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The Science of Psychology

ACTIVITY BOOK 2022

Queen's University

CHILD and ADOLESCENT DEVELOPMENT
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WANT TO PARTICIPATE IN STUDIES?

WHO can participate?

Infants
Children
Adolescents
Families

WHAT types of activities?

Games
Videos
Surveys
Conversations

WHERE do you participate?

Online via video chat or secure websites

In-person at Queen's University

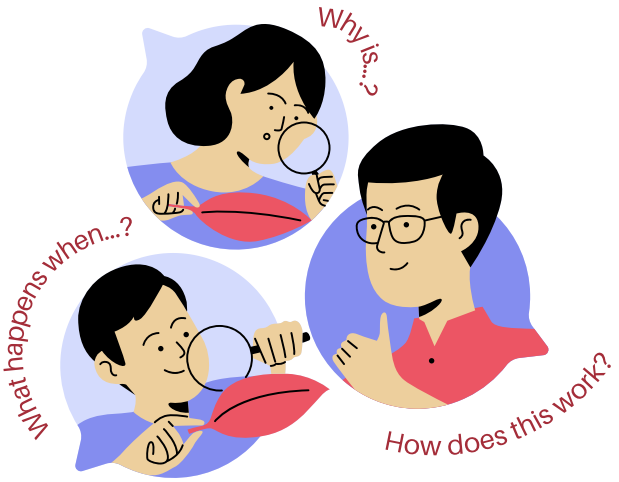
HOW can you participate?

Email
child.studies@queensu.ca
OR visit:
https://www.queensu.ca/psychology/devstudies

PSYCHOLOGISTS ARE SCIENTISTS

THINK LIKE A SCIENTIST!

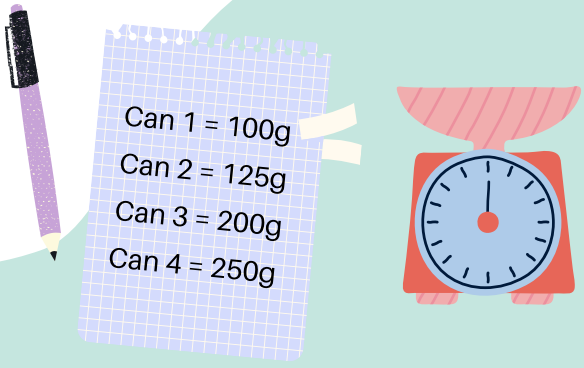
Scientists ask questions

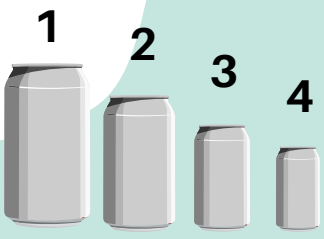


Scientists test **predictions** by doing **experiments** and making **observations**

Let's think like a scientist!

Question, predict, experiment, and observe!





Which can is the heaviest?

I predict that the largest can (#1) is the heaviest!

Looks like my predictions were wrong... the smallest can (#4) is the heaviest!

What do you think? Why might the small can be heavier than the large can?

PSYCHOLOGISTS ARE SCIENTISTS

Psychologists ask **questions** like...

How does the brain work?

How do we learn math, language, physics, art...?

How does our past affect our future?

What makes humans special?

How do we promote healthy development?

Psychologists test **predictions** by doing **experiments** and making **observations.**

The activities in this book help you to think like a psychologist.

MISSING METHODS

Here are just three of the ***many*** methods that psychologists use in their research - but, oh no! Each word is missing important letters! We've gathered all the missing letters here - can you figure out where each one goes?

[A C O R S T W]

I N ◯ E R V I E ◯

This machine is an MRI. That stands for: ***Magnetic Resonance Imaging***

B ◯ A I N

S ◯ A N

O B ◯ E R V ◯ T I ◯ N

1) Interview
2) Brain Scan
3) Observation

Build your paper scientist

THE EEG

Another method that psychologists can use in their experiments is **electroencephalography (or EEG)**. In this method, scientists use a cap with little electrodes to measure brain activity.

With EEG, psychologists can observe how brain activity changes - while you are sleeping, learning, talking, etc.

In the next activity, you are going to build your own EEG lab to play!

Build your paper scientist

1

Print the next page making sure to extend it to the whole paper sheet.

2

Use your favourite colouring materials and your creativity to give the clothes and gadgets your own style!

