Dear Parents,

How wonderful to really start to feel some sunshine and warmth in the air. Spring is truly a time to enjoy the outdoors and feel refreshed and re-energised and what a perfect time to have a break from school. We have all experienced a long and cold winter which has been particularly nasty for our children with viruses, colds, Influenza B and gastric bugs. There is nothing worse as a parent to have a sick child at home and particularly when that temperature spikes in the middle of the night.

So with all of that hopefully behind us, I wish the entire school community a wonderful term’s break, enjoy the opportunity to maybe go away for a short time and just take the time to enjoy the children’s company. Our public parks and gardens are at their best at this time of year, maybe have a picnic in the Dandenong’s or in our own Royal Botanic Gardens. Safe travels to all families who are going away, and I look forward to seeing all the children and families back at school on Monday 5th October.

A reminder to all families that all children will be dismissed from our Final Assembly at 2.30pm tomorrow afternoon.

Farewell Kylie Ashton!

The whole school community extends our very best wishes to Kylie and Tim as they excitedly await the birth of their first child. Kylie joined our school in 2011 as a young graduate teacher and she has blossomed into a wonderful classroom teacher who always has the interests of her students at heart. With science as her passion, Kylie has been instrumental in her teaching of Science to other staff and famous for her slime and food experiments in Science Club. I know 3/4 A will miss Kylie terribly and I am sure the next 2 days will be full of fun and celebration in the upstairs portables.

Kylie’s final day at our school will be October 5th and I will announce to our community 3/4’s replacement teacher on Friday.

Farewell to Keaton and Montana Saggers, Freddie Tremlett and Charlie and Oscar Sorell!

We will farewell the following families at our assembly tomorrow afternoon and have the opportunity as an entire community to wish all these families well. The Saggers are relocating to Sydney, Freddie is joining Christchurch Grammar and the Sorrells are enjoying a sojourn through Italy for a whole term! Thankfully Vita has the boys well equipped to cope with any travel situations and may even help Liza and Cam eat on a daily basis!

We will also welcome back for Term 4, Freddie and Pricilla Moffat; Will and Harry Atwell and Samuel Harris who are all returning from a term in the snow.

Grazie Vita!

Thank you Vita for an incredible Italian Day! It was fantastically organised and we appreciate all of the time and effort you have put in to make this such a successful day. The school was awash with red, white and green and everyone enjoyed the singing, the performances, the food and the entertainment. It still remains an annual highlight of the year and a wonderful way to complete our school term.
Staffing in Term 4

Both Pippa Cocks and Peter Cracknell will both be on leave for the first week in Term 4. Peter Cracknell will be representing Victoria in the Australian Hockey Masters tournament and we wish him all the very best in Cairns. John Mulligan who is known to the children will be taking PE and Mary Rodder, a highly experienced teacher will be teaching Prep P.

Roof works during the School Holidays

A reminder again to all our families that our Infant Building will have roof restoration work undertaken during the school holidays. This means that access to our school through the Northcote Road gates will not be permitted. It will be wonderful to see a shiny new roof on our elegant Infant Building at the end of our holidays.

News from the Department of Education

On Monday 14 September, the Victorian Government announced a series of landmark reforms to build and define Victoria as the Education State.

The announcements included a focus on strong school leadership, better teaching, more collaboration between teachers and schools and resources targeted at student need.

Next year all government schools – including ours – will receive extra needs-based funding so we are able to better respond to every student’s needs.

You can find out how much extra funding every government school will receive next year on the Find Your School’s Equity Funding Amount website: http://www.education.vic.gov.au/about/educationstate/Pages/schoolbudget.aspx

Our teachers will receive training to implement the new Victorian Curriculum, which will include new subjects like digital coding and respectful relationships.

The government also set new state-wide education targets – goals for our students in areas like maths, reading, science, the arts, resilience and critical and creative thinking.

This is an exciting time for Victorian schools, and these new initiatives will inform our planning for 2016.

I encourage you to visit the Department’s website to find out more about the Education State initiatives: http://www.education.vic.gov.au/educationstate.

