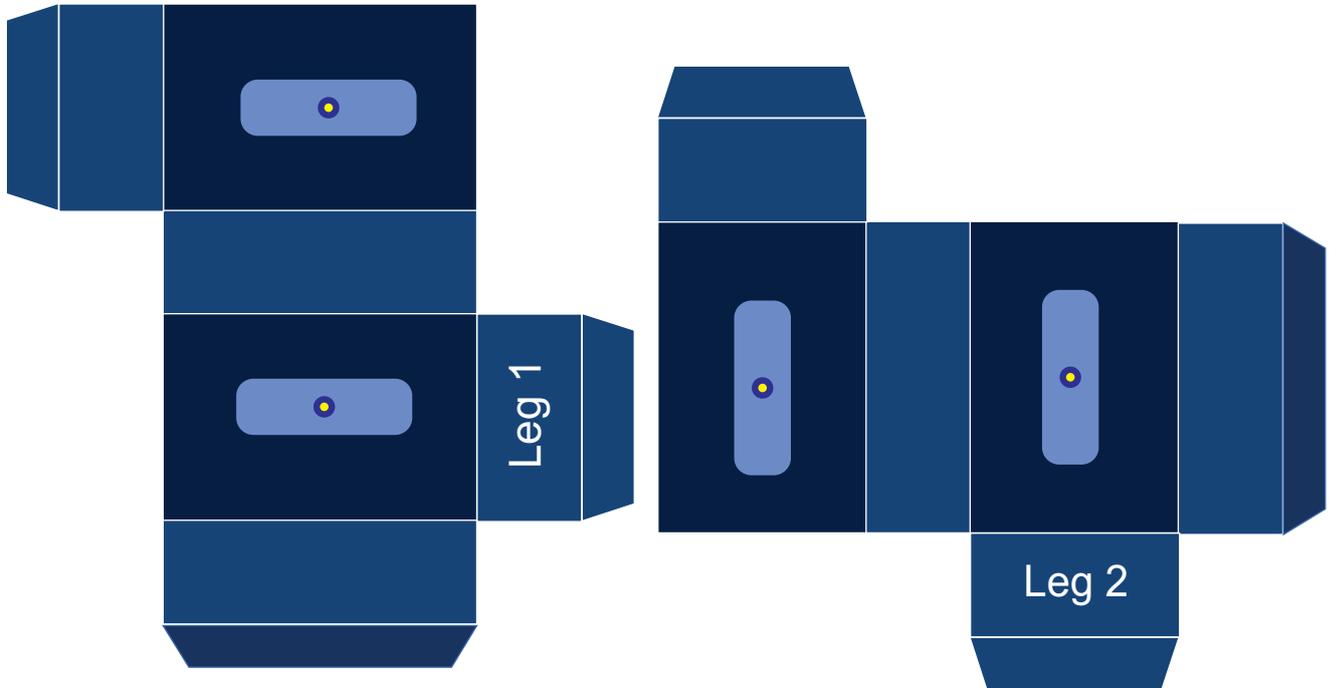
www.boxofscience.com





DIY Paper robot

Make your own BoxyBot



Procedure:

1. Print the 'Part 1' and 'Part 2' pages.
2. Cut out the box outline and paste them on a cardsheet.
3. Fold all cutouts to make boxes out of it.
4. Stick hands, legs, head on their places.
5. Enjoy your BoxyBot

Make a list of areas, fields where automation, robotic machines are helping humans.

Take picture of your Boxy and share with us



Space for Notes

Explore STEM with Box of Science

