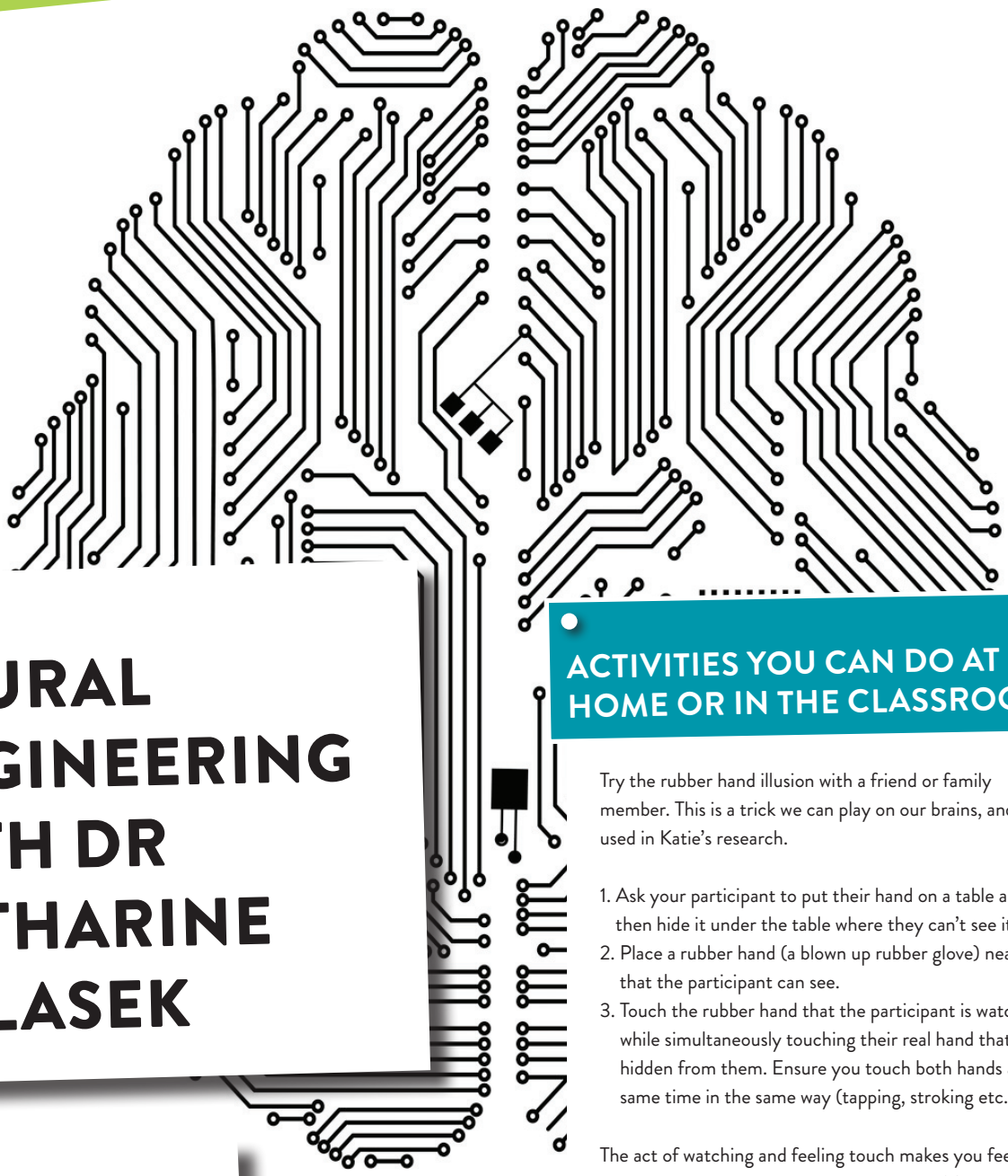

NEURAL ENGINEERING WITH DR KATHARINE POLASEK

TALKING POINTS

KNOWLEDGE

1. What are two main parts of the nervous system?
2. What is meant by 'referred sensations'?

COMPREHENSION

3. What are the reasons for using surface electrical stimulation to treat phantom limb pain?
4. Why was creating a tapping sensation using electric currents important compared with buzzing and tingling?

ANALYSIS

5. Why is Katie's team hoping to evoke a 'natural' sensation for amputees?
6. Katie studied responses in people both with and without amputations. Why do you think this is important?

EVALUATION

7. If you were trialing a new electrical stimulation treatment, what questions would you ask the participants in your trial?
8. What do you understand about neuroplasticity and how it relates to Katie's research?

ACTIVITIES YOU CAN DO AT HOME OR IN THE CLASSROOM

Try the rubber hand illusion with a friend or family member. This is a trick we can play on our brains, and is used in Katie's research.

1. Ask your participant to put their hand on a table and then hide it under the table where they can't see it.
2. Place a rubber hand (a blown up rubber glove) nearby that the participant can see.
3. Touch the rubber hand that the participant is watching, while simultaneously touching their real hand that is hidden from them. Ensure you touch both hands at the same time in the same way (tapping, stroking etc.).

The act of watching and feeling touch makes you feel like the rubber hand is actually your own hand! After a while, touch the rubber hand but not your participant's hand. Do they still feel the sensation of touch?

You can watch a video of how this being demonstrated here: **www.youtube.com/watch?v=sxwn1w7MJvk**

MORE RESOURCES

Teach Engineering has a whole teaching unit on biomedical engineering and the human body: **www.teachengineering.org/curricularunits/view/cub_biomed_curricularunit**

STEM for Kids also has some fun biomedical engineering activities such as 'Hitting The Funny Bone', 'The Lean Mean Fighting Machine' and 'Eye Tech & Virtual Reality': **stemforkids.net/programs/biomedicalengineering/**

eGFI lists a host of lesson plans and ideas relating to bioengineering: **teachers.egfi-k12.org/tag/biomedical-engineering/**