Have a wonderful break everyone

Rochelle Cukier
Principal
I am impressed to see so many students do well in the Premier’s Reading Challenge (PRC) this year. 162 students successfully completed the PRC and a total number of 7809 books were read by our students at APS. Well done! If some students could not complete the PRC you are welcome to participate in the PRC next year starting Term 1. I am looking forward to seeing more students participate and complete the PRC next year.

Walk to School
As part of our active travel program we are always looking for ways to promote our students travelling to school actively. To this end I am happy to promote October as Walk to School Month, an initiative of the state and local governments. There are prizes and certificates to be won for both the school and individuals. As with our Ride to School Day in March we also encourage all forms of active travel, so riding, skating and scooting are also encouraged. More details will follow at the beginning of Term 4.

Italian Day
Today is Italian Day. We are having a fantastico time. A big thank you to Vita Vampatella and the parents for all the hard work and time you put into organising this wonderful and entertaining event. We appreciate it. Grazie mille.

Work Over Holidays
During the school holidays the roof on the infants building is being rejuvenated to stop any future leaks. In addition, we are having a new shelter over the 1/2 classroom area and a new seating/storage beside the sandpit. Shortly, after the holidays we will be getting a new front fence in Densham road and a new air-conditioning unit in the performing arts centre. Apart from the roofing work all of these projects are locally funded through the fundraising activities such as the Trivia night and the Fun Run. Thank you to parents for your generous contributions to these activities. I wish everyone a very happy and restful break over the holidays and that you come back to school in Term 4 refreshed and relaxed.

Working Bee Donation
For those parents who were unable to attend the Working Bee on Saturday 5 September, we would be grateful if you could make a $30 contribution to our Working Bee fund for ongoing maintenance.

Please complete your details below:

☑️ I would like to make a $30 (or other amount) donation to the APS Grounds fund

Family: ________________  Pay by: ☐ Cash  ☐ Cheque  ☐ Credit Card  ☐ Qkr!

☐ Direct Deposit to Armadale PS Account BSB 083 298 A/C No: 02 891 1383 please note on your direct deposit transaction your Family Name & Working Bee

Amount: $30.00 or $_______  ☐ MasterCard  ☐ Visa

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Expiry Date: _____ / _____  Cardholder’s Name: ___________________________

Signature: ___________________________

Thank you to the following families who were unable to attend our recent working bee and made a donation to our Working Bee fund:

♦ Will & Indi Officer
♦ Will & Tom Hucker
♦ Emily Start
♦ Natalie Tabbagh
♦ Jamie & Ryan Nguyen
♦ Toby Ralph
Pedagogy Corner

This is issue of Pedagogy Corner will continue to lead us to explore Mathematics. Last week we were alerted to the importance of understanding that mathematics needs to be a subject for learning and not performing if we are to develop great maths learners. I use the word ‘we’ because it is imperative that parents and teachers promote positive attitudes and behaviours in our children and that conflicting messages are eliminated. As a school we have embarked on a journey, with the guidance of Larissa Raymond from Ed Partnerships, of reflection and discovery as we begin to develop a pedagogy that will promote optimum mathematical learning.

The following information formed the basis of many discussions that we have had and continue to have as a staff:

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This information arose directly from an article titled ‘The Mathematics of Hope: Moving from Performance to Learning in Mathematics Classrooms’. Please take the time to read this article, at the end of this week’s newsletter as we encourage you to be a part of this learning journey with us.

Connie Apostolos-Thernos
Curriculum and Pedagogy Leader
Prep Bulletin Term 3 week 10

There have been some interesting discussions and ‘wonderings’ throughout our enduring understanding, ‘The seasons affect how our world works’. As well as participating in sessions with Monash University exploring the Physical, Chemical and Biological Sciences, the students have been able to explore different concepts such as, the Water Cycle, weather patterns, animal migration, hibernation and plant growth. The students were able to put themselves into the shoes of a scientist and archaeologist and make predictions and observations. They explored solids, liquids and changing matter through conducting experiments and cooking. Our unit has promoted curiosity about the world and some ‘wonder’ questions have included: “What makes the rain?” “What makes the clouds?” “How are rainbows made?” “Why is the moon white at night?” “Why does it look like the moon is following you when you are in the car?” and “How hot is the sun?” Such questions have allowed students to develop deeper understandings of why things occur, make connections to their experiences and, make greater sense of their world. We have observed and experienced how the weather and seasonal changes have an effect on the types of activities we do, the food we eat and clothing we wear as well as, the effect they have on nature around us; blossoms on fruit trees, blooming daffodils and sprouting lettuce, which all led us to explore life cycles of plants, seed germination and the needs of living things.

The Seasons – Taking action:

In the second week of term, to celebrate our learning, we will ask students to come dressed as a particular season. Start brainstorming some ideas during the holiday break. The Preps will perform one song and play musical instruments that they have made at Assembly on Wednesday 13 October.

Please put this date in your calendar.

An autumn tree...

‘Parent Corner’ - Investigations:

We are asking for interested parents to share a particular skill with students during Investigations next term. A timetable will be put up on the Communication Board in the Infant Hall early next term.

Book Sharing:

During Investigations, some students from 1/2 K shared their wonderful books with us. The Grade 1/2 students have been publishing books as part of exploring their enduring understanding. It was interesting to view the different types of texts that were produced; poetry, fiction and non-fiction and learn of students’ inspiration for their books. What great authors and illustrators we have at APS! Together, we shared a love and appreciation of literature - what a lovely connection between the students. The books that the Grade 6 buddies made for the Preps will be sent home later this year.

Izzy & Phoebe reading to the Preps

End of Term 3 - Early Dismissal:

Tomorrow, students will be dismissed at 2:30pm. There will be a whole school assembly at 1:30pm in the MPC.

Have a safe, fun and restful holiday break. See you back at school re-energised and ready for Term 4!

Prep Teachers

Student Banking

The following students have qualified for a Dollarmites Certificate this week:

- Amelia Monohan (Bronze)
- Ruby Hyde (Silver)
- Isabel Larner (Silver)
- Monique Labrosse (Silver)
- Aaron Feile (Silver)
- Isabella Keyte (Silver)

Well done!

Please read the important update regarding rewards for Term 4.

Commonwealth Bank School Banking Update

Following the decision last month to recall the Cosmic Light Beam Torch due to a potential safety issue, a decision has been made to also withdraw the upcoming Lunar Light Band reward from the School Banking Rewards Program.

To avoid disappointment there is a new reward item available for redemption in Term 4 while stocks last. Students can now test their skills with a game of frisbee with the new Galaxy Glider!

Once students have collected 10 tokens, they can simply include a note, along with their 10 tokens in their deposit wallet on banking day to advise that they would like to redeem their tokens for the Galaxy Glider reward item.

Don’t forget the Outer Space Savers Money Box is also available in Term 4.

Alison Crone
Student Banking Co-ordinator

Prep Teachers

Izzy & Phoebe reading to the Preps
**Italian Day**

A HUGE thank you to Vita and her team of helpers for another una giornata fantastica! It is such a rich cultural immersion - albeit for a day.

**Topic of Inquiry – Where we are in Place and Time**

Our family histories help us understand that we are all different.

How has my family history shaped me?

Why is my past important?

**Hats**

It is compulsory for sunhats to be worn every day until the end of the year.

**Holiday Reading**


**Swimming**

The swimming program at Lauriston Pool commences next term.

Please see the Newsletter for more details.

Monday 30th November - Friday 4th December (5 lessons)

Monday 7th December - Thursday 10th December (4 lessons)

We wish you all a safe and relaxing holiday time.

Kind regards,

Year 1 /2 Team

**Tomorrow is the last day that we are able to accept any Earn and Learn stickers.**

If you have any stickers still at home that you have not brought to school yet, please make sure the come to school tomorrow so we are able to put the towards some fantastic rewards for our school.
5B is supporting Operation Christmas Child - 2015

Operation Christmas child is a charity designed to bring happiness to children in South East Asia and the South Pacific who have very little. Where people like you and I can put items into a shoe box for the children to open at Christmas time. Items like clothes, toys, education & personal hygiene items. In 5B, we have decided to support Operation Christmas Child 2015 by holding a honey joy stall in term 4 to raise money for the boxes which cost $9 each. Once we have done that, we will be asking for donations from the school community to fill the boxes with appropriate gifts for children in need. Over the holidays, it would be great if everyone was able to purchase one item for this worthy cause. There will be a box in the office for the collection of the goods. Thank you, in advance for your generosity.

6 things to remember when choosing items:

SOMETHING TO WEAR: t-shirt, polo shirt, shorts, skirt, cap, beanie, sandals, etc.
SOMETHING TO LOVE: teddy bear, doll, soft toy, etc.
SOMETHING SPECIAL: carry bag, sunglasses, bangles, stickers, necklaces, craft kits, a personal note.
SOMETHING FOR SCHOOL: exercise book, pencil case, pens, pencils, colouring pencils, sharpener, eraser, chalk, etc.

SOMETHING TO PLAY WITH: tennis ball, cars, skipping rope, marbles, musical instrument, yo-yo, slinky, finger puppets, wind-up torch, blow up ball etc.
SOMETHING FOR PERSONAL HYGIENE: soap and face washer, toothbrush, hairbrush, comb, scrunchies, hair-clips, etc.

Do not include:

ITEMS THAT LEAK OR MELT: (these can spoil boxes) including toothpaste, shampoo, bubbles, plasticine/play dough and batteries
FOOD OR LOLLIES OF ANY KIND: (due to customs regulations) including medicines and vitamins
USED OR DAMAGED ITEMS: (due to customs regulations) including worn clothing and old toys
BREAKABLE ITEMS: including glass, porcelain and mirrors
ITEMS THAT CAN SCARE OR HARM A CHILD: including war or pirate-related items such as toy guns, knives, military figures or skull and crossbones
GAMBLING-RELATED ITEMS: including playing cards and dominos

The age groups for each box are 2 to 4, 5 to 9 or 10 to 14.

Please donate items to a box at the office up until October 25. Boxes need to be ready for drop off by the 31st October. Please put a smile on a child’s face for Christmas!
Dear Parents,

The Swimming Program gives each child an opportunity to enjoy physical activity as well as gaining a valuable and important life skill. Our aim is to develop confident swimmers. Activities to develop confidence in water, swimming stroke development and water safety aspects will be covered in the intensive program beginning Monday 30th November. This program complements the school PE program and all children are expected to attend.

Term 4 Swimming arrangements for Prep and Years 1 & 2

Swimming lessons for Term 4 will commence for Prep and Years 1 & 2 children on Monday 30th November. They will be held at the Lauriston Girls’ School Swim Centre Huntingtower Road, Armadale. As in previous years, we are running an intensive swimming program on the following dates over two weeks:

- Monday 30th November, Tuesday 1st December, Wednesday 2nd December, Thursday 3rd December, Friday 4th December
- Monday 7th December, Tuesday 8th December, Wednesday 9th December, Thursday 10th December

Each lesson will be approximately 40 minutes with trained swimming instructors provided at the following times:
- 1/2E & 1/2D (9:30-10:10am)
- Prep P & Prep S (10:10-10:50am)
- Prep C (10:50-11:30am)
- 1/2W & 1/2K (11:30am-12:10pm)
- 1/2P (12:10pm-12:50pm)

Cost & permission: Included in the Term 4 excursion levy form sent out at the end of term 3.

Swimming items

- To assist with the changing process children swimming at the earlier lesson times can wear their bathers to school under their school uniform, prior to walking to the pool. (NB: Girls should wear one piece design and boys ‘speedo’ style) Please remember to supply underwear for your child when changing after the lesson.
- Goggles are highly recommended and need to be provided by parents prior to the commencement of the program. There will be no borrowing of goggles from the pool.
- Named swim caps will be provided by Armadale Primary School and are included in the cost for all students. These will be distributed to each Prep and Year 1 & 2 child at the beginning of the program.
- Additional caps will be on sale for $5.00.

Children also need to bring a towel and labelled swimming bag/sports bag. A plastic bag is not recommended.

ALL SWIMMERS MUST WEAR A CAP - GOGGLES ARE OPTIONAL BUT HIGHLY RECOMMENDED

Please note:
No child can attend the swimming program without returning the signed parent permission form from the excursion levy form.

Please name all swimming items and clothing.
Parents & Friends for Armadale

Tomorrow is the last day of term 3, so the PFA would like to wish everyone happy holidays and hope you all manage to have a break.

When we return in term 4, the fun will begin with the “FUN RUN”………..

Fun run

The Fun Run will be on Friday 23rd October, so please make sure you have signed your child’s sponsor sheet, so they can start collecting sponsors over the holidays.

Armadale Primary Cookbook:

The cookbook subcommittee will continue to put together a “Cookbook on behalf of Armadale Primary”. There is still plenty of room left, so please use your time over the holidays to get out your best recipes and/or creative pieces and send them through.

The template for recipe submissions and details on how to submit art work or writing pieces has been emailed out by your Class Rep.

The Cookbook Subcommittee will advise the new meeting schedule.

PFA Committee Meetings:

Wednesday 14th October 2:30pm in the staffroom
Wednesday 2nd November 2:30pm in the staffroom
Wednesday 2nd December 2:30pm in the staffroom

Thank you for your continued support of Armadale Primary School

Kind regards

Caz Laughton and Sarah Monahan
PFA Co-Presidents
Email: armadalepfa@gmail.com

Library News:

Book Fair: All back orders have been given to students and I hope everyone gets enjoyment out of their new books.

Theme Term 3: Thank you to the Grade 6 students for having their Natural Disaster work displayed in the library this term for the theme, there was some exceptional work on display.

Books: Please get those books back before the end of Term 3, it’s amazing how quickly this term has gone!

Happy Reading,
Brett Leyshan
2015 Fun Run
Friday October 23rd

It’s that time of the year again for the 2015 Fun Run! Sponsorship forms have been sent home so if you haven’t found it, you might want to check through your child’s schoolbag ..... 

The 2015 Fun Run will be held on **Friday 23rd of October**, so please help your child/children seek sponsorship from Family, Friends, Relatives and Neighbours over the holidays. All funds raised will go towards replacing and installing more synthetic grass in the school grounds.

Once again we have received a great selection of prized donated from the organisation focused on health and wellbeing. The more money you raise the greater your chance of winning a prize.

More information of the event and parent assistance required will be available next term.

Happy September holidays

Nicki Batagalo and Peter Cracknell

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**Part Time EA Role in Hawksburn**

**Skills and Experience:**

**Essential:**
- Demonstrate bookkeeping skills
- Demonstrate intermediate skills in using MS Office for document production purposes (and document formatting)
- Generally “tech savvy” and is not afraid to “try new technology”
- Great communication skills
- Strong organisational and administrative qualities

**Desirable:**
- Strong experience using Xero Accounting Software
- Understanding of ASIC governance and compliance
- Salesforce CRM experience

**Role Description:**

Initially to trial with two half-days per week, with scope for increasing to two full days per week within the next 3 months.

To find out more about this role please call Gary Rowley on 0412256563 or email on gary@galvinrowley.com.au.

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**Term Snapshot**

- **Auburn High School**

  - In 2018 all students studying Chinese will have an opportunity to travel to China for a 6 week language and cultural immersion program. They will be attending a Chinese school for 4 weeks.

  - Auburn High School offers many clubs such as robotics, arts, knitting, fencing, football, debating, design and technology workshop, choir, Wonder Book Club and more.

  - To find out more about Auburn High School, please visit our website: [www.auburnhs.vic.edu.au](http://www.auburnhs.vic.edu.au)

  - Like us on Facebook for regular updates on what’s happening at Auburn High School.

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Whilst all care is taken to ensure the validity of advertisements in this newsletter we take no responsibility and imply no endorsement.

On Friday 2nd October (the new public holiday!) at 7pm, the most esteemed event of the festival will present a cavalcade of international and Australian tap dancers showcasing everything you love about tap dance and more.

The event will push the boundaries of what tap is thought to be and excite you by the possibilities and sheer entertainment.

Enjoy the sights and sounds of Australia’s best tap dancers, including original members of the Tap Dogs, new hot & all female troupe - Footnotes, The Melbourne Tap Dance troupe, our live band and a moving finish by our international headline artist from Chicago - Emmy Award Winner, Tony Awards Nominee, Ted Louis Levy.

Cost: $20 - $40
Seating is allocated

Suitable for:
All ages, families, grandparents, kids, lovers of music & rhythm

Location & Parking:
38 Huntingtower Rd, Armadale
Ample free parking in and around venue

Would you like 20% OFF ticket?
Enter the code 'TAPPING' at checkout
Swimming Lessons and Coaching

For ages 4 years and above
Armadale, Prahran, South Yarra and East Malvern

- Quality lessons
- Low student / teacher ratios
- Well trained staff
- Attention to detail ensures your children get the care and attention they deserve
- Adult teaching and fitness squads

According to SafeKids Worldwide, more than half of all drownings for ages 6 and over occur in open water situations. Why? One reason is that basic swimming skills are not enough. Children must learn strokes and become advanced swimmers as soon as they are capable. Improve swimming skills not only for safety, but also for the lifelong health and fitness benefits.

For further information go online or call
www.h2oswimming.com.au
Ph: 9572 3005

Enrol for summer NOW

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Make a Mask!

Holiday Program @ Duldig

Karl Duldig, Mask, c. 1955, earthenware
Karl Duldig is internationally famous for his sculptures, including masks.

A fun School Holiday activity
Make your own sculptured paper mask these holidays for Halloween or your next party with our Sculptor in Residence, Stefan Damschke. Use Karl Duldig’s clay masks and artworks as inspiration!

Tuesday 22 September or Tuesday 29 September
10.30am – 12.00pm
for children 8 – 12 years
$20.00 (materials included)
To make a booking contact the Duldig Studio
9885 3358 or 0498 708 326
or email melinda@duldig.org.au for further information

Whilst all care is taken to ensure the validity of advertisements in this newsletter we take no responsibility and imply no endorsement.
The Mathematics of Hope: Moving from Performance to Learning in Mathematics Classrooms

Jo Boaler, Professor of Mathematics Education, Stanford University & Co-founder of Youcubed

Heinemann Digital Campus

In 2006 a trade book appeared on bookshelves that would ultimately have one of the biggest impacts of any research volume ever published in education. In *Mindset: The New Psychology of Success* Carol Dweck summarized key findings from her research on the nature and impact of mindsets. The book quickly became a *New York Times* best-seller and was translated into more than twenty languages. Dweck’s decades of research with subjects of various ages showed that students with a “growth mindset”—who believe that intelligence and “smartness” can be learned—go on to higher levels of achievement, engagement, and persistence. The implications of this mindset are profound, especially for students of mathematics.

Mathematics, more than any other subject, has the power to crush students’ confidence (Boaler 2009). The reasons are related both to the teaching methods that prevail in U.S. math classrooms and the fixed ideas about mathematics held by the majority of the U.S. population and passed on to our children from birth. One of the most damaging mathematics myths propagated in classrooms and homes is that math is a gift, that some people are naturally good at math and some are not (Boaler 2013a, 2013b). This idea is strangely cherished in the Western world but virtually absent in Eastern countries such as China and Japan that top the world in mathematics achievement (PISA 2012).

New scientific evidence showing the incredible capacity of the brain to change, rewire, and grow in a really short time (Maguire et al. 2006) suggests that all students can learn mathematics to high levels with good teaching experiences. Traditional educators believe that some students do not have the brains to be able to work on complex mathematics, but it is working on complex mathematics that enables brain connections to develop. Students can grasp high-level ideas but they will not develop the brain connections that allow them to do so if they are given low-level work and negative messages about their own potential (Boaler & Foster 2014).

As I work with schools and districts, encouraging mathematics teaching that promotes growth rather than fixed mindsets ([www.youcubed.org](http://www.youcubed.org)), a critical requirement is that teachers offer mathematics as a learning subject, not a performance subject. Most students asked what they think their role is in math classrooms say it is to answer questions correctly. They don’t think they are in math classrooms to appreciate the beauty of mathematics, to explore the rich set of connections that make up the subject, or even to learn about the applicability of the subject; they think they are in math classrooms to perform. This was brought home to me recently when a colleague, Rachel Lambert, told me her six-year-old son had come home saying he didn’t like math; when she asked him why, he said that “math is too much answer time and not enough learning time.” Students

“Math is too much answer time and not enough learning time”

-6 year old
from kindergarten upward realize that math is different from other subjects: learning gives way to answering questions and taking tests - performing.

