GUIDE DOGS

STEM Pack 1 for KS2

Guide dog partnerships

Lesson plan

Aim:

To explain some of the science and technology that is used to create successful guide dog partnerships.

Objectives:

- Use research techniques to access and select relevant scientific information, from a range of sources, including ICT.
- To understand that offspring grow into adults of the same kind, but are not always identical to their parents.
- To understand the gestation periods of other animals and comparing them with dogs and humans.
- To understand that living things rely on each other within the natural world
- To communicate their findings by speech, writing, drawings, diagrams, charts, tables, bar charts, line graphs
- To understand how engineering and technology enables people with sight loss to understand and access the world around them.
- Pupils learn to carry out different types of enquiry, plan and develop ideas and reflect on what they have done.

Teacher/ Leader Notes:

The activities aim to meet some of the Key stage 2 requirements for Science, Technology, Engineering and Maths.

Resources:

- STEM learner Resource pack
- A copy of Our (guide dog) Breeds
- Cut- outs/ resources from teacher/ leader notes in this pack

Further Learning:

Make Sense our STEM pack gives young people an insight into the senses of people and dogs. It has lesson plans on sight loss and sensory play activities

We also have 3 modules that explain the training and matching of guide dogs. What does a guide dog do, How are guide dogs trained and Guide dog/ pet dog spot the difference.

Available to download from **www.guidedogs.org.uk/learning**

Activity 1

Gestation of mammals

Introduction

Explain that nearly all mammals including dogs and humans give birth to live young. During the gestation period which is the time between egg fertilisation and birth, the offspring develop (grow) inside the womb.

Use resource sheet - Gestation table

Encourage the class to either fill out the gestation days table using online research or through picture cards placed around the classroom (not provided). Once they have filled out their table they can then convert their findings into a bar chart.

Engage the children in a class discussion about the results.

- Look at the graph, find which three species of animals have the longest gestation period?
- What do you notice about the number of offspring they have per pregnancy? Why do you think this is?
- Which animal has the shortest gestation period?
- Do you think we could ever have guide elephants or cats instead of guide dogs, discuss reasons for and against?

Activity 2

Breeds of dog

Encourage the class/ group to discuss why dogs were chosen to help people who are blind or partially sighted get out and about independently.

- We train dogs because unlike other animals, dogs have a real willingness to please and work hard for their owner.
- People can build an extremely strong bond with their dog, unlike animals such as cats which are much more independent.
- Some breeds are the right size and have the right level of initiative and intelligence as well as attributes such as confidence, dependability needed for guiding a person.

Why do we have certain breeds?

Guide Dogs used to use adult dogs of any suitably sized breed offered from members of the public or external breeders to train as guide dogs, however, the dogs didn't often succeed. We started breeding our own puppies in the 1960's, Labradors, Golden Retrievers and German Shepherds have been and remain our most common pure breeds but we also cross breeds as well.

Paired activity

Around the room place the Dog cards with the parents 1-5 and give each pair the sheet with the offspring (dogs) A to E on them.

The pairs need to move around the room and match the right offspring with the right parents and write the name of the type of dog if they know it.

1= E Golden retriever x German Shepherd,

2= D Golden retriever x Labrador,

3=C German Shepherd,

4=B Poodle x Labrador,

5=A Labrador.

Group discussion

Why do you think we cross some of the breeds?

Why do we use Poodle cross Golden retrievers?

Exercise

Use the table of breeds to complete the pie chart to show the percentages of the guide dog breeds and cross breeds.

The Golden Retriever crossed with the Labrador has produced the most successful guide dog of all, combining many of the great traits of both breeds this is also true of the Golden retriever cross German Shepherd. We sometimes breed poodles with Labradors so the puppies will shed less hair which may be helpful to people with allergies to dog hair but will keep the same qualities of a Labrador.

Activity 3

Guide dog partnerships

Introduction

When a potential guide dog starts their training at about a year old, they learn to wear a guide dog harness with a handle. We give the dogs time to get used to the harness and use treats and rewards to make it a positive experience.

Use the picture of a harness and handle to start the discussion.

- What do you think the harness is made from?
- What do you think the handle is made from? Why? (think about what information the person needs to get from the handle)
- How are the two joined together?

Divide the class into groups to design their own handle, each group could test out all the different types of material or each group could focus on one material and make a few prototypes, by creating simple rectangles to mimic the shape of the harness.

Substitute:

Metal with Pipe cleaners , Plastic with straws, Wood with lolly sticks, Fabric/ leather with string

Provide the groups with pipe cleaners, plastic straws, lolly sticks, string and sticky tape and scissors. For testing you will need small weights. Record your findings from each of the handles in a group table.

Test one – feedback from the handle, whilst sitting still with your eyes closed can you tell which way the handle is being moved test this 5 times and record your score out of 5.

Test two – strength - hang small weights from the bottom of each one, which one holds the most weight?

