



I'm a teacher, get me OUTSIDE here!



Creative STAR Learning Ltd

Maths Journals

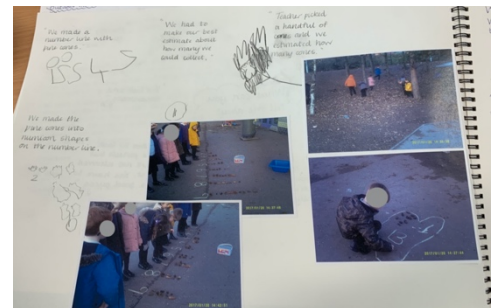
Journaling, if done well, can be a useful approach to helping children embed and reflect upon learning that has happened. It can complement outdoor work nicely as it can happen inside or out, depending on the weather.

The aim is to make a journal entry immediately after an outdoor numeracy session. Follow up with a maximum of 10-minute journal time. By doing this, you build a memory of what has happened. It is a very focused approach to journaling, compared with many traditional approaches to journaling. It is very much about the learning that has taken place, reflecting and applying this. As a consequence, children need time and support to develop this area of practice.

Types of journals

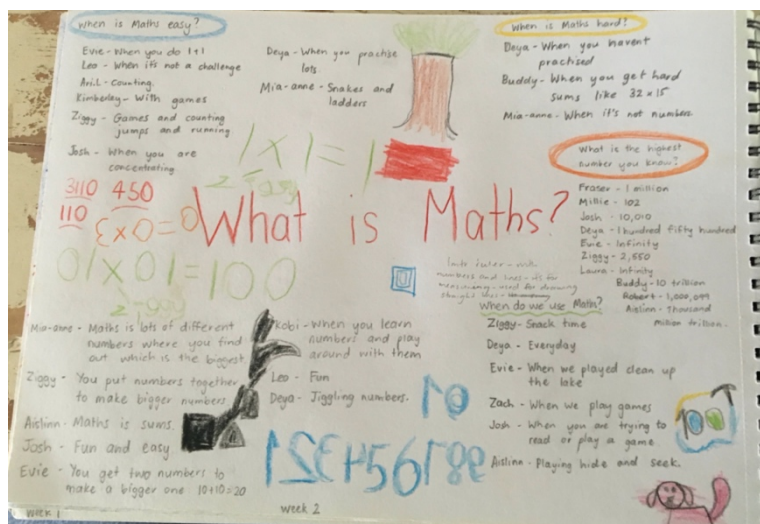
1. Whole class. With very young children who are learning how to write, having a larger whole class journal, e.g. a large book, may be more appropriate. You model the entries and the children draw and write their ideas to support your text and vice versa.

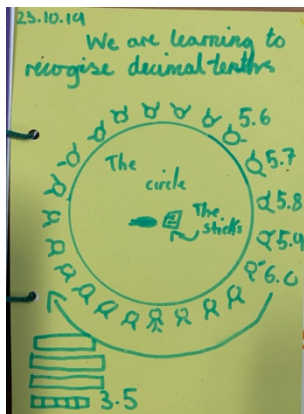
One class teacher in the Dundee Outdoor Numeracy Project experimented with this approach. Rather than going for a whole class approach, she found it better to ask a group of interested children to share their ideas on the forthcoming outdoor maths session, e.g. about estimation. These ideas would be shared with the whole class prior to going outside. When outside, she observed and listened to the children's comments as they completed the tasks which were always practical. After the session, she would invite those who wanted to, to help her write up the class reflections. Again, these would be briefly shared with the whole class at an appropriate gathering time.



The other element of this approach was the teacher kept her planning notes in the big book too. This meant it was a documentation tool that would help her remember what had happened and she could build upon her own professional development the following year.

The example below is from Upper Sturt Primary and shows how the process began, the second week after their summer holidays, by encouraging the Primary 1 children to think about what maths is and how they use it.





2. Individual, using cards. This was my original suggestion. That each child took an A5 card after the session. The process used is outlined below. This works well if you do not have many or any tablets. The other advantage is that the cards can be easily displayed in the classroom prior to being added to the child's other entries. One teacher would put these up on a washing line and they would stay there until the following week.

3. Individual, using a digital format, such as the See Saw app where children can store their digital recordings. This seems to be better received by children who are less engaged in maths and who do not like putting pencil to paper. The other advantage is that the learning can be shared with a parent, if you have this functionality set up.

The process

Reasons for using A5 card

- It is half the size of an A4 sheet. For children who are not keen on writing, it seems a lot less daunting. It also encourages children to be succinct.
- Look for the unwanted remains in your art cupboard. If your school is skint and cardboard-less, ask your class to donate cereal packets. There is no need for squared paper.
- Card does not disintegrate outside and can be easily dried out, if it gets wet.
- Use pencils outside – they will write on wet card. Remember journaling can happen inside or out.
- It's easier to attach leaves, twigs and other material found outside to illustrate a point.
- You are not under pressure to fill a whole jotter with wonderful work.
- If a child makes a hash of their entry, it's easy to start over.

Types of journal entries

There are different types of entries that can be made into a maths journal. You will need to plan which type your class will use. It's easy to slip into the habit of just undertaking a descriptive or recall entry. The higher order thinking happens when we ask our classes to evaluate, create and investigate. This is the true value of journaling. It is also why you need to give it some thought beforehand!

The types of journaling outlined below are the ones recommended within the *Maths No Problem* approach. They have various blog posts and videos about maths journaling which are worth reading, so you can get a better understanding of the processes involved. See the links below.

- **Descriptive/recall:** This is what has been done outside and what we learned, e.g. *Write a note to explain how to how to make a reasonable estimate of large quantities, e.g. the number of leaves on a tree.*
- **Evaluative:** This is about comparing different approaches to tackling a problem, e.g. *Which method is better for making a reasonable estimate of large quantities?*
- **Creative:** This is about demonstrating the process you went through in a situation where there is more than one way to do something, e.g. *Write a maths sentence (or several to make a maths story) about how you managed to work out the number of leaves on a tree.*
- **Investigative:** This is an additional problem or challenge linked to what has happened outside, e.g. *Anna found three ash leaves which are known as compound leaves. Each has a different number of leaflets. Devise a way of quickly estimating the quantities of leaflets that increases accuracy.*

Ultimately, we want children who are able to be confident demonstrating multiple representations of number or a way of solving a problem: physical models, visual models, oral and written explanations and a desire to challenge themselves in their mathematical thinking.

Making an entry

- Always have name, date and a title for the entry.
- Maths equations can also be referred to 'maths sentences'. Children need to be able to read, write, explain and understand them, e.g. $4+6+5$. Encourage your children to use these and develop this skill as well as use mathematical vocabulary. When an explanation requires several sentences, then this becomes the 'maths story'.
- Once children know and understand how to create journal entries then, they may wish to decide how to record some of their entries some of the time.
- Encourage children to draw diagram or a picture to represent their learning. It does not have to be a written paragraph. For this reason, it is worth looking at how to sketchnote and to show your class the basics of this approach to recording. A useful starting point is Sylvia Duckworth's website <https://sylvia Duckworth.com>
- Be prepared to support differentiation. The children will respond at their level, but do encourage improvement and have higher expectations of those who are more able. The younger children and those who are struggle will draw and annotate more and be more descriptive. The more able and older children's journals will be more evaluative.

Being prepared

- Plan the type of journal entry you want children to undertake, even if they decide what to write.
- You will need to model **how** to write an entry. Then children need scaffolding to get going before eventually being able to write entries independently, especially in P2 as they begin to get going with individual entries.
- The process takes **time** to embed, but once established, especially throughout a school, then the children develop the habit.
- Remember it's to help children reflect and reason mathematically. It's okay to go off on a tangent but bring children gently back by asking "*Where's the maths in this entry?*" or "*What have you learned about how to estimate, from looking at the leaves on a tree?*"
- When providing written feedback, comment for improvement. Highlight elegant solutions and share these with the class. Older and more able children should be more evaluative in their responses rather than simply descriptive, once the journaling process has become embedded in your practice.

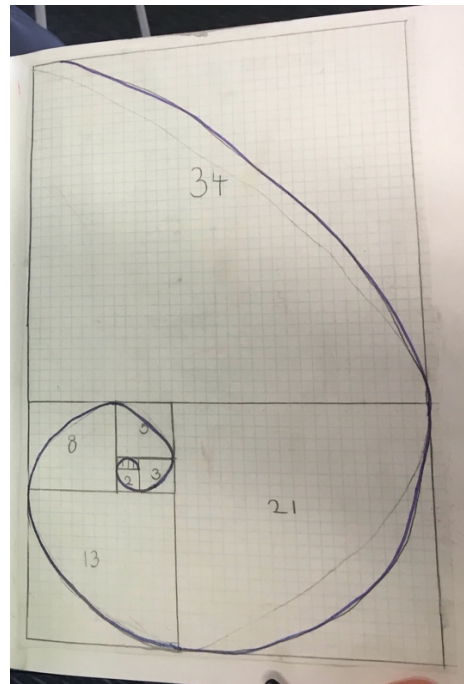
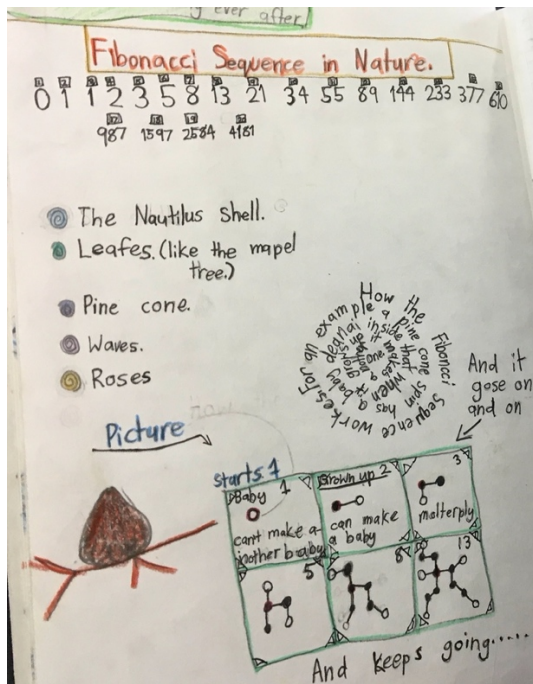
Knowing your purpose for having the journals

- We are looking for the process of *reflection*, the use of maths vocabulary and the ability of a child to explain their thinking. It is not a jotter for calculations.
- Some teachers decide children need ownership of their journals. They are not marked but the teacher does read them. If there's a misconception this can be used as a teaching point either for that child, a group or whole class.
- It can be used for reference during lessons, inside or out. Children can flip back and refer to it so that it helps them in subsequent lessons. This is particularly good if the journal is always available during a maths session.

Undertaking further investigations

The journaling described above needs to become a regular part of your routine and an approach to embedding maths outside and making the connections to learning that is happening inside or elsewhere. Sometimes, though, it is useful for your class to further extend this work into a research project. This could stem from a particular interest or perhaps a child asks a question that needs further unpicking.

At this point, there is an element of functional writing brought in, about creating a poster or leaflet that can show the learning investigation. At Upper Sturt School just outside Adelaide, the children often end up exploring maths (and other areas of the curriculum) and create more detailed pieces of work:



Useful links about maths journals

There are many approaches to using maths journals. The suggestions made above, are very tightly linked to the development and demonstration of maths skills. Have a look at:

- *How to Use Maths Journal* video: <https://vimeo.com/151516124>
- *Maths No Problem* blog: <http://bit.ly/2kblBK6>
- *Maths Journaling* – World End School <https://worldsendjuniors.co.uk/index.php/curriculum/maths-centre-of-excellence/mastery-in-maths/>