3

Cut out the drawings around the outer black lines - don't forget the flaps - they will hold clothes on the characters!

4

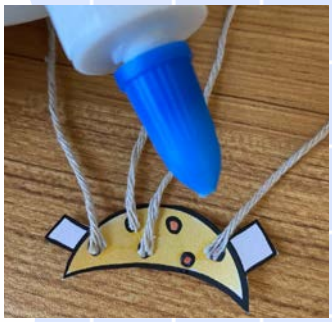
Decide which character will be the scientist and which will be the participant. Fold the clothing flaps behind them.

5

Fold the computer in the middle, so it looks like a tiny laptop!

6

Glue some pieces of string to the EEG cap - they will look like wires!

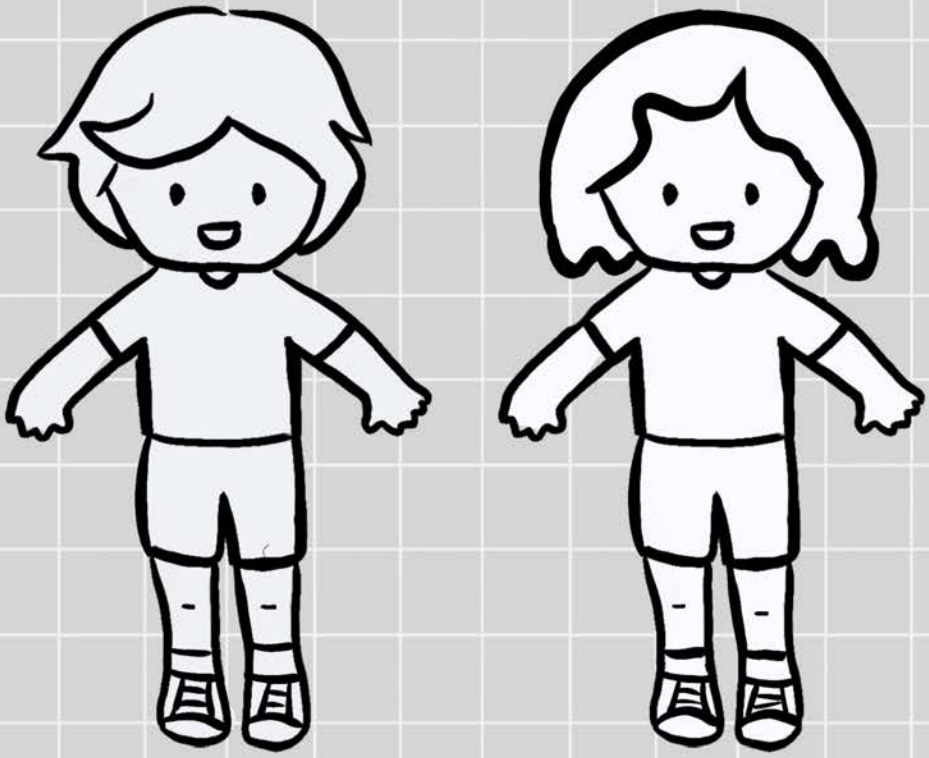


7

Glue the strings to the back of the laptop and gadget to complete the scientist's EEG equipment. Put the cap on the participant.

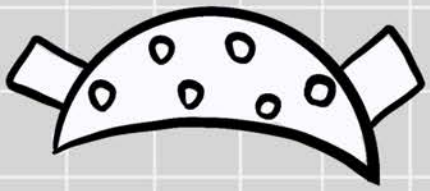
You're ready to play!

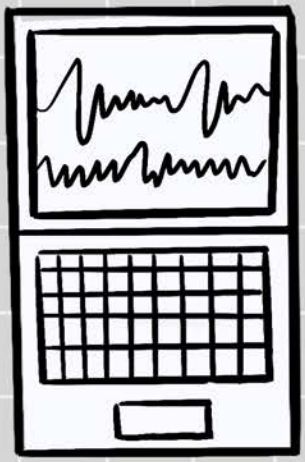
Build your paper scientist

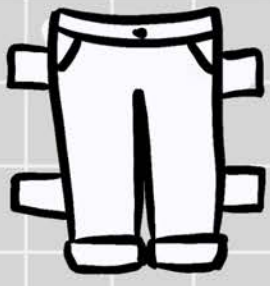


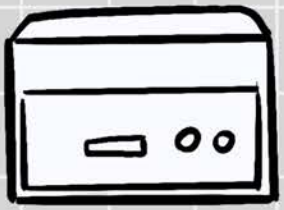
You will need:

- Scissors
- Coloured pencils, markers or crayons
- Pieces of string
- Glue









Psychologists study

THE BRAIN

This wrinkly organ inside our head is so amazing and powerful! The brain controls all the functions in our body, and with such great responsibility comes a lot of complexity. We need scientists to better understand how the brain works and what makes it special.

Psychologists study

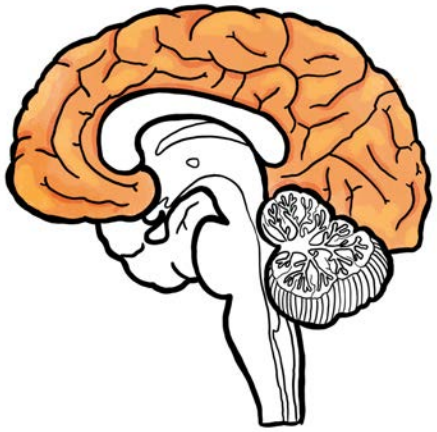
THE BRAIN

Parts of the Brain

1. CEREBRUM

(say: suh-REE-brum)

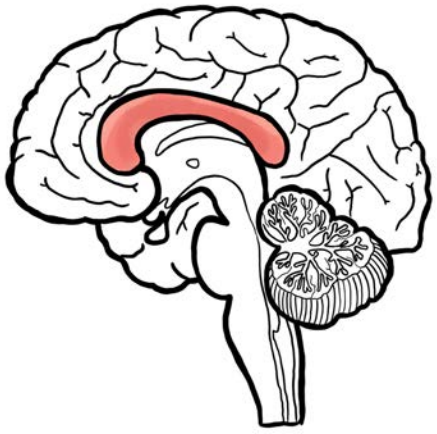
The Cerebrum is the largest part of the brain. It is the thinking part of the brain. It stores your memories and lets you learn and feel emotions. The Cerebrum also controls your voluntary muscle movements – like the movements that let you dance or speak! The cerebrum has two halves that we call 'hemispheres': the right hemisphere and the left hemisphere.



2. CORPUS CALLOSUM

(say: KOR-pus ka-LOW-sum)

The Corpus Callosum is a thick band of nerve fibers that connects the two halves of the brain. It's a bridge for information to travel from one hemisphere to the other.



Psychologists study

THE BRAIN

Parts of the Brain

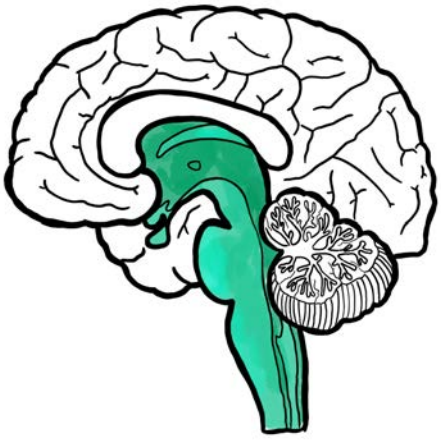
3. CEREBELLUM

(say: sair-uh-BELL-um)

The Cerebellum is at the back of the brain and controls your balance, movement, and coordination. It lets you ride a bike or skate!

4. BRAIN STEM

The Brain Stem connects the brain to the spinal cord. (The spinal cord is a bundle of nerves that is protected by your spine and is the main pathway for information to travel from the brain to the rest of the body). The Brain Stem is important for many of your basic body functions, like breathing and swallowing.

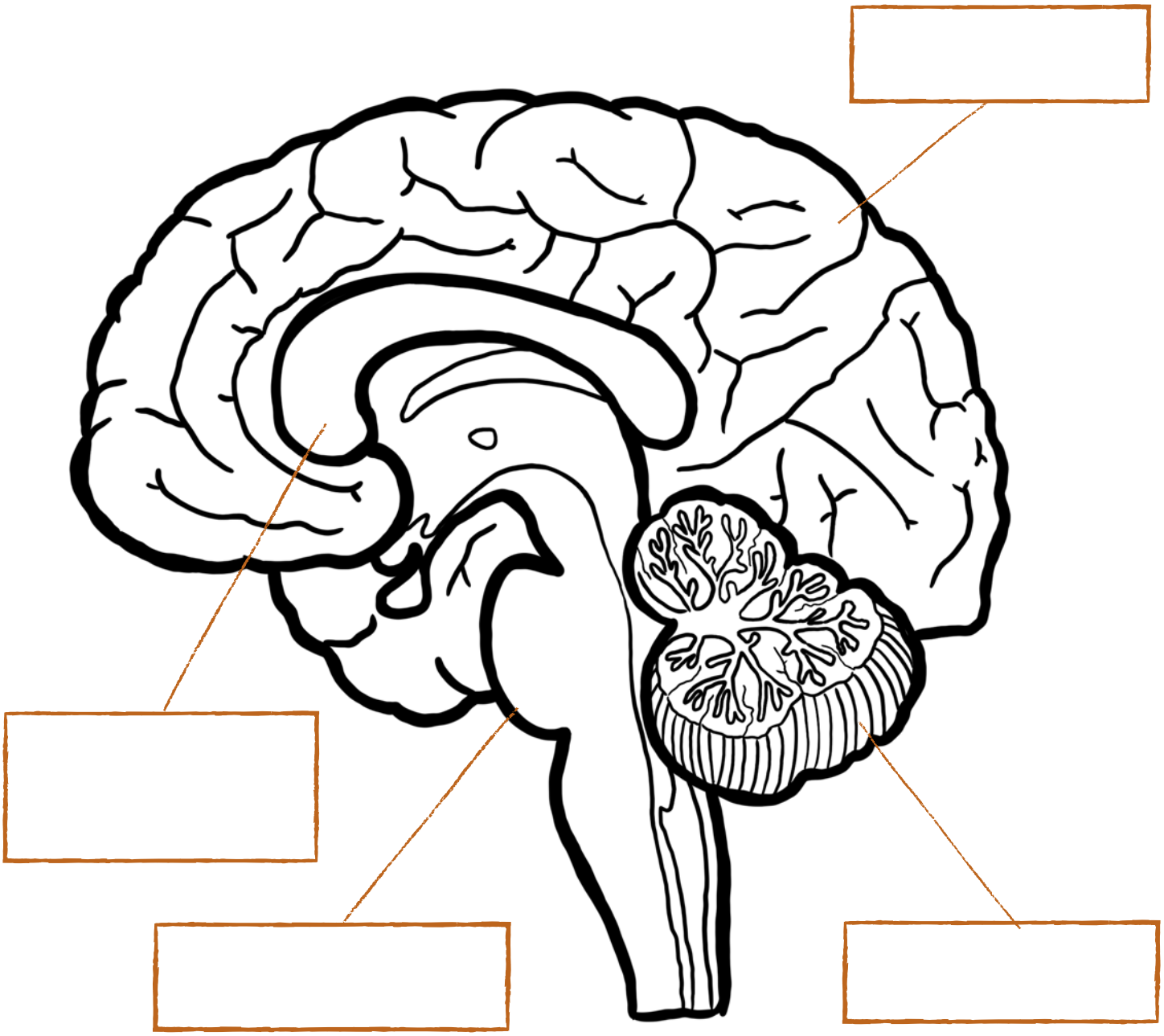


Note: In the pictures above, we 'sliced' the brain to take a look at the inside. The complete brain is formed by two halves - the hemispheres -- like this picture on the left.

Psychologists study

THE BRAIN

Now it’s your turn!
Colour and name the parts of the brain

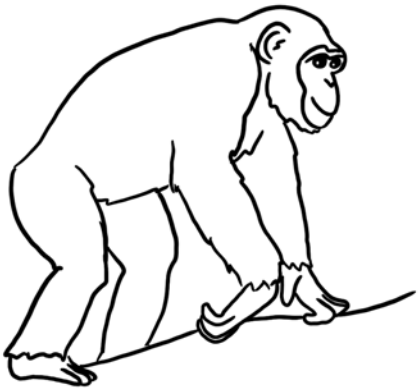


Psychologists study

THE BRAINS OF OTHER ANIMALS

Psychologists also study the brains of other animals, to compare them to the human brain. Here are some of the animals that psychologists study. Can you guess which brain belongs to each animal?

