

# Brain Science

Understanding Adolescent Brain Development and Behavior



**Idaho  
Out-of-School  
Network**

# About ION

## Our Mission:

To build, advocate for, and lead a strong out-of-school community. ION provides tools and resources to increase access to quality youth programs.



## Our Vision:

Every Idaho child has an opportunity to learn and thrive through participation in a high quality out-of-school program.

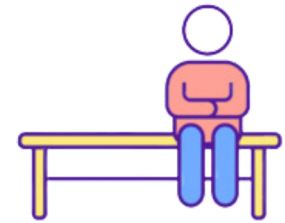
# Three Myths About Teen Brains



Raging hormones  
make kids crazy!



Kids just need to  
grow up!



Kids just need to do  
things by themselves!

# Parts of the Brain

## Frontal Lobe



The thinking center or CEO of the brain.  
Controls decision making, problem solving,  
judgement and self control.  
*The last lobe to fully mature!*

## Parietal Lobe



Receives and processes sensory  
information from the body.  
*Immature until around the age of 16!*

## Occipital Lobe



Responsible for processing visual  
information.  
*First of the lobes to fully develop.*

## Temporal Lobe



Responsible for memory, emotion,  
hearing and language.  
*Still developing after age 16!*

## Brain Stem

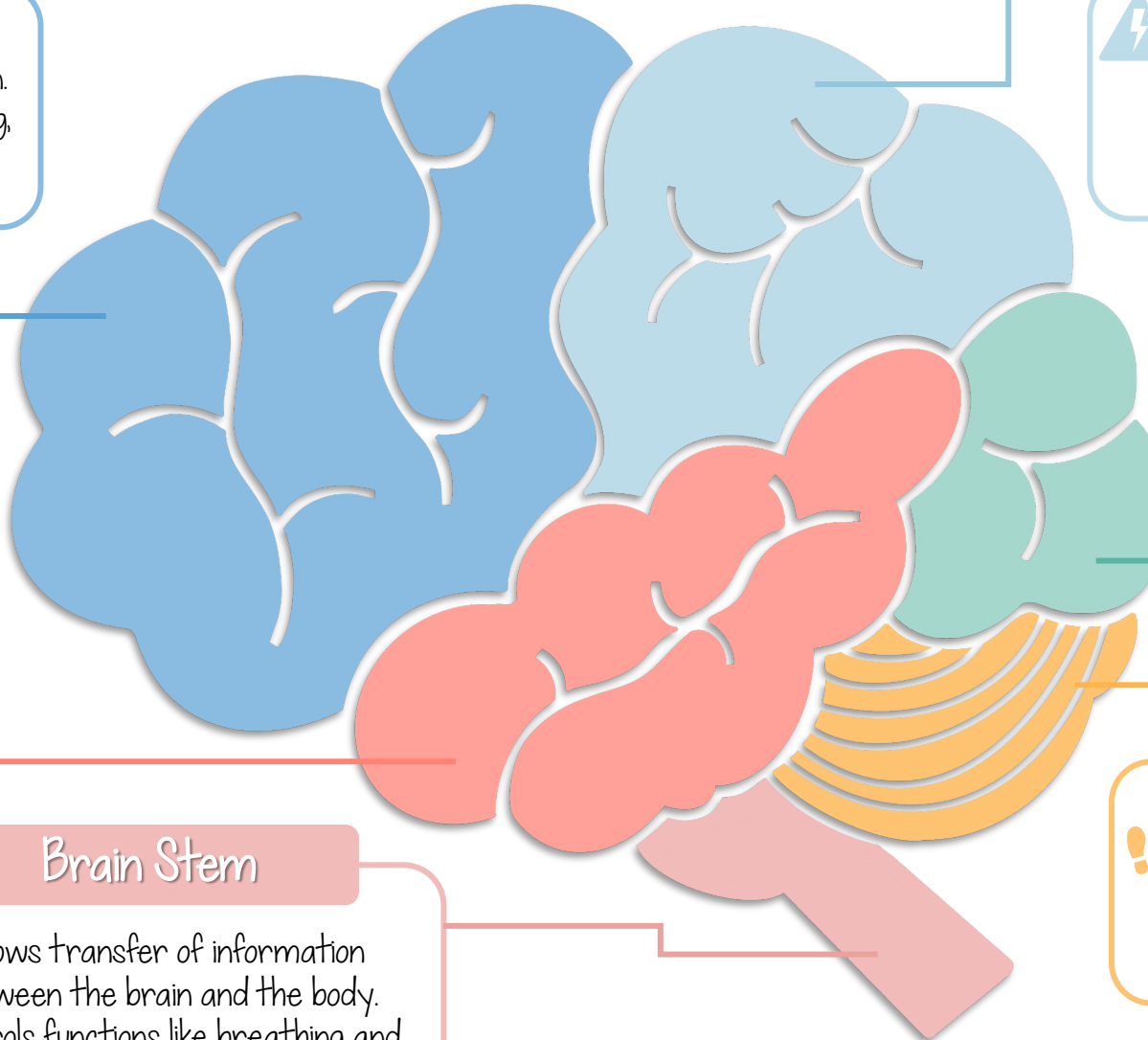


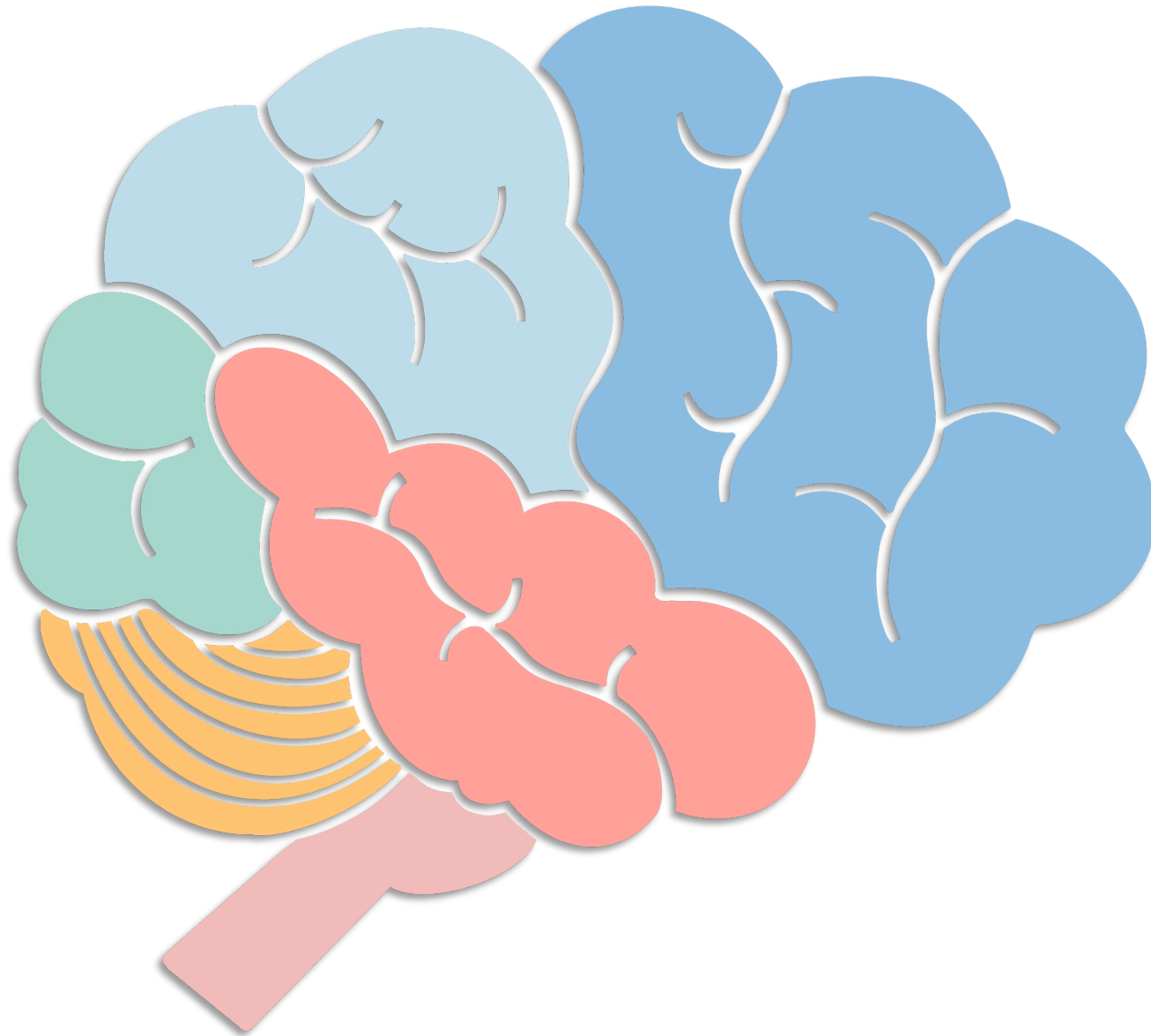
Allows transfer of information  
between the brain and the body.  
Controls functions like breathing and  
circulation.

