

**Some senses require feedback (information) from other senses to provide the person with complete useable information.**

**People use their senses in combination with each-other to do complex tasks .**

**Clever people also watch and access the outcome of a task before repeating the action or modifying the action. ( Habits of Mind link)**

**Question - How do people learn?**

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### **MORE ADVANCED DISCUSSION**

Humans also have types “senses” that are subjective, these are senses ( actually opinions/feelings) that are based on experiential , cultural and/or nurturing conditioning.

Examples of this could be “Danger”, “Fun”, “Beautiful”, “Harm”, “Bully”

Imagine how you could explain to an alien how to process the word “Danger” so that the alien could catch fish to eat but avoid great white sharks. (The alien can speak English)

How could you explain to an alien that it’s OK to have opinions but not to be a “bully”.

### **TARGET VOCABULARY**

**Senses  
Sensors  
Information  
Reading  
Tasks  
Programming  
Instructions  
Feedback  
Knowledge  
Language  
Learning  
Remembering  
Modify  
Repeat  
Think**

## TEACHING POINT

This is what a robot without any “touch ( pressure) sensors” would feel doing this task.

To tie shoelaces the robot would have to rely strongly on prior learning - instructions it had been given on how to tie shoelaces.

It would also need some sensor that provided feedback on position of it’s fingers and the position shoelace ends and loops.

It would also need to know the thickness of the shoelaces to know how to grasp the ends with enough grip to hold them.

During the process of tying the shoelace you need to let go of the lace end to pass it through a loop, the robot would need a sensor that allowed it to find the lace again and know where the loop is.

Tying shoelaces is a more complex task than we first thought!

## Human Senses – Example Answers

Sense	Information it Tells Us
Sight	Near / far Colour Bright/dark – night/day Pretty , friendly, Size, shape What is it? Recognising Danger Reading / letters Who is it ( face recognition) Etc.
Touch	Texture Hot/cold Pressure* Wet/ dry Solid/ liquid Etc.
Etc	Etc

\*This is a hard one and may not come up , coax it out - question – How do you know when to stop closing your fingers on a glass? Why don’t you just keep closing until the glass breaks?

Look at the items in the list and then ask the class what information from our senses requires **PRIOR KNOWLEDGE / EXPERIENCE/ LEARNING?**

How can a robot “know” this information ?  
Answer-The programmer tells the robot.



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## GUIDED QUESTIONS FOR:

### CAN A ROBOT TIE IT'S SHOELACES? Senses & Sensors Investigation

Print out the details of this activity from :

<http://www.thetech.org/robotics/activities/page05.html>

#### **Discussion – What are human senses, what sorts of things can they tell us?**

Make a list

See the table below.

#### **Tie your shoe laces normally**

Question – List all the senses that you used to do this.

See worksheet table following

#### **Close your eyes and tie your shoelaces**

Question – What senses did you use to tie the laces this time

Was it harder? What information didn't you have while you were tying the laces?

Did you have to use any other senses more ?

Was there something else you had to rely that wasn't a sense?

#### **Tape the pop sticks / tongue depressors to your fingers and try to tie your shoelaces:**

What made this so hard to do? What sense weren't you able to use?

#### **Now tape the pop sticks / tongue depressors to your fingers and try to tie your shoelaces WITH YOUR EYES CLOSED:**

What made this so hard to do? What sense weren't you able to use?

What did you have to rely on?