

# creatistics

## Educator & Parent Guide



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## STEAM Kit Exploring Colour

This STEAM kit contains a complete range of essential art and craft products, plus an educator guide with ideas for teaching concepts of Exploring Colour in the classroom. Investigate, discover, create and reflect with this comprehensive range of products. Kit contents may vary.



### This Kit Includes:

- Educator Guide
- CS6250 Creatistics Watercolour Asst Colours - Set 6
- EC723 Paint Pipettes 1ml - Pack of 12
- EC110 Mixing Palette - 10 Wells x 3
- CS2050 Creatistics Dough - Red 1kg Tub
- CS2053 Creatistics Dough - Blue 1kg Tub
- CS2051 Creatistics Dough - Yellow 1kg Tub
- CS2054 Creatistics Dough - Orange 1kg Tub
- CS2052 Creatistics Dough - Green 1kg Tub
- CS2055 Creatistics Dough - Purple 1kg Tub
- EC370 Coloured Plastic Bowls - Set of 6
- MD1134 Roymac Watercolour Paper 230 x 305mm
- RE5213 Colour Diffusing Paper 23 x 30cm - Pack of 50
- CB842 Small Mist Bottles - Set of 6
- K28L Heavy Duty 28L Storage Container

# STEAM

## What is STEAM?

STEAM is an educational approach that incorporates Science, Technology, Engineering, the Arts and Mathematics to guide students' learning. Students that are exposed to experiential learning are proven to be better problem solvers, more creative and develop higher level critical thinking skills. These attributes are essential for all students, in order to meet the needs and expectations of the 21st Century workforce and future careers.

## Science and Young Children

Young children are natural scientists. From birth they are actively constructing an understanding of how the world works. Their natural curiosity and interest in their surroundings is science at its most fundamental.

The Early Years Learning Framework emphasises the importance of active and involved learning and the development of dispositions such as curiosity, creativity and perseverance. As children ask questions and explore their world they engage in experimentation, problem solving, theory making and complex thinking.

For this reason it is important that science for young children is not simply about learning “facts” or watching “experiments”. While facts and experiments are important, science in early childhood is best thought of as being about learning to think and act scientifically. A questioning mind and a willingness to experiment are vital.

It is important to think holistically when we think about science. Science concepts tend to be complex and interconnected. While it is sometimes helpful to think about an idea or concept in isolation this is rarely a true reflection of the actual world. Rather than seeing science as a “stand alone” subject contemporary approaches to science education see it as being interconnected with a range of other curriculum areas. A STEAM (Science, Technology, Engineering, Arts and Maths) approach considers science in relation to the related areas of technology, engineering and maths, and by also including the arts seeks to also emphasise the importance of creative thinking and experimentation to the scientific process.

Experiences which take a STEAM approach are likely to be more complex, interesting and valuable than those that treat each STEAM component separately.

## Using this Kit

This kit is designed to stimulate children's interest and learning in relation to the science concepts related to colour.

The materials provided allow multiple ways to explore the chosen topic and suggestions for specific experiences using the materials provided.

Remember that children learn best when they are interested in a topic and when they are able to make connections between what they are learning and what they already know. Where an experience follows on from an existing interest it is likely to be more meaningful. Rather than seeing these experiences as “one-off” ideas that can be slotted into your program at any point look for connections to ideas and interests that the children are already exploring.

As an educator remember too that your role is to support children's learning. One way to do this is to be knowledgeable about the topics that the children are investigating. We have provided some information on the potential learning in each of the suggested experiences but doing your own research will also help you to guide and extend the children's thinking.

Be careful not to introduce a “correct” explanation or answer to a question too quickly. While “answers” are important the process of exploring a topic is just as important. Children will gain more if they learn how to find something out rather than just being given the factual information. Science is often a process of trial and error, of making and testing theories, and it is this aspect that we should aim to encourage.

Ask questions and encourage the children to do the same. Resist the urge to provide an answer straight away (even when you know it!). Wonder about the things that you can see and model curiosity – “I wonder why that happened?” This is often the only invitation children need to start suggesting their own ideas.

**Activity 1:**

# Colour Mixing

This experience enables children to experiment with colour mixing in water. Using pipettes they can add drops of colour to water in the palette wells – initially watching the colour spread into the clear water and then observing how colours mix as they add drops of different colours to each other.

