

Moving Monsters D&T Class Kit (TE00771)



This unit encourages children to investigate how air can produce movement and how this can be used in simple pneumatic mechanisms.

The class kit contains resources such as burger boxes, syringes, balloons and tubing, enabling the construction of the moving monsters.

In this download you will find ideas for planning your D&T project on Moving Monsters. We hope you enjoy them.

Contents (Parts included in the class kit):

1. 30x burger boxes
2. 1x balloon pump
3. 50x 5ml syringes
4. 100x round balloons
5. 10m of 6mm plastic tubing
6. 1m of 8mm clear PVC tubing
7. D&T Association help sheets



Ideas for using the Class Kit



Top Tips

- Build up a collection of washing up liquid bottles, egg boxes and other boxes well before starting the project. Make sure that the bottles are empty and washed out before using them.
- When planning ideas about the moving monsters, encourage the children to think of ways in which their bodies move such as their arms, legs, or tongues moving up and down.

Glossary

Compressed – something that is squashed, such as air in a tube.

Input – what goes into a system.

Lever – a beam which turns about a point.

Output – what comes out of a system.

Pivot – a point about which a lever turns.

Pneumatic – a system that works using gases (air).

Investigate a variety of familiar objects that use air to work

Discuss that mechanisms are a collection of moving parts that work together as a machine to produce movement. Sketch toys which use mechanisms.

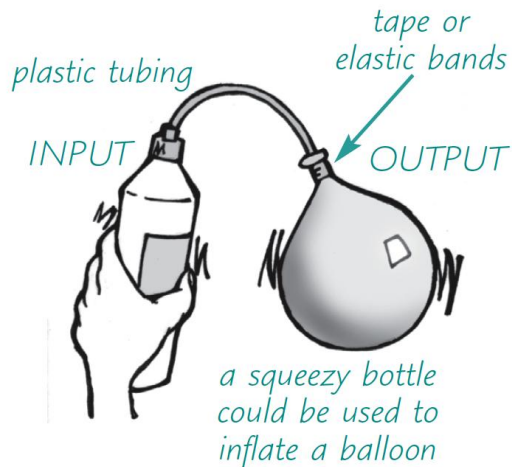
Explain that there is always an input and output in a mechanism. The input is the energy that is used to start something working. The output is the movement that happens as a result of the input.

How many objects can you think of that use air to make them work? Give children a few minutes to discuss their ideas with a partner, then list the ideas. How do each of these objects use air? Invite children to describe how they think they work.

Look at the picture of objects that use air to work, e.g. recorder, bicycle pump, party blowers. Ask children to describe what the air does and how it has been used in the design of these products.

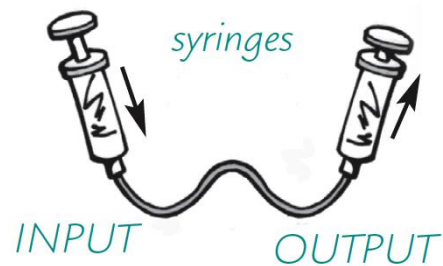
Investigate techniques for making simple pneumatic systems

The children can blow air on their hands and feel the flow of air. If balloons are blown up the force of the air coming out is stronger. Let the children feel the force of air that comes out of a squeezed washing up liquid bottle, a bicycle pump, foot pumps etc.



Tip: The balloon needs to be securely fixed to the tubing. Use a tight elastic band wound several times or use masking tape. A tight fit is also needed when attaching the tubing to the syringe, otherwise, air will escape. If the tubing is difficult to get onto the syringe, soak the end in hot water to allow the plastic to soften slightly – it will tighten as it cools down.

Investigate using syringes and tubing. Syringes come in a variety of sizes. Experiment with two different sized syringes to observe the movement, taking care not to point them at anyone! The movement may be slow. This is because the air is being compressed inside the tube. When it can be compressed no more, it pushes out the opposite plunger. Join the two syringes so that one is fully compressed and the other is slightly compressed. This will ensure that the syringes do not push out of the tubing.



Show children a picture of a syringe and tubing attached to a balloon. What do you think will happen to the balloon when the syringe is pushed in? Why? Ask - Do you know what the word 'pneumatic' means? Explain how a pneumatic system works and give them some examples of items that use pneumatics, e.g. bicycle pumps, pneumatic drills, pipe organs, etc. Can you explain how each of these works? Children discuss in pairs and then share their ideas with the rest of the class.

Tell children that they will be investigating pneumatic systems in preparation for creating a moving monster with pneumatics. Let them have a go at making a system. Then use the pictures and model how to attach the syringe and balloon to the tubing. Can they think of any other ways of making a pneumatic system?