For students to see mathematics as a subject of learning, not performing, they need tasks and questions in math class that have space to learn built in. When students spend all their time in math class answering discrete questions to which the answers are either right or wrong, it is very difficult to develop a growth mindset or to believe that mathematics is about growth and learning. When teachers ask students to find the area of a rectangle with sides of 12 feet and 2 feet, for example, students are being asked to perform a single calculation correctly. When teachers ask students to find a rectangle with an area of 24 square feet, students are being asked to use their imagination, to think; they need to consider various rectangles and think about the relationship between length and width. Students can propose different rectangles and discuss the equivalence of area in different shapes. In the first example students are answering a question on area; in the second they are learning about rectangles, dimensions, and area. If a mathematics question or task does not have space within it to think, learn, and discuss, its potential as a learning task is limited. Tasks that are particularly valuable are those that have a low floor and a high ceiling - that is, anyone can access them, but they can be taken to very high levels. (For examples of high-quality math tasks and low-floor, high-ceiling tasks, see www.youcubed.org, watch https://www.youtube.com/watch?v=pOOW0hQgVPQ, and see http://nrich.maths.org.)

Mathematics and Mistakes

Research has recently shown something stunning—when students make a mistake in math, their brain grows, synapses fire, and connections are made; when they do the work correctly, there is no brain growth (Moser et al. 2011). This finding suggests that we want students to make mistakes in math class and that students should not view mistakes as learning failures but as learning achievements (Boaler 2013a). Students do not, as many assume, need to revisit a mistake and correct it to experience brain growth, although that is always helpful; brain growth comes from the experience of struggle. When students struggle with mathematics, their brains grow; being outside their comfort zone is an extremely important place to be.

Mathematics classrooms throughout the U.S. are often set up to make students feel good by giving them lots of questions they can answer. Teachers believe that mistakes and struggle are unproductive and try to shelter students from them. This culture needs to change. While I was sitting in an elementary classroom in Shanghai recently, the principal leaned over to tell me that the teacher was calling on students who had made mistakes to share with the whole class so that they could all learn. The students seemed pleased to be given the opportunity to share their incorrect thinking. Instead of classrooms filled with short questions students are intended to get right or wrong, mathematics classrooms need to be filled with open-ended tasks that include space for learning as well as space for struggle and growth (www.youcubed.org).

For mathematics to become a learning subject with room for mistakes and growth, teachers need to make students feel good about mistakes and comfortable with struggle. When I taught a recent online
class and shared the mistakes research with forward-thinking mathematics teachers, they came up with a range of ways for getting students to value mistakes (http://www.telegraph.co.uk/education/universityeducation/10414989/University-education-maturing-of-the-Mooc.html, http://tinyurl.com/65464y6). One teacher, on the first day of school, asked her students to crumple up a piece of paper and throw it at the wall in a way that expressed the feelings they had when they made a mistake in math. She then asked them to retrieve the paper, uncrumple, and use a colored marker to highlight all the creases left on the paper; these, she explained, symbolized the brain growth that comes from mistakes. She had the students hang on to their brain growth diagrams for the school year.

Other changes need to happen as well. Mathematics teachers need to stop frequent, timed testing; replace grades with diagnostic feedback (Black et al. 2002; Boaler & Foster 2014); and de-emphasize speed, so that the students who think slowly and deeply are not led to believe they are not capable (Boaler 2014). Perhaps most significantly and most radically, schools should also remove fixed student groupings that transmit fixed mindset messages and replace them with flexible groupings that recognize that students have different strengths at different times (Boaler 2009; Boaler & Foster 2014).

Fortunately these changes are entirely consistent with what is known about good teaching and learning. Decades of research show that when students engage actively with mathematics—work on long, applied problems with room for struggle and growth—and receive positive messages about their potential, they succeed (Boaler 2009; Schoenfeld 2002). The new Common Core mathematics standards (http://www.corestandards.org/) include a set of eight mathematical practices that require students to work in these ways, and they are a step in the right direction.

Currently three fifths of U.S. students fail mathematics, and mathematics is a harshly inequitable subject (Kozol 2012; Silva & White 2013). When our classrooms change—when students are encouraged to believe they can be successful in mathematics and are taught using the high-quality teaching methods they deserve—the landscape of mathematics teaching and learning in the United States will change forever (Boaler & Foster 2014). We will have many more confident and capable mathematics learners, and they will go on to become teachers of mathematics who inspire future generations to further success in science, technology, and mathematics.

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References