## You Will Need

- mixing palettes
- pipettes
- water
- liquid watercolours or other non-toxic dyes in the primary shades (red, blue and yellow) and small stable containers to store these in (small jars or containers will work well)
- aprons or child-sized lab coats

## The Science

Colours can be defined as primary, secondary or tertiary colours. The primary colours – red, yellow and blue – can't be made by any mixing any other colours. Secondary colours – purple, orange and green - are made by combining two of the primary colours eg: red and blue, yellow and red or yellow and blue. Tertiary colours result when a primary colour is mixed with one of its secondary colours eg: red with purple will produce a reddish-purple; yellow with orange will produce yellow-orange.

## What To Do

Fill the wells in the mixing palettes with clean water. With each palette provide three small jars or bottles containing the different coloured food colourings (if these are very strong then you can dilute them with water rather than using all of the dye in one go!) and a pipette for each jar of colour.

Depending upon whether the children are familiar with using a pipette you may need to demonstrate how they work. Once they have mastered the skill of sucking up a small amount of colour then allow them to experiment by adding drops of colour to the various wells in the palette. As they do this they will be able to experiment with mixing different shades. This will work most effectively when a small amount of colour has been added to the water. As more is added the colour will tend to become murky. Be prepared to regularly refresh the water so that the colours are clear and easily observed. Discuss with the children what is happening and encourage them to predict what will happen when a new colour is added.

Given the potential of the colouring to stain clothes it is a good idea to use aprons for this experience. Alternatively, if you have them, child-sized lab coats add to the “scientific” feel of this experience and can also lead to the children role-playing being scientists.

## Potential Learning

This experience allows children to explore colour and the way that colours mix to produce new colours. Initially children will simply enjoy the experience of using the pipettes and watching the water change with each drop of colour that is added. This can lead to discussion of the different types of colours –primary, secondary and tertiary – and of which colours are needed to make other colours. This experience also offers opportunities for prediction as children anticipate what will happen when new colours are added.

The pipettes offer opportunities to develop fine motor skills and hand-eye coordination and promote care and attention to detail.

## Following Up

This experience offers lots of opportunities to talk about colour and how colours can be mixed together.

Adding black dye (as well as the original colours) will allow the children to create darker shades (although will probably end with completely black water!)

The colours created can be used to dye paper or fabric (see Activity 2 – Diffusion)

**Activity 2:****Diffusion**

Watch as liquid colours soak into diffusion paper to create unusual and colourful patterns

**You Will Need**

- colour diffusing paper
- liquid watercolours or other non-toxic dyes
- pipettes
- mixing palettes
- mist bottles

**Extension Activity**

- watercolour paper
- plain paper
- paper towel
- tissues

**The Science**

Diffusion is the process by which a substance moves from an area of high concentration into areas of low concentration. The texture of the diffusion paper enhances this affect – allowing the colour to soak into the paper and spread. If multiple colours are used the colours will also blend and mix where they come into contact.

**What To Do**

Provide the children with liquid watercolours, pipettes and mixing palettes as in Activity 1 (colour mixing). Once the children have mixed a range of colours introduce the colour diffusing paper. Use the pipettes to add drops of colour to the paper and watch the effect created. Discuss with the children how the colour spreads and what happens when different colours bleed into each other and begin to mix.

As a variation, use the misting bottles to apply the colour – is this as effective as the pipettes? Discuss how the way the colour is applied makes a difference to the effect created (NB: unless the mist is applied heavily it will not tend to soak in or spread as well as the colour that is applied with the pipettes. The comparatively large drop of colour dropped by the pipette diffuses more readily than the misted colour which is applied more evenly to the paper surface).

Once dry the paper can either be kept by the children or used for other art and craft experiences.

**Potential Learning**

This experience allows children to explore colour and the way that colours mix using another medium – the diffusion paper. Watching the way the colour bleeds into the paper and how it mixes with other colours creates opportunities for discussion and prediction both about the way the colour mixes but also about how the liquid moves through the paper.

**Following Up**

Repeating this experience with a range of other paper types allows for comparison of how well the paper absorbs the liquid. Encourage the children to look at and handle the different types of paper and predict which will carry the colour most effectively. Add the colour to each and compare results with the predictions. Sort the paper from most to least absorbent and record the results of this experiment. Discuss why some types of paper absorb the colour more readily than others. What are the properties of the most absorbent paper?

**Activity 3:**

# Dough Colour Mixing

Using dough children can experiment with colour mixing in a more gradual way than using liquid colours. As the dough colours are mixed together they initially retain their individual colours before slowly beginning to blend.