Test three - Flexibility, twist your handle, how many times can you twist the handle before it breaks?

Consider the results and discuss your findings. Did you influence the results at all, how could you minimise human influence? Discuss how successful each handle would be and why. Which would you prefer to use?

Table of results (example)

	Product tested	Feedback	Strength	Flexibility
Group A	String/ leather			
Group B	Straw/ plastic			
Group C	Pipe cleaner/ metal			
Group D	Lolly stick/ wood			

Activity 4

Using GPS wearable tech

Introduction:

As an organisation we are always trying to find new ways to enable people with sight loss to live and get around independently. One project we have been working on with businesses is to develop wearable tech that enables the user to navigate with a voiceover through a headset. More recently people with sight loss have been expanding their environment and visiting new places using GPS through smartphones and other devices.

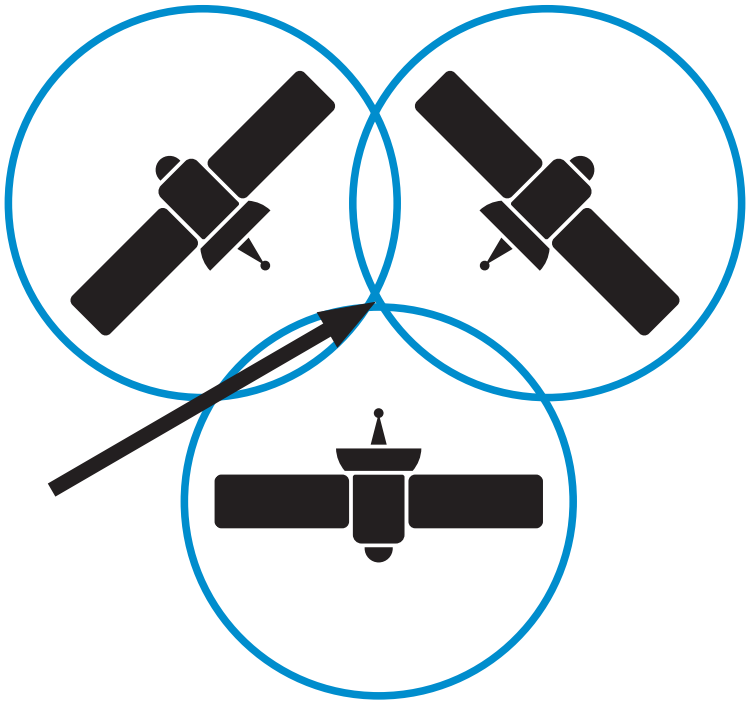
Ask the class/ group what they know about GPS, does anyone know what the letters stand for? Global Positioning System. What other terms are used for GPS? Sat-Nav, Navigation system, map app's

How does it work: GPS uses 30 satellites which are orbiting the Earth at an altitude of 20,000km, each satellite orbits the Earth twice a day. They were originally used by the military but now anyone with a GPS device can use them. You may want to bring up an image of a satellite orbiting the Earth for the group to see.

Ask the group to:

Imagine you could see the satellites above you, at any time during the day 3 or 4 of the 30 satellites will be overhead. Each satellite emits a unique signal which travels at the speed of light, your device, possibly your phone receives the signal. It then works out the distance you are from each one from the time it takes for the signal to arrive and pinpoints your location. It can then be used to give you a route to your chosen destination.

You are in the area where the three satellites lines overlap



Use resource - picture of Kelsey and Lacey

Kelsey is a young person and guide dog owner, he goes everywhere with his guide dog Lacey. While a guide dog helps its owner cross the road safely and avoid obstacles, the person with sight loss needs to know where they are going and to navigate the space around them. Many guide dog owners use GPS or Apps to help them navigate. Some smart phones have voice recognition and describe what's on the screen, which makes them easy to use on the move.

Introduction:

Kelsey and his guide dog Lacey are on their regular route when they find the road blocked. Kelsey makes the decision to try a different route using the Sat-nav app on his phone, whilst Lacey follows his instructions and guides him along the road, stopping at kerbs and crossings.

Give the group directions to follow (draw) on their map, they should trace from the starting point to the destination (resource sheet).

Listen carefully and follow the instructions, where do Kelsey and Lacey end their journey?

Directions are:

- Turn around
- Walk to the corner and stop
- Turn Left
- Walk forward past the Zebra crossing to the corner and stop
- Turn Left
- Walk forward to the corner and stop
- Turn left
- Walk forward and stop at the pelican crossing
- Using the pelican crossing cross over the road
- Turn right on the other side
- Walk to the corner and stop
- Turn left
- Walk forward past the Zebra crossing to the corner and stop
- Turn left
- Walk forward to the corner and stop
- Turn left

Ask the class where did Kelsey and Lacey end their journey? (the school)

Explain at every corner Lacey will sit so that Kelsey knows he is at the edge of the road, examples of this can be seen in our video 'The life of guide dogs':
https://youtu.be/AHXMePThvgw

Stem group challenge

Finding the right escalator

Split your class/ group into smaller groups for this problem-solving activity

The brief:

People with sight loss may find it difficult to find the correct escalator or travellator, particularly when the up or down escalator are right next to each other, or if they are visiting somewhere new. This could be in the supermarket, shopping centre, airport or train station, can they come up with a solution?