## Cerebellum



Controls movement, muscles, and  
balance. Plays an essential role in  
voluntary motor skills





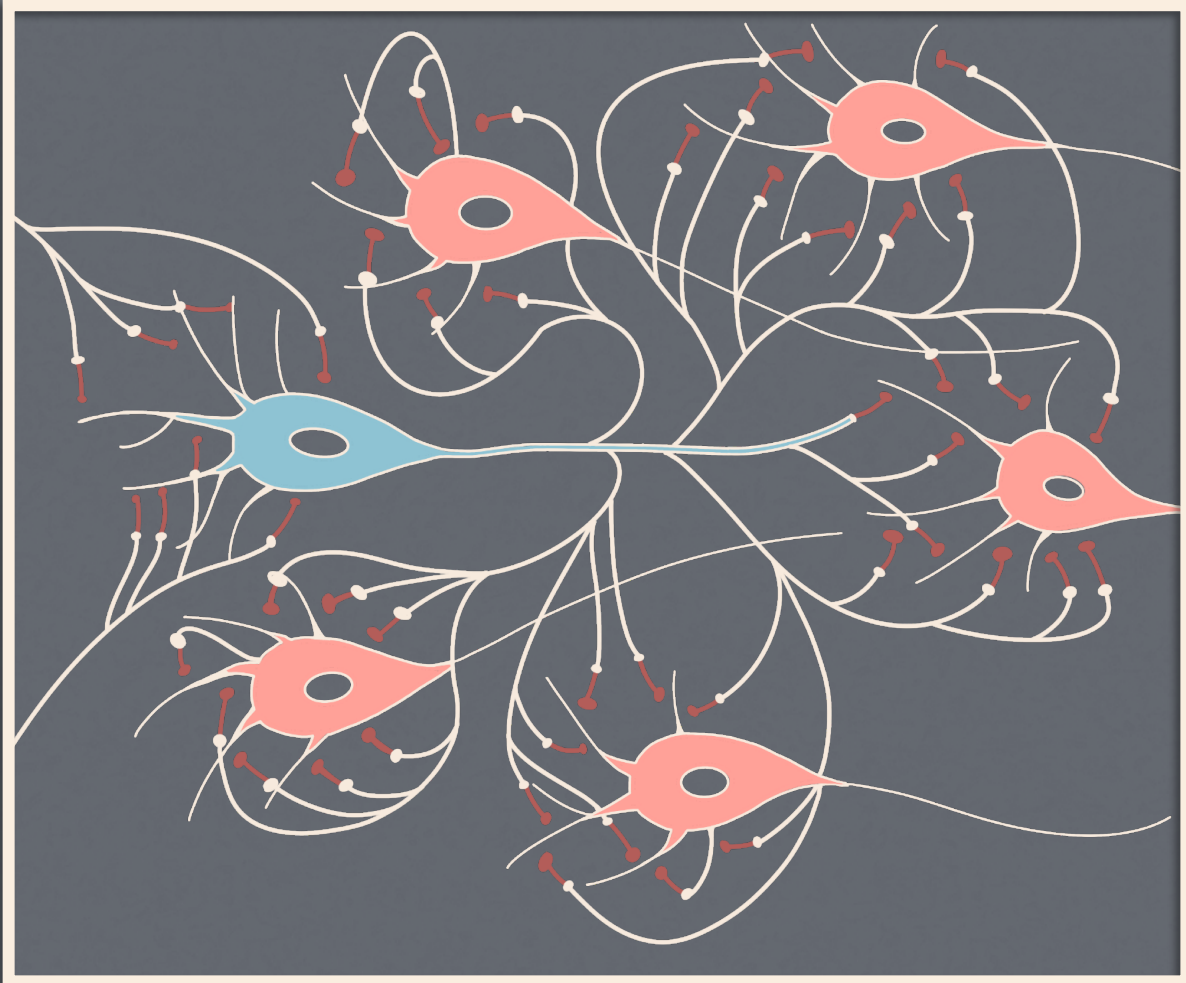
Although the brain reaches 90% of its adult size by age 6, the brain undergoes MAJOR changes throughout adolescence.