## You Will Need

- dough in various colours
- coloured bowls

## The Science

Colours can be defined as primary, secondary or tertiary colours. The primary colours – red, yellow and blue – can't be made by any mixing any other colours. Secondary colours – purple, orange and green - are made by combining two of the primary colours eg: red and blue. Tertiary colours result when a primary colour is mixed with one of its secondary colours eg: red with purple will produce a reddish-purple. When a material is in a liquid state its component molecules are much more mobile. This allows them to flow together and combine very quickly compared to a solid material (such as the dough). The process of mixing the dough will however allow you to observe how the colours mix together at a much slower rate. Initially the effect will be a marbled one where the two original colours can be clearly observed as well as the colour that results from mixing them. It is only as the play dough is combined further that an even colour is achieved.

## What To Do

Break the dough into small pieces and roll into balls. Place these into the corresponding coloured bowls and invite the children to choose two colours to mix together. What do they think will happen?

As they begin to mix and knead the balls of dough together encourage them to describe what they can see? Is this what they thought? Do they think the colours will blend or will the dough stay multicoloured no matter how hard they mix it?

Once the colour has fully blended the children can choose whether to add another colour to the one they have made or to start again with two new colours.

## Potential Learning

This experience allows children to explore colour and the way that colours mix to produce new colours. Initially children will simply enjoy the experience of interacting with the dough. If you have done the pipette activity this can lead to discussion and comparison of how quickly/slowly the colours changed. This can also lead to discussion of the different types of colours –primary, secondary and tertiary – and of which colours are needed to make other colours. This experience also offers opportunities for prediction as children anticipate what will happen when new colours are added.

## Following Up

Another way to investigate colour using dough is to make a batch of plain, uncoloured dough. Shape into balls and make a hole/well in the middle of each by poking a finger in. Pour a small amount of liquid watercolour or food colouring into the hole and then seal it up (a little like a Chinese dumpling). As the children knead the dough they can watch the colour begin to spread into the plain, white dough. Initially this will create a streaky pattern but eventually the dough will become evenly coloured.



**Activity 4:**

# Dough Patterning

Use coloured dough to copy and create patterns.

## You Will Need

- coloured dough
- coloured bowls
- pattern sheets (see over)
- coloured markers, pencils or crayons (in the same colours as the dough)

## The Maths

Patterning is a significant branch of maths. The ability to recognise and copy patterns is an important step in the development of children's mathematical abilities. Recognising patterns helps to develop predictive skills as children firstly identify what the pattern is and then predict how it will continue.

## What To Do

To prepare for this activity divide the coloured dough into smaller balls and place them into the corresponding coloured bowls.

Photocopy the blank pattern sheet (see over) and use the coloured markers, pencils or crayons to create a series of patterns for the children to copy. These should range from simple to complex.

Place the pattern sheets and dough on a table and encourage children to use the dough to copy the patterns indicated on the sheets.

Encourage them to identify what colours they will need and to choose a ball of dough that corresponds to each.

Children break dough into smaller pieces and use these to make the patterns.

## Potential Learning

This experience involves colour matching and copying a provided pattern.

Children are learning to recognise patterns and predict what will come next.

Following the patterns as indicated on the pattern sheets is also a form of "reading" as the children decode and make sense of the information that is presented in visual form.

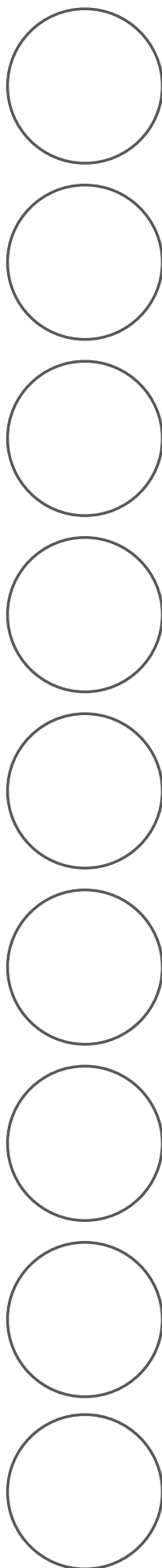
This experience will also help to refine fine motor skills as the children break the dough into smaller pieces and roll them to form the balls needed to replicate the patterns.

## Following Up

Once children have mastered copying the patterns you have created they can also begin to create their own. In this variation of the experience ask the children to use the dough to create their own patterns. Provide them with the blank pattern sheets and coloured textas or pencils so that they can record the patterns they have made.

## Activity 4 (continued):

### Blank Pattern Sheet





**Activity 5:**

# Dough Pictures

For older school-aged children this experience offers a new way to use modelling dough to add colour to a picture.