Plan:

Encourage the groups to research escalators and sight loss as part of the planning stage.

You may wish to use the video 'The Life of Guide Dogs' or activities from the Make Sense STEM pack to give the group an insight into sight loss.
Available from **www.guidedogs.org.uk/learning**

Now that they have researched the problem it's time to think about solutions, encourage the groups to jot down ideas then agree on a plan to create one of them.

Questions to consider when designing their solution:

1. How can I design a solution that will also keep people safe?
2. What materials can I use for my design?
3. What would work, a low tech or a high-tech solution?
4. What other senses could people with sight loss use to find the escalator?

Do:

Depending on the resources available encourage the groups to think about the problem then design their idea creatively using virtual or physical models. Raspberry Pi, Mindstorm, Lego etc. or; a physical scale model virtual run through of their idea on the computer. They need to think about how and why their idea would work and explain this in their notes. Give each group an opportunity to share their idea with the whole group.

Reflect:

Make time at the end of the session for the groups to explore their idea and analyse what worked and how they could improve their design.

- Review your idea against the original problem, did you succeed?
- Would you make any changes to your design or your whole approach?
- How could you improve your design?
- What have you learned?
- What did you find out about working together as a team?

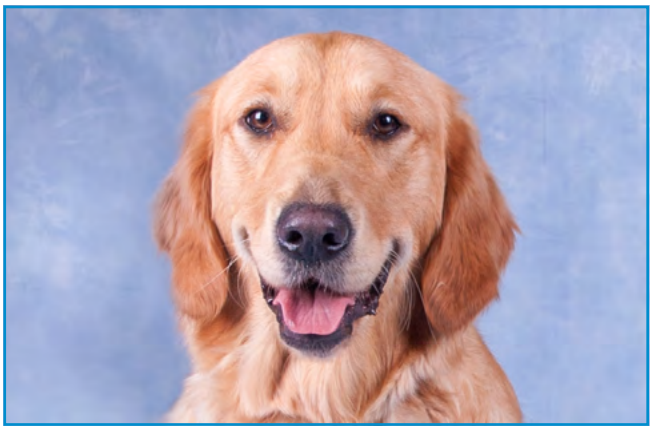
Stem activity 2

Class resource guide dog breeds

Place the cards around the room, or use with your interactive white board. Encourage pairs to match parents with their offspring discuss their characteristics, similarities and differences.

Mum and Dad – Pair 1

Mum and Dad – Pair 2



Mum and Dad – Pair 3

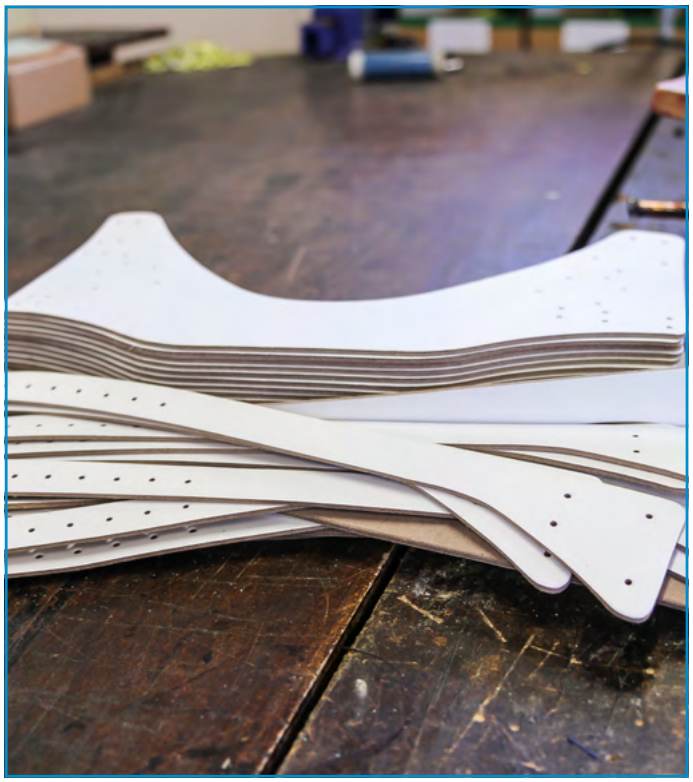
Mum and Dad – Pair 4

Mum and Dad – Pair 5

Stem activity 3

Harness and Handle

Either print or show the following resources on the whiteboard



Stem activity 4

Kelsey and Lacey