EMPIRIBOX

Primary School Science

Scientific skills – Planning Teacher Guide

General guidance

This activity is designed to ascertain children's *Working Scientifically skills of* evaluation. The context of the activity is narrowed to a familiar topic of fitness and one therefore that all children will understand. It is not intended to test their knowledge but their progress in the acquisition of science skills. It may also be repeated at the end of a term or school year to assess their progress.

It is not intended to be conducted like a test. Ideally, children will work collaboratively at the activity to allow discussion and to support peer-teaching. Ideally, you will circulate around the groups of children during the activity to listen to their conversations and ask questions to probe their thinking and misconceptions. Circulating around the groups offers an opportunity to record assessment information during the activity. For example, noting that a child has said something that shows they have some understanding of an idea even though they might not be able to write it down.

Relevant LKS2 *Working Scientifically* objectives:

- Asking relevant questions and using different types of scientific enquiries to answer them;
- Setting up simple practical enquiries, comparative and fair tests.

Relevant UKS2 *Working Scientifically* objective:

- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.

Animals including humans topic specific guidance

Children will have already have learned about the importance for humans of exercise and eating the right amounts of different types of food, and hygiene in KS1. They will also have made casual observations. They will also have noticed the effects that playing games and taking exercise have on their bodies, but this should not cause a problem for the activity.

You may wish your children to carry out and evaluate the investigation if time permits although it does not form part of this activity.

Investigating fitness

This task is an investigation planning task in the context of the *Human health and fitness* Programme of Study.

During vigorous exercise, the breathing rate increases to take in oxygen faster and release carbon dioxide faster. The heart rate increases to transport oxygen (and glucose from the digestive system) to the respiring muscles at a faster rate. This is an example of systems working together (the respiratory system, digestive system and the circulatory system). The time it takes for the breathing and heart rates to return to their normal rate is called the recovery time.

Regular exercise increases the strength of the muscles in the cardiovascular system (heart, diaphragm and muscles between the ribs) making them more effective at getting oxygen into our lungs (using the diaphragm and rib muscles). It also strengthens the muscles in the heart so that it works more effectively too.

Discuss with the children what constitutes fitness, for example being able to run fast for a long time / play football for a full match without collapsing etc. and feeling back to normal quickly.

1) Typical questions might include:
   - How does exercise affect breathing rate?
   - How does breathing affect heart rate?
   - How does exercise affect body temperature?
   - Do different types of exercise affect breathing/heart rate differently?

Up to 3 marks for acceptable questions.

2a, b, c) Children are asked to choose one question to plan an investigation, and name the independent, dependent and control variables.

1 mark each

2d) In this advanced level activity, children are expected to use correct terminology for the variables and recognise the key variables to control.

Up to 2 marks

3) Children are asked to make a prediction relating to their investigation question and to explain why they think this.

1 mark for an acceptable answer.

4) This may relate to experience (when they have taken part in exercise) or by applying prior knowledge. For example, from investigations in KS1.

1 mark for an acceptable answer.

5) After making a list of equipment that they will need to carry out the investigation.

1 mark for an acceptable answer.

6) The children are asked to write a simple method.

Up to 2 marks for an acceptable answer.

7, 8) The final part of the activity is a simple risk assessment. Taking part in exercise is a low-risk activity when it is supervised correctly.

1 mark each for acceptable answers.

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Group/Name: ……

Class: ……

Marks	
Total	15

Scientific skills – Planning

Investigating exercise

Some children are learning about the importance of exercise for keeping healthy.

Look at the picture of some children exercising.

Exercise causes changes to happen in your body.

You are going to investigate how your body changes after exercise.

Think of some questions we can ask about the changes that happen.

1) Write down two or three questions we can ask.

✎ ……

✎ ……

✎ ……

3 marks

2a) Which question will you investigate?

1 mark

…….

2b) Name the independent variable in your investigation.

1 mark

…….

2c) Name the dependent variable in your investigation.

1 mark

…….

2d) Which variables do you need to control?

…….

…….

…….

2 marks

3) What is your prediction?

…….

…….

…….

1 mark

4) Explain why you think this will happen.

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…….

1 mark

5) What equipment will you need for your investigation?

1 mark

6) Write out the method for your investigation.

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2 marks

7) Describe one risk in this investigation.

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1 mark

8) How could you control this risk?

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1 mark