## You Will Need

- coloured dough
- coloured plastic bowls
- watercolour paper
- drawing pencils

## The Science

Colours can be defined as primary, secondary or tertiary colours. The primary colours – red, yellow and blue – can't be made by any mixing any other colours. Secondary colours – purple, orange and green - are made by combining two of the primary colours eg: red and blue, yellow and red or yellow and blue. Tertiary colours result when a primary colour is mixed with one of its secondary colours eg: red with purple will produce a reddish-purple; yellow with orange will produce yellow-orange.

## What To Do

Set up a table with the paper, pencils and dough (put each colour into the corresponding coloured plastic bowls). Provide the paper and pencils so that the children can draw a picture that they would then like to colour. Once they have drawn the outline of their picture demonstrate the following technique for using the dough. Take a small piece of dough and use your fingers to smear it across the paper. This will create a thin layer of dough in the area you have chosen to colour. You can then add additional colours in the same way. Mixing the dough together before applying it to the paper allows you to also make additional colours if needed. Once the picture has been coloured you can use a pencil to mark in the outline of the original drawing where it has been covered up by the dough. Leave the picture to dry.

## Potential Learning

This experience allows the children to practice a new technique for adding colour to a drawing. It offers opportunities to develop fine motor skills as they carefully add the dough to the picture. It also offers the opportunity to explore colour mixing using the dough.

## Following Up

The effect created with the dough typically uses blocks of colour that resemble some forms of printing. If the children respond well to this technique then you could consider introducing printmaking as another way to explore the use of the colour in art.

The Fauves (a group of predominantly French artists working at the beginning of the 20th century) used strong colours in much of their work. The most famous of the Fauves was Henri Matisse. This experience could link to an exploration of their work and use of colour.

**Activity 6:**

# Frozen Colours

Use coloured ice cubes to explore colour and the process of freezing and melting.

## You Will Need

- mixing palettes
- pipettes
- water
- liquid watercolour or other non-toxic dyes
- clear or white glasses, cups or bowls

## The Science

Colours can be defined as primary, secondary or tertiary colours. The primary colours – red, yellow and blue – can't be made by any mixing any other colours. Secondary colours – purple, orange and green - are made by combining two of the primary colours eg: red and blue. Tertiary colours result when a primary colour is mixed with one of its secondary colours eg: red with purple will produce a reddish-purple. At 0 degrees Celsius water freezes into ice. As it warms above this level it will begin to melt. The melting process will depend on how much heat is applied to the ice. At a low temperature it will melt slowly; at a higher temperature it will melt quickly. The speed of melting may also be influenced by other factors such as any insulation that may protect the ice from the heat source or the size of the piece of ice (ie: smaller pieces will melt much more quickly than large pieces).

## What To Do

Fill the wells in the mixing palettes three quarters full with water (this allows room for expansion as the water freezes). Use the pipettes to add colouring to each of the wells as we did in the Colour Mixing experience. Initially it is best to add only one colour to each well (this allows the colours to mix more clearly later). Once all the wells have been coloured place the palettes into a freezer.

After they are frozen remove the coloured ice and place into a bowl or tray.

Provide the children with clear or white containers to hold the ice (this will ensure that the colours stand out clearly as they melt). Ask them to choose two different coloured ice cubes and place them into the container. Discuss what they think will happen – this could include discussion about the ice melting as well as about the colours mixing.

The ice will melt slowly and as it does the colours will start to mix. As this occurs you should be able to see the two coloured ice cubes sitting in a pool of differently coloured water.

If you would rather this happened more quickly you could put the ice into a clear zip-lock bag so that the children can hold the ice and speed up its melting with the heat of their hands.

## Potential Learning

This experience provides another way to explore colour mixing while also introducing the idea of freezing. Ice is generally a fascinating material for young children and they will enjoy the process of freezing and then melting the ice. The colour mixing will help to reinforce the other learning about colour that the children have been involved in.

Because the ice melts slowly the children will be able to observe the two original colours and the new colour created by mixing them as they melt.

## Following Up

Make and then freeze a greater range of colours to allow more complex mixing or mix more than two colours together at once (although remember that as you mix more and more colours together you will likely get a fairly murky brown or grey result!).

Make a colour chart to record the results of your colour mixing (eg: red + yellow = orange). You could use words or colours or a combination of both so that the children can refer back to this in future.

Another interesting extension would be to use black colouring to make “black” ice and see what happens when it melts.

You could also use juice in various colours to create edible iceblocks – even layering these (by allowing each colour to freeze before adding the next on top) to create distinct bands of colour.

## Notes:

[illegible]



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