EXPERIMENTOVÁNÍ V PŘÍRODOVĚDĚ NA ZAHRANIČNÍCH INTERNETOVÝCH STRÁNKÁCH JAKO INSPIRACE PRO VÝUKU - ODKAZ KOMENSKÉHO ZÁSADY AKTIVITY A MOŽNOSTI JEJÍHO POJETÍ V PŘEDMĚTECH O PŘÍRODĚ

Ondřej Šimik

1. Komenského pohled na přírodovědnou výuku

- příroda jako prostor pro CELÉHO člověka
- prostředek pro inspiraci pro samotné LIDSKÉ JEDNÁNÍ
- překračuje čistě materiální rovinu
- *„Fyzikální svět jako brána k duševnímu a duchovnímu rozvoji*"

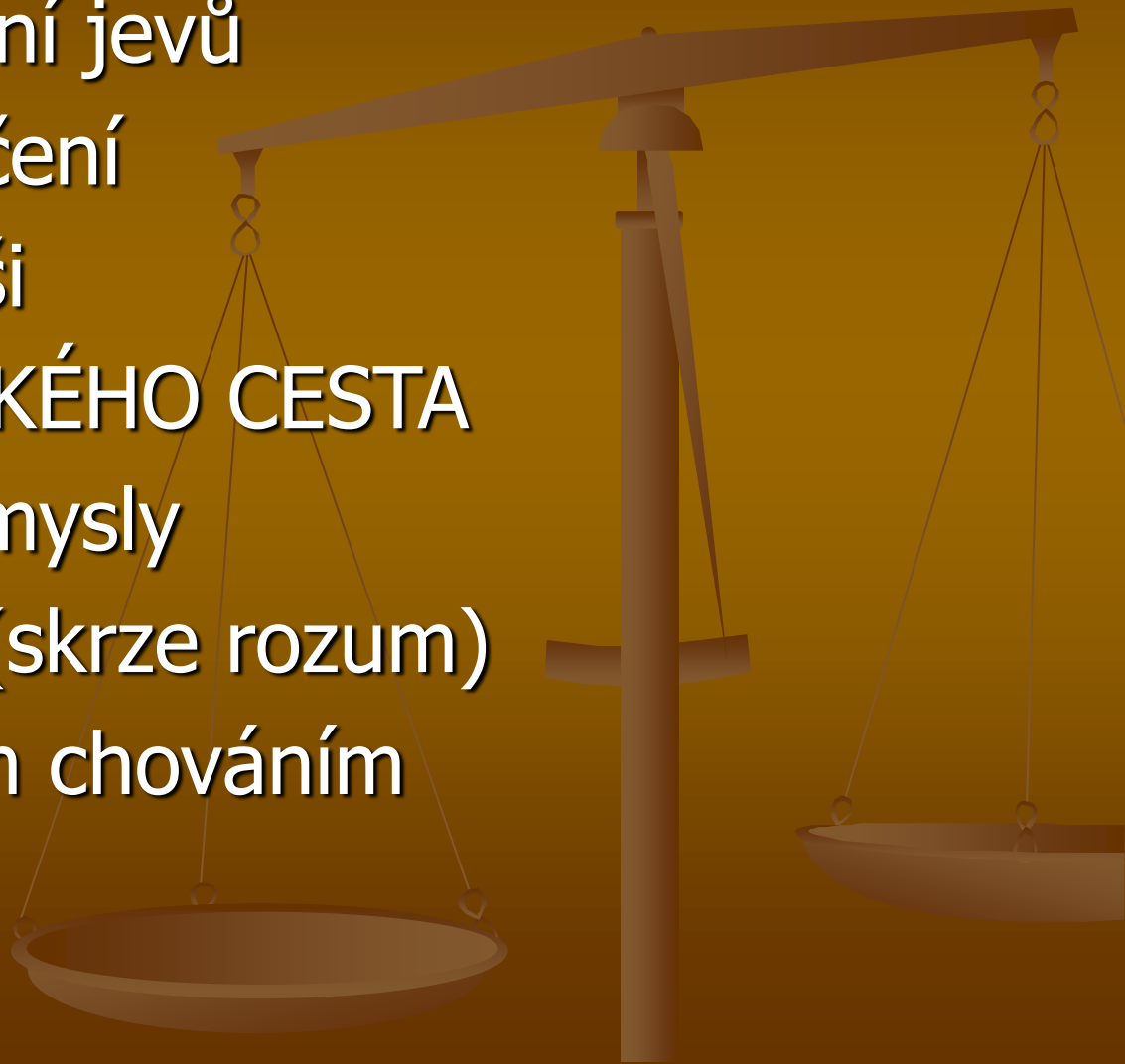
Klíčové prvky v odkazu J.A.K. v přírodovědné edukaci