It take about 25 years for the brain to fully develop!



# Synaptic Pruning

By the age of 11 or 12, the neurons in the front of the brain have formed thousands of new connections. Over the next few years most of these connections will be pruned.



The connections that are used the most will be reinforced and strengthened, while the ones that aren't will die out.



Teens have extra, un-connected, synapses in the area where risk-assessment takes place, which can get in the way of judgment. As the brain prunes these un-connected areas, rational thinking will improve.

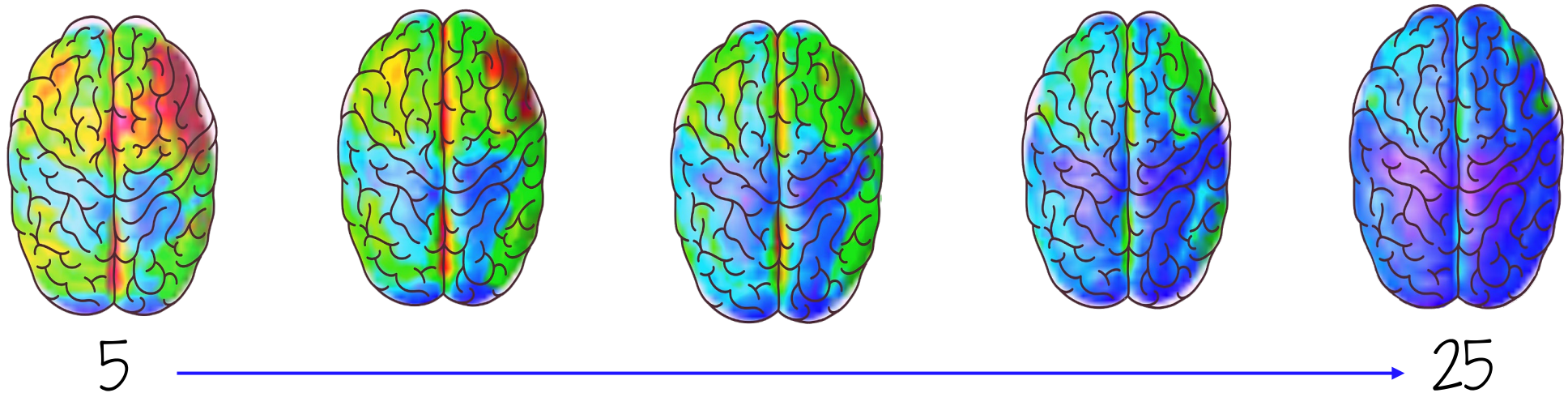
# Inside Out





# Brain Upgrade

A teenage brain is not just an adult brain with less life experience!



Grey matter volume decreases in a wave from the back to the front of the brain as unwanted neural connections are pruned. Grey matter density actually increases.

Think of it as a network and wiring upgrade!



# Teenage Brains Are Different

1. **Dopamine Levels:** There is more dopamine activity in the brain's reward center in early adolescence than at any other point in life. Therefore, teens will go out of their way to seek rewarding experiences.

2. **Hyper-Rational Thinking:** The part of the brain that is in charge of decision making isn't fully developed in adolescence. As a result, teens tend to focus on the thrill or the positive aspects of an experience and don't weight negative consequences the same. This makes decision making really hard!



Let's look at an example...













# Experiment

Study by Deborah Yurgelun-Todd, director of neuropsychology and cognitive neuroimaging, McLean Hospital, Belmont, Massachusetts.

- Suggests that the teen brain actually works differently than an adult's when processing emotional information from external stimuli.
- Dr. Todd looked at the brains of 18 children between the ages of 10 and 18 and compared them to 16 adults using functional magnetic resonance imaging (fMRI)
- Both groups were shown pictures of adult faces and asked to identify the emotion on the faces.



**What is the emotion?**

A. Anger

B. Joy

C. Surprise

D. Fear



**What is the emotion?**

A. Anger

B. Joy

C. Surprise

D. Fear



**What is the emotion?**

A. Happiness

B. Sadness

C. Anger

D. Surprise





**What is the emotion?**

A. Happiness

B. Sadness

C. Anger

D. Surprise



**What is the emotion?**

- A. Surprise
- B. Happiness
- C. Fear
- D. Sadness



**What is the emotion?**

**A. Surprise**

B. Happiness

C. Fear

D. Sadness



**What is the emotion?**

A. Joy

B. Sadness

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D. Anger





**What is the emotion?**

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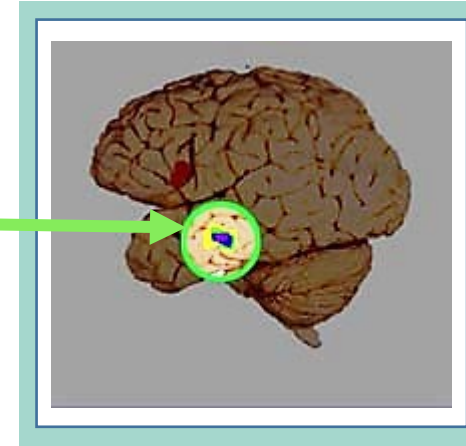
# It's Hard!



- Although adults have an easier time interpreting emotions, it can still be difficult.
- Both of these photo sets show “Joy” but the left is showing “Fake Joy” while the right is showing “Real Joy”
- Should be noted that we are using white, American, people for this test.

# Kids misinterpret facial emotion 40% or more of the time!

Kids mostly used the amygdala: the region that guides instinctual or "gut" reactions. Reactions, rather than rational thought, come more from the amygdala



Adults relied on the frontal cortex, which governs reason and planning. The frontal cortex gives adults the ability to distinguish a subtlety of expression and isn't fully functioning as a teen.



Teens and adults use different parts of the brain to process what they were feeling and seeing.

# What Can You Do?

## 1. Show that you care

- Teens CRAVE positive attention!
  - Don't assume they already know how much you care for them.
  - Be specific. Tell them what makes you proud or happy. Even little things.
- Listen to them.
- Respect the feelings they are having, even if you don't understand.
- Keep criticism specific to the behavior and not personal statements.
- Unconditional support doesn't mean unconditional approval.
  - You can have high expectations for behavior while showing that you won't withdraw support based on the behavior.





# What Can You Do?

## 2. Set reasonable expectations

- Have high expectations but don't focus on achievement only
- Focus on things like:
  - Being kind
  - Being helpful
  - Being honest
  - Being respectful etc.
- Teens learn a lot from success, and it helps them take on new challenges.
- If they come up short of expectations teach them how to recover and try again!



# What Can You Do?

## 3. Set rules and consequences

- Discipline is about teaching, not punishing or controlling
- Discuss what behavior is acceptable and unacceptable
- Be very specific.
  - Keep your rules short and to the point.
- Explain your thinking and decisions.
  - Explaining the rationale behind rules and consequences helps teens make better decisions for themselves later.
- Make consequences immediate and linked to choices or actions but
  - Be reasonable
  - Be flexible
- Don't negotiate when it comes to restrictions imposed for safety.



# Where are the kids?

- Ask the kids!
  - Where are their friends?
  - Where are the younger siblings?
- Many kids use OST programs to maintain connections and relationships
- Check-in with your current members?
  - How did they join?
  - Who do they know?



# How do you get them to come in?

- Create a member/youth council
  - Host a youth led Solution Lab/Crash Up
  - Youth Voice is a great motivator
- Have member mentorship
- Bring in programs they may already enjoy or used to be members of
  - 4H, YMCA, Boys and Girls Club, STEM organizations, etc.
- Create times for fun
  - Create time to hang out, eat food, play games, go out...
- Reward effort





