



Organising a STEM day for feeder schools

To Do

- Invite local feeder schools to engage as early as possible.
- Target Year 10 pupils.
- Identify and secure specialist rooms e.g. labs, sports halls, etc.
- Identify and train up AS/A2 College students as mentors/ambassadors.
- Work with partners and curriculum teams on developing a robust H/S brief.
- Identify and engage with local employers to design, plan and deliver realistic and age appropriate STEM activities.
- Start and end the day with Big Bang activities to engage pupils
- Ensure that there is a follow up plan.
- Work in partnership to establish a STEM club.
- Challenge young people by providing take away activities which should be followed up with school staff and mentors.
- Set targets for schools to engage parents, local employers and to set up SEM clubs and safeguard funding for this initiative.
- Link AS/A2 learners to the STEM club.
- Organise lunch (be sure to identify cultural, specialist and religious needs).
- Check numbers of students arriving from schools at least 2 weeks before the event to ensure enough materials for the activities have been ordered.
- Ensure Marketing are aware of the event and photos /newspaper etc. organised to publicise and record the event.

The aim of this activity is to encourage schools to work in partnership with learning providers. It is aimed at Year 10 pupils to encourage young people to access STEM subjects.





Physics and Engineering

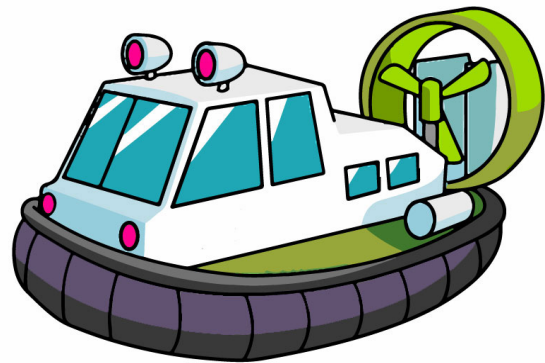
Build a hovercraft

YOU WILL NEED

- Balloon
- Old CD
- Drinks bottle pop up lid
- Strong glue

This activity will let all your STEM day visitors build their own mini hovercraft.

If you are feeling ambitious you could get a couple of leaf blowers and some ply wood to build a ride-on hovercraft ... but make sure students wear helmets when testing the hovercraft. Works better on a smooth vinyl floor.



INSTRUCTIONS

1. Glue the closed bottle lid to the centre of the CD making sure the hole is completely covered.
2. Let the glue set.
3. Blow up the balloon, and twist the neck to the air in.
4. Stretch the neck of the balloon over the closed end of bottle lid, trying not to let any air escape.
5. Now, open the pop-top lid so the air from the balloon can start to escape. Place it on a smooth surface and give it a push.
6. Decorate a few and race them over different surfaces and with different sized balloons.



STEM DAY

Chemistry

Find the fake vodka

YOU WILL NEED

- Ethanol samples
- Butanol samples
- Lab safety gear

For the distillation test

- Distillation equipment
- Thermometers
- Heat source

For the iodoform test

- Test tubes
- Sodium hydroxide solution,
- A solution of iodine in aqueous potassium iodide
- Disposable pipettes

For the potassium dichromate test

- Test tubes
- Potassium dichromate(VI) solution,
- Sulphuric acid
- beaker and just-boiled water
- Disposable pipettes

In this activity your visitors take the role of detectives attempting to smash a ring of fake vodka importers by identifying the alcohol in two samples of fake vodka.

Set up a forensic lab with distillation equipment and provide the learners with samples of ethanol and tert-butanol labelled exhibit A and exhibit B. They can confirm their results with test tube tests.

Learners can also use IR and Mass Spectra to enable them with their identification.



INSTRUCTIONS

1. Find out the boiling point of ethanol and tert-butanol.
2. Use distillation to purify the two samples of fake vodka.
3. Identify the nature of the alcohol as ethanol or tert-butanol from its boiling point.
4. Confirm the identity of the alcohol with standard test tube reactions (potassium dichromate and the iodoform test).



Biology

Lactose free milk

YOU WILL NEED

- Milk
- Lactose free milk
- Test tubes
- Lactase enzyme
- Glucose test strips

INSTRUCTIONS

1. Put 3ml of regular milk and 3 ml of lactose free milk into two separate test tubes and label as A and B.
2. Use glucose strips to test the concentration of glucose in the lactose free and regular milk by comparing the colour of the strips against the illustration on the glucose strip pack. Record the findings.
3. Add a drop of Lactase enzyme to the regular milk and warm the test tube in your hands.
4. Test the regular milk again with a glucose strip and compare with your earlier results. You should have a higher concentration of glucose if the enzyme has successfully broken down the lactose.

Some people and many animals cannot tolerate the lactose in milk.

With this activity your learners will take the role of biochemists helping a cat rescue centre feed their lactose intolerant cats.

The learners will add an enzyme to break down the lactose in milk turning the hard to digest lactose into more digestible galactose and glucose.

They can then taste and test the results.

If you have time you can also look at how genetics and ethnicity relate to lactose intolerance as his topic provides an excellent E&D opportunity.





Itinerary

Students to work through the carousel of activities in school groups throughout the day.

- 10.00 Schools arrive at college.
Sort out a meeting point for all schools to gather.
- 10.15 General Welcome by Principal and timetable of event given out.
- 10.30 First activity - 50 mins
- 11.30 Second activity - 50 mins
- 12.30 Lunch – students given lunch vouchers to use in college refectory. Student college ambassadors sit with and talk over lunch.
School Staff taken to lunch by college staff.
- 1.15 Third activity – 50 mins
- 2.15 Plenary and evaluation.
- 2.45 Students leave to go back to school/home.

Things to Avoid

Avoid activities that do not identify or lead to pupils being able to identify realistic and available STEM careers.

Avoid activities that are JUST activities.

Avoid stereotypical activities that exclude specific genders.

Avoid short term fixes, this should be a project that builds.