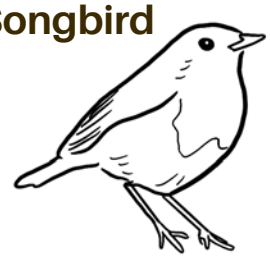
Chimpanzee



Mouse

Dog

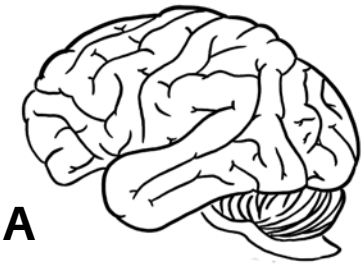
Songbird



Fish

B

D



A

C

E

Answers: Chimpanzee (A), Mouse (C), Dog (E), Songbird (D), Fish (B)

WHAT DO YOU KNOW ABOUT THE BRAIN?

Try out these 6 trivia questions and see how well you know the brain. When you are all done, make sure to check your answers on the next page.
(But, no peeking!)

1. True or False: The brain is the control centre of the nervous system.

2. The _____ is the biggest brain structure.
(Hint: Look back at the brain colouring page!)

3. How much does an average adult brain weight?
a. 7 lb/3.2 kg b. 5 lb/2.3 kg c. 3 lb/1.4 kg d. 1 lb/0.5 kg

4. True or False: The brain has a million nerve cells called *neurons*.

5. How many hemispheres does the brain have?
a. 1 b. 2 c. 3 d. 4

6. What are two examples of things we can do to take care of our brains?
(Hint: There are lots of right answers!)

WHAT DO YOU KNOW ABOUT THE BRAIN?

ANSWERS

1. **True:** The brain helps you do lots of things like eat, talk, move, and learn!

2. The **cerebrum** is the biggest brain structure. It makes up about 85% of the brain.

3. **C:** The average adult brain weighs **3 lb/1.4 kg**

4. **False**: The brain actually has *billions* of neurons!

5. **B:** The brain has **2** hemispheres: the right hemisphere and the left hemisphere

6. **Possible answers**: Get enough sleep, eat balanced meals, exercise and play, wear a helmet when biking and skating, spend time with friends and family, do creative activities, learn new ideas, and many more!

Psychologists study

HOW WE SEE THE WORLD

We experience the world through five main senses – we see with our eyes, hear with our ears, smell with our noses, taste with our tongues, and feel with our fingers. But our senses can sometimes fool us! What we see, hear, smell, taste, and feel may be different from what it's like in the real world...

Psychologists study
THE FIVE SENSES

Word Search

Can you spot the five senses?

E	R	Y	O	L	T	A	H	T	W
T	K	R	T	M	S	I	G	H	T
S	M	Z	R	N	L	Q	Y	B	S
A	P	N	E	L	W	Z	T	Q	E
T	X	D	E	T	H	S	O	W	C
F	O	M	S	R	D	N	U	O	S
P	S	D	Q	P	B	E	C	D	E
W	C	A	T	E	M	T	H	L	S

The five senses are: sight, sound, smell, taste, touch

Test your senses at these links:

https://www.youtube.com/watch?v=_SHFwmPQ_rQ [Hearing]

https://www.xrite.com/hue-test?PageID=77&Lang=en [Vision]

Guess That Flavour!

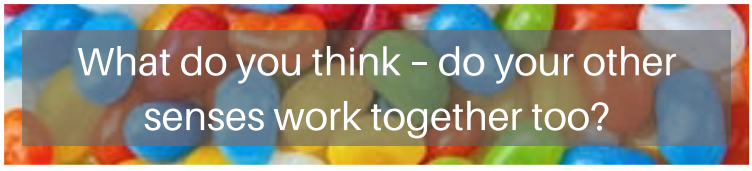
Here's a fun experiment you can do with a partner. You just need different flavours of jelly beans!

Step 1: When your partner isn't looking, pick out five or more jelly beans.

Step 2: Tell your partner to close their eyes and pinch the nostrils of their nose (so they can't see or smell anything!)

Step 3: Give your partner one jelly bean at a time and ask them to guess the flavours, just by tasting them.

With their eyes closed and nose blocked, your partner is probably going to get a lot of the flavours wrong! Why? Because our sense of taste is helped a lot by our sense of smell.



What do you think – do your other senses work together too?

How Fast Can You Go?

Here, we have two versions of the "Stroop Task" from Psychology research. The first version is below - it uses words, so it will likely be most fun for school-aged children and adults.

The second version is on the next page - it uses pictures of objects, so it can be played by preschool children and early readers.

We explain the science behind this game on the next page!

Word Stroop Task

Your job is to name the ***colour*** of each word, from left to right, as fast as you can. Use a timer to see how long each box takes you.

YELLOW	RED	GREEN	BLUE	GREEN
PURPLE	ORANGE	BLUE	YELLOW	RED

Time:

GREEN	ORANGE	YELLOW	RED	BLUE
PURPLE	RED	BLUE	YELLOW	GREEN

Time:

BOOK	SQUARE	CHAIR	THREE	ONE
CIRCLE	FLOWER	PAPER	TWO	OVAL

Time:

What was your fastest time? Which box was the hardest?

Why do you think that is?

Picture Stroop Task

Your job is to name the ***colour*** of each picture in a line, from left to right, as fast as you can. Use a timer to see how long each line takes you.

Time:

Time:

Time:

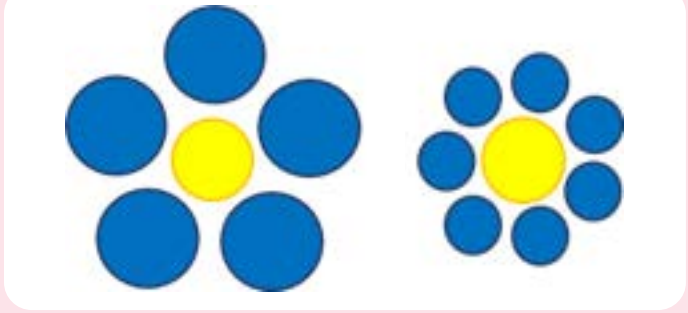
The Stroop Effect

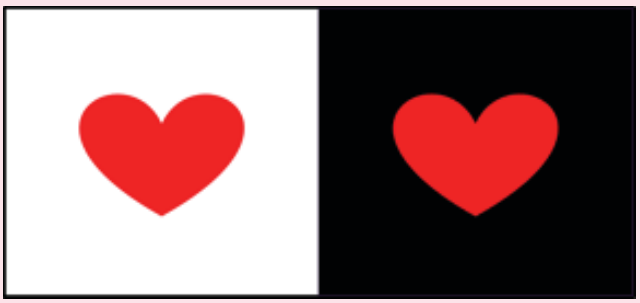
For many people, the top line of the Stroop task is much easier than the middle line – their first time is the fastest and their second is the slowest. You'll notice in the top line that all of the colours match with the pictures/words. It's easier for you to come up with those colour names because your brain already has them in mind (it thinks: 'apples are red'; 'those letters spell out orange'). In the middle line, the colours *don't* match. That means your brain has to fight with what it sees – it wants to say the colour the pictures should be (apples aren't purple!) or read what the letters spell out.

Can you guess what your brain is doing in the bottom line? Well, shapes don't usually have colours linked with them – a square or circle can be any colour. So, your brain does not get confused like it does when you see a blue banana. The Stroop task shows how our senses – and what we've learned in the past – can change how we think!

Psychologists study
ILLUSIONS

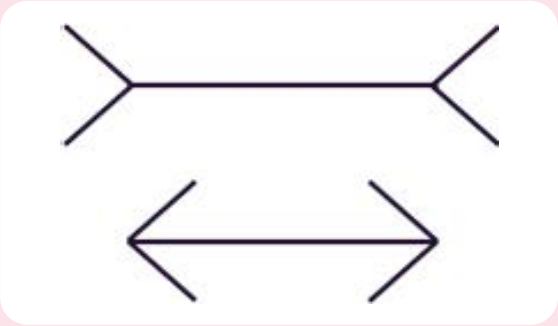
Which flower has the biggest yellow circle at its centre: the one on the left or the one on the right?





Which heart is a lighter/ less vibrant shade of red: the one on the left or the one on the right?

Which line is longer: the one on the top or the one on the bottom?



ANSWERS:

The correct answer to all three of these questions is: *neither*. Both circles, hearts, and lines are exactly the same! Don't believe us? Print this page and cut them out to check!

When you look at it again, even knowing that they're the same, they still look different, don't they? That's because your brain compares them to their surroundings. The small circles make the centre one on the right look bigger, arrows pointing out make the line on top look longer, and a dark background makes the heart on the right look lighter/less vibrant! Context can change what we see!

Psychologists study

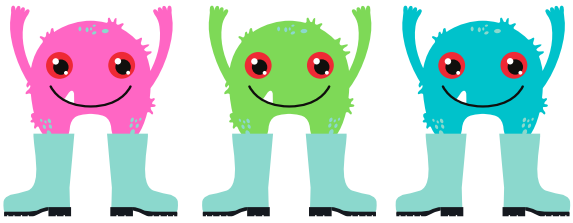
HOW WE THINK AND LEARN

Psychologists explore the mind. They study how it works, like how we remember information, learn, and solve problems. They study how parents and teachers influence our learning. They also study the minds of other animals in order to better understand our own. This section will provide you with activities, reflection questions, and comics to help start your journey to becoming a mind-explorer!

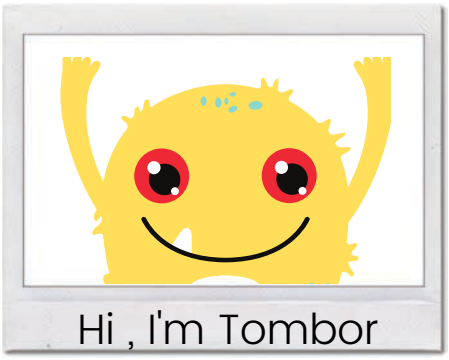
Psychologists study
PROBLEM-SOLVING

For this activity, read the story, circle "yes" or "no" to answer the question, and explain your answer in the lines provided.

All poggops wear blue boots.



Tombor is a poggop.



Does Tombor wear blue boots? **YES** **NO**

Explain your answer

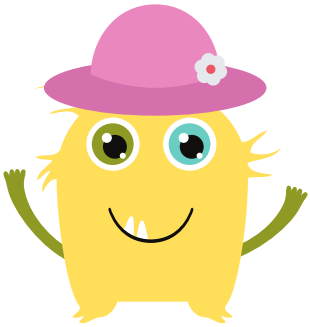
To solve this problem, we need to use *deductive reasoning*. We use information from the story to answer the question. As long as the information is true, we can answer the question logically, in a way that makes sense.

Psychologists study
PROBLEM-SOLVING

For this activity, read the story, circle "yes","no", or "maybe" to answer the question, and explain your answer in the lines provided.

Danu is a regli

Danu wears a pink hat



Do all reglis wear pink hats? **YES NO MAYBE**

Explain your answer

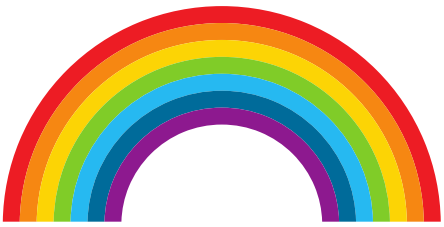
To solve this problem, we need to use *inductive reasoning*. We cannot simply use information from the story. Instead, we have to think beyond the information we were given to come up with an answer. And, our answer may not feel certain to us.

Psychologists study **MEMORY**

Remembering the colours of the rainbow in order can be quite hard:

RED, ORANGE, YELLOW, GREEN, BLUE, INDIGO, VIOLET

Instead of memorizing all those words, remembering this name might help with your memory:



ROY G BIV

- This is called an ***acronym.*** To make an acronym, you take the first letter of each word and combine them to make a new word that is easier to remember.
- You can even turn it into an *acrostic* by turning the first letter of each word into new words that combine into a memorable phrase:

RICHARD OF YORK GAVE BATTLE IN VAIN

Can you make acronyms or acrostics to remember the words in these lists?

- The 8 planets in our solar system
- The 5 great lakes
- The 10 Canadian provinces

Psychologists study

WHO HELPS YOU LEARN?

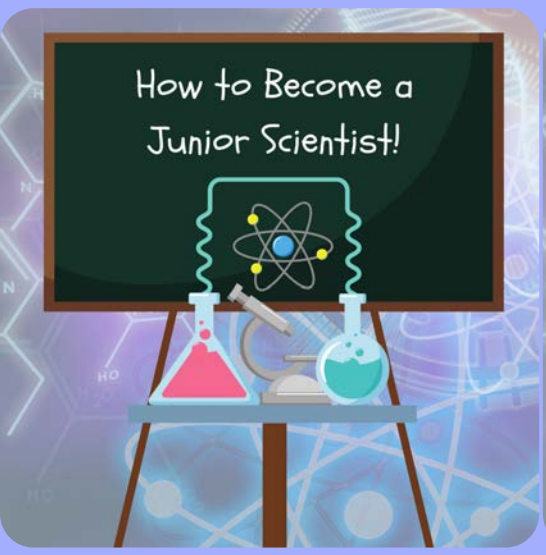
For this activity, we are reflecting on who helps us learn:

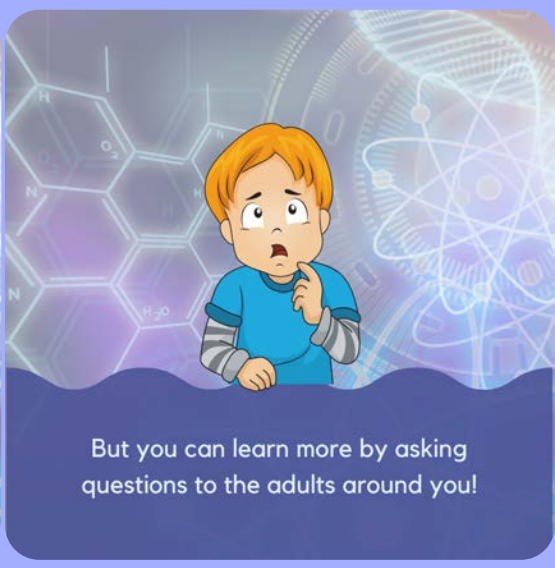
1) In the "ME" circle, write or draw all the things you love to learn about: art, sports, science...
2) In the "HOME" circle, write or draw everyone at home who helps you learn those things.
3) In the "SCHOOL" circle, write or draw the teachers and friends who help you learn.
4) In the "COMMUNITY" circle, write or draw any*one* or any*thing* in your community that helps you learn: community programs, news, social media...

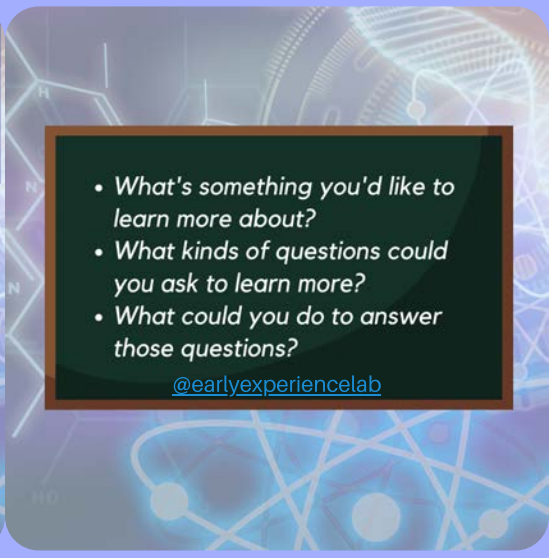
Psychologists are interested in how we learn from the people around us. Our world contains people who are directly related to us or that we see every day and have the greatest impact (family, friends, teachers). There are also many people we don't talk to as often (other people in our neighbourhood, city, or country).

Psychologists study

HOW YOU LEARN BY EXPERIMENTING







Psychologists study

HOW YOU MEET YOUR GOALS

Reaching your goals takes a lot of brain power!

@earlyexperiencelab

But even though it's hard work, it can also be rewarding!

To reach your goals, your brain helps you think ahead and come up with a plan!

It allows you to focus on that plan and not get distracted.

Even if you run into things that get in your way...

Your brain helps you get through them by quickly changing how you think and act!

When you reach your goals, the brain sends out what scientists call **reward signals**!

These signals make you feel good about your success!

They push you to set even harder goals and learn more about what the world has to offer!

- *What are your goals?*
- *How do you break down your goals to make a plan?*
- *If you run into problems, how would you solve them?*

Psychologists study

HOW THE EYES HELP YOU LEARN

@earlyexperiencelab

As a baby, you spent a lot of time looking at your parents' eyes!

Since you couldn't move around yet, looking where your parents looked helped you learn about the world!

You followed your parent's gaze!

By following your parents' gaze, you learnt what's important to pay attention to!

Looking at the same things together also helped you and your parents bond!

Scientists know all this because they've also been looking at the eyes to study how babies think and learn!

Science shows that babies look longer at new and surprising things and look less at things they've already learnt about!

Babies also look longer at things they like than things they don't like!

Because the eyes give so much information to babies and scientists alike, they can truly be thought of as the windows to the soul!

- *What can you learn by observing with your parents?*
- *What kinds of experiences do you and your parents share together?*

WANT TO LEARN MORE?

Check out

frontiers FOR YOUNG MINDS

Frontiers for Young Minds provides a collection of freely available scientific articles by distinguished scientists that are shaped for younger audiences by the input of their own young peers.

https://kids.frontiersin.org/

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The Science of Psychology

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