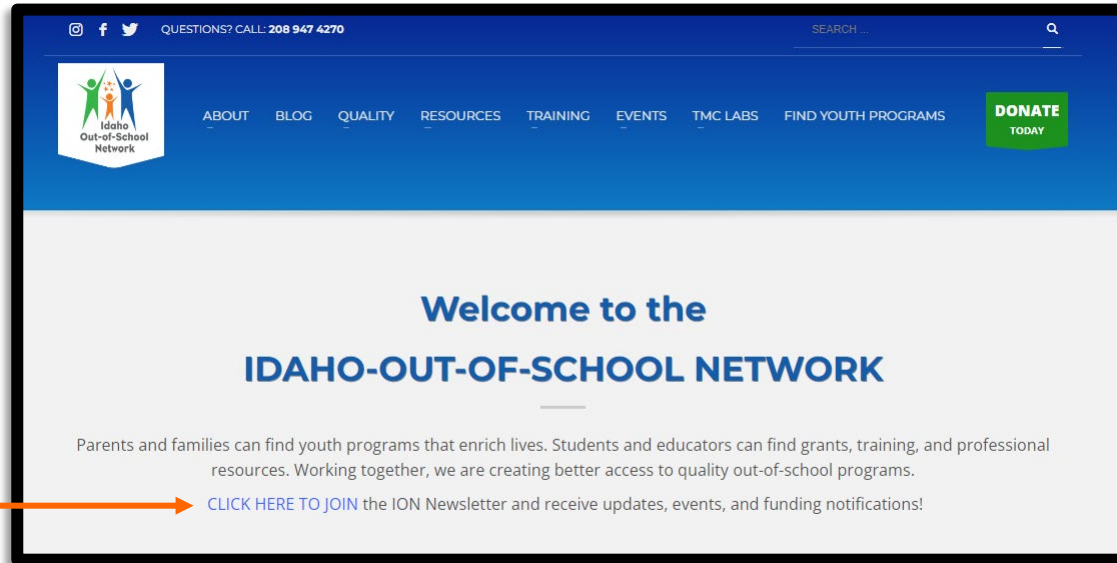
Questions? Concerns?  
Thoughts? Comments?



# ION Website

Please take a moment to check out the Idaho Out-of-School Network website:

[www.IdahoOutOfSchool.org](http://www.IdahoOutOfSchool.org)



Don't forget to sign-up for our newsletter!

# ION Learning Academy

[https://idahoutofschool.org/learning\\_academy-2/](https://idahoutofschool.org/learning_academy-2/)

Membership  
Is  
**FREE!**



The screenshot shows the homepage of the ION Learning Academy. At the top left is the logo for the Idaho Out-of-School Network, featuring three stylized figures in green, orange, and blue. To the right of the logo is a navigation menu with links for ABOUT, BLOG, QUALITY, RESOURCES, TRAINING (highlighted in orange), EVENTS, TMC LABS, and FIND YOUTH PROGRAMS. A green button labeled 'DONATE TODAY' is positioned in the top right corner. The main content area has a light gray background and features the heading 'WELCOME TO THE ION LEARNING ACADEMY' in blue. Below the heading are three paragraphs of text: the first describes the quality of professional development programs; the second states the organization's belief in long-term sustainability; and the third mentions the interactive learning environment. A fourth paragraph notes that the ION Training Calendar has moved to the Learning Academy. A fifth paragraph states that registration is free and many trainings are also free. At the bottom, there is a call to action 'CLICK BELOW TO LOGIN OR REGISTER' and two buttons: a blue one for 'CLICK TO REGISTER FOR NEW ACCOUNT!' and a green one for 'CLICK TO LOGIN INTO EXISTING ACCOUNT!'.

Idaho Out-of-School Network

ABOUT BLOG QUALITY RESOURCES **TRAINING** EVENTS TMC LABS FIND YOUTH PROGRAMS **DONATE TODAY**

## WELCOME TO THE ION LEARNING ACADEMY

Quality professional development programs target many specific outcomes, including increased staff knowledge about youth development, use of effective strategies for activity programming, and implementation of methods for promoting positive relationships with youth.

ION believes that quality professional development focuses on the long-term sustainability of the out-of-school time workforce by increasing providers' marketable skills to increase public support for the youth development field.

The ION Learning Academy provides an interactive learning environment that allows you to access interactive and unique training opportunities.

The ION Training Calendar has moved to the Learning Academy.

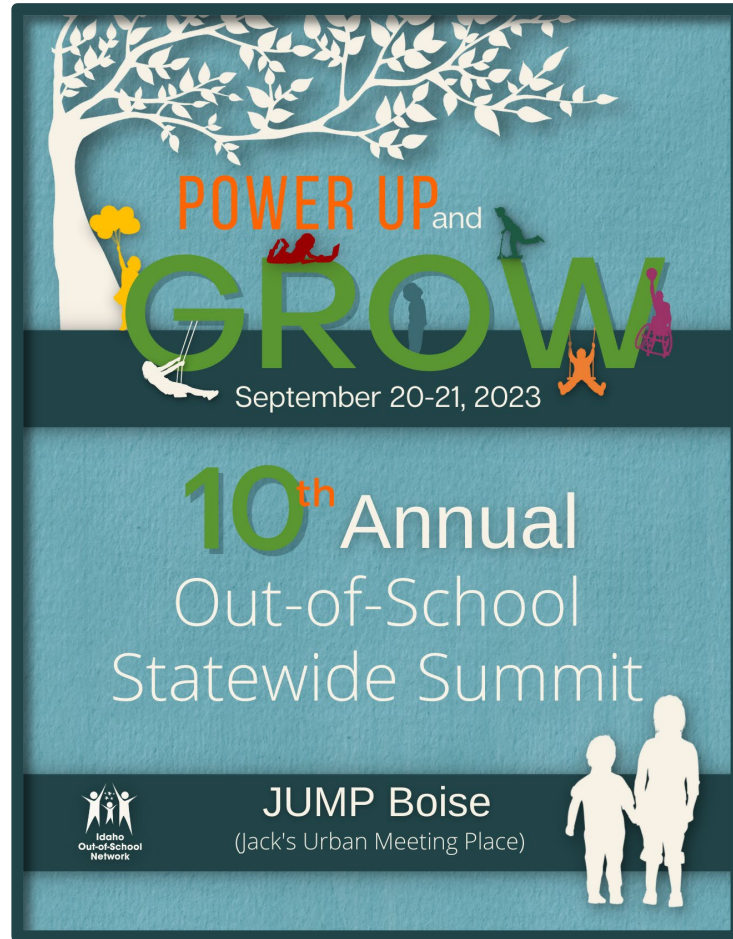
Registration for the ION Learning Academy is **FREE** and there continue to be many **FREE** trainings available.

CLICK BELOW TO LOGIN OR REGISTER

**CLICK TO REGISTER FOR NEW ACCOUNT!** **CLICK TO LOGIN INTO EXISTING ACCOUNT!**

# Power Up Summit

<https://idahooutofschool.org/2023-power-up-summit-2/>





# Resources

Recommended Reading List: <https://idahoooutofschool.org/bmi/> (scroll to the bottom of the page)

- *Fostering Resilient Learners Strategies for Creating a Trauma-Sensitive Classroom*
- *The Trauma-Informed School*
- *Relationship Responsibility and Regulation*
- *The Deepest Well*
- *What Happened to You?*
- *Treating Traumatic Stress in Children and Adolescents*
- *The Boy Who Was Raised as a Dog*
- *Helping Children Succeed What Works and Why*
- *Better Than Carrots or Sticks*

Reporting: <https://idahoooutofschool.org/bmi/> (found in Trauma Sensitive Practice and Youth Mental Health)

- Protecting Youth Mental Health
- Idaho Youth Risk Behavior Survey
- Idaho Healthy Youth Survey State Report

# Resources Cont.

## 1. Teen Brains Clear Out Childhood Thoughts

By [Clara Moskowitz](#) | March 23, 2009

<https://www.livescience.com/3435-teen-brains-clear-childhood-thoughts.html>

## 2. The Amazing, Tumultuous, Wild, Wonderful, Teenage Brain

By Daniel Siegel | October 31, 2016

<https://www.mindful.org/amazing-tumultuous-wild-wonderful-teenage-brain/>

## 3. The Adolescent Brain: A Second Window of Opportunity

Editors Nikola Balvin & Perna Banati | March 6, 2018

<https://www.unicef-irc.org/article/1750-the-adolescent-brain-a-second-window-of-opportunity.html>

## 4. Careful – Teenage Brain On Board

March 26, 2009

<https://www.theage.com.au/lifestyle/careful-teenage-brain-on-board-20090326-gdtfv6.html?page=fullpage>

## 5. Teenage Brains

By David Dobbs | October 2011

<https://www.nationalgeographic.com/magazine/2011/10/beautiful-brains/>

# Thank You!



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