- aktivní pochopení jevů
- zájem žáků o učení
- od smyslů k duši
- TROJÍ KOMENSKÉHO CESTA

1) poznej skrze smysly

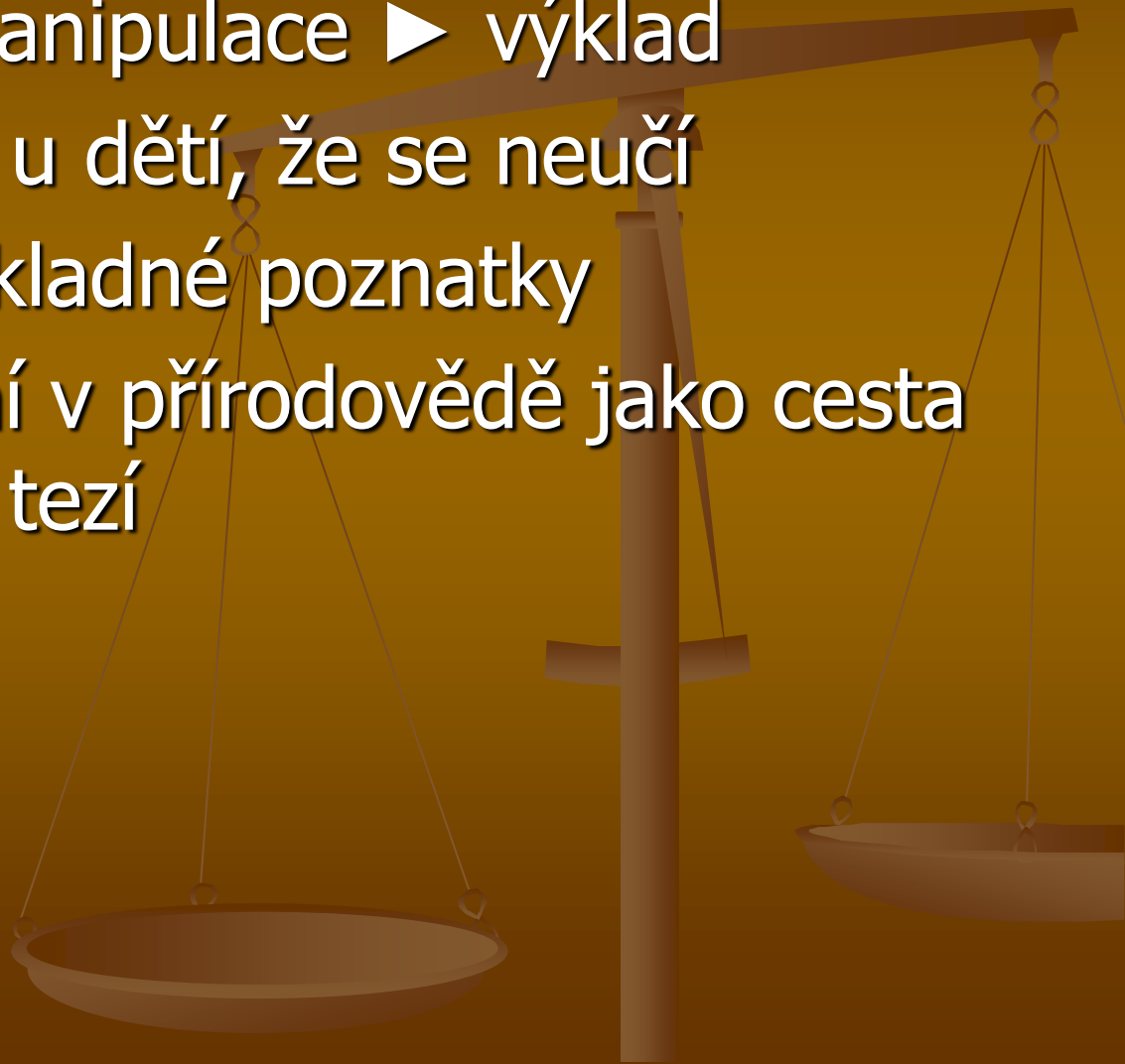
2) zapiš do duše (skrze rozum)

3) realizuj uctivým chