MAKE YOUR OWN MICROSCOPE

LESSON PLAN

MAKERVERSITY DIY
MAKING TOOLS FOR LEARNING

LEARNING OBJECTIVES

Use basic tools to dismantle a webcam.

Work as a group to hack components into a working microscope.

Recognise the components within a webcam.

LESSON PREPARATION

NB: Test webcams and laptops before lesson to avoid disappointed children!

Class need to be in teams of four, one team per table. Lay out tool kit on tables, along with worksheets/instructions where applicable. One laptop is needed per team.

Sawing stations should also be set up at the side of the room, where a member of staff can supervise learners with this activity.

ORAL STARTER

(Slide 2) Do you know the word 'hack'? Where have you heard it before?

Discussion aims: hacking – computers, introduce idea of hacking objects, refer to board for common hacks

"Today we are going to learn a hack of our own…"

INDEPENDENT ACTIVITIES

(Slide 3) **TTYP:** What is a webcam? Have you used one; if so, what for? Can you imagine why they were first invented? **CQ:** What parts do you think are inside a webcam?

Feedback to class. OK, so…

(Slide 4) **TTYP:** What about microscopes? Where are they used and what for? **CQ:** What parts do you think are inside a microscope?

Feedback to class.

(Slide 5-7) CT to introduce **WALT/WILF** and guide chn through tool kit. Outline expectations when using tools, always to be supervised by adult.

(Slide 8) Chn to unpack webcam and examine it; can they work out what each part is for? Feedback to class; have we seen any of these bits before?

PLENARY ACTIVITY

(Slide 26) Chn to feedback the top 3 things they saw under the microscope as a group.

CQ: Can you think of any other uses for the parts of a webcam we met today?

AFL: Assessment for learning
CQ: Challenge Question
KV: Key Vocabulary

TTYP: Talk to your partner
WALT: We are learning to...
WILF: What I'm looking for...

STEP-BY-STEP INSTRUCTIONS | COMPONENT DIAGRAMS | KEY VOCAB EXPLAINED | TOOL KITS, HINTS & TIPS

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	Teachers may want to gather a selection of materials/items from outside for the children to explore with their microscopes.		(Slide 9) Discuss form and function - why do these components look the way they do? (Slide 10) Chn to remove casing of webcam. Safety: screwdriver. (Slide 11) **CQ:** look at the screw thread - does it look like anything? Inside of bottle lid? (Slide 12 & 13) Chn to remove front casing of webcam. Why do we need the front casing? (Form and function.) (Slide 14) **KV:** Circuitboard. **KV:** LED. **CQ:** What other devices do you think might use these bits? (Slide 15) **KV:** Soldering. Direct chn to worksheet to record definitions. (Slide 16) Allow chn time to examine the components of the circuitboard.	

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			(Slide 17 & 18) Move on to twisting lens a little (NB: not all the way out!). Encourage chn to consider changes in image on laptop screen. **AFL:** Can you remember the rhyme for loosening or tightening something? Allow chn to fully remove the lens and examine behind it. (Slide 19) Chn to measure lens holder depth and mark on casing of lens. (NB: this need not be 100% accurate – differences between the groups will allow for discussion and comparison later in the session.) If calipers unavailable, use a sturdy material with a flat base, such as strip of card/dowel/straw. (Slide 20 & 21) Teams to sawing station, to saw lens to depth marked on in previous step. Where possible, all children to have a turn at sawing. (NB: chn may find it useful to saw approx. a quarter of the lens, then rotate and saw, and continue until sawn through.)	

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			(Slide 22) Whilst sawing, cut out nets ready to be constructed. Chn use worksheet to construct stand for microscope. CT/TA to circulate to help with instructions/fiddly bits. (Slide 23 & 24) Chn to reinsert cut lens into holder on circuitboard. Assemble stand around it – microscope ready to use! (Slide 25) Explore! Direct chn to worksheets where they can record their favourite views from microscope.	

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