Put the balloon inside an egg box and try to make the hinged lid move up and down. The syringe can be tried in different positions to observe the movement.

Design and Plan

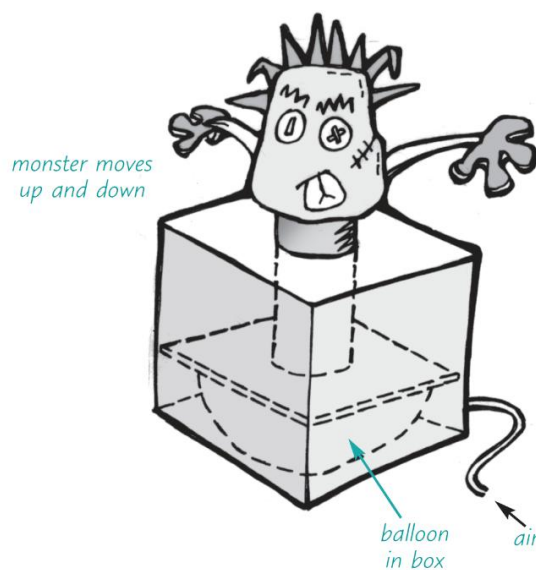
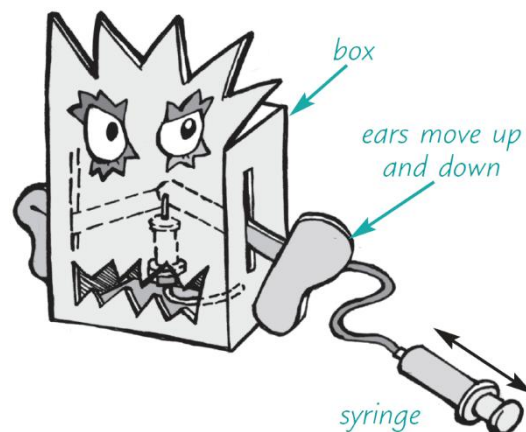
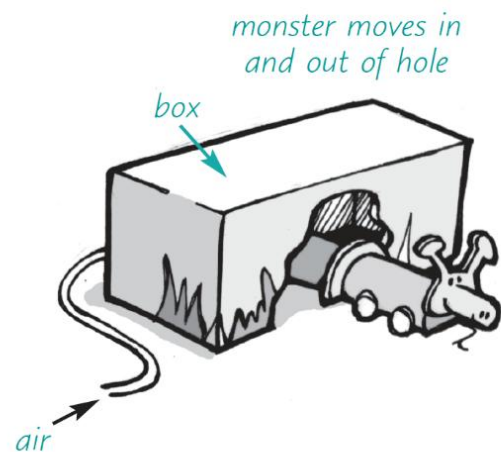
Look for pictures of monsters in story books.

Plan a moving monster using the design criteria and use annotated sketches to describe what you will do.

Make a list of the resources needed to make the moving monsters and the tools needed for the job.

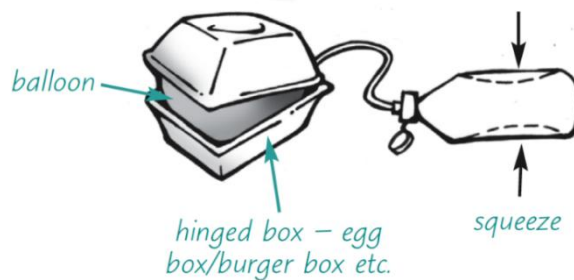
Practise using the tools and try different techniques.

Collect materials to use with the model, such as bottles, boxes, scraps of fabric etc.



Test out ideas using prototypes.

Children use a balloon, balloon pump and tubing to make a prototype of the pneumatic system that will go inside their moving monsters. Introduce word prototype - the first one you make as a model for the rest. Use it to adapt and improve the design if necessary.



A box could be used to house the pneumatic mechanism. Lids can be attached with a hinge so that they lift up and down, or holes could be cut in the box for something to move up and down or in and out. Children will need to make a list of materials that they will use. In their sketches, they can show which part of the monster moves and how they will make it happen.

Make a monster with a moving pneumatic part selecting from a range of tools and equipment.

Make your moving monster. Use a storyboard to record and reflect on how they made their model. Note down the skills they needed and acquired during the process.

Example Storyboard:

<i>I chose a box</i>	<i>I cut a hole in the top</i>	<i>I attached a lid</i>	

Evaluate the moving monsters against the design criteria and suggest improvements.

Encourage the children to evaluate their moving monsters by assessing their functionality and creativity. Talk about any changes made during the making process. Talk about how the monster moves and test the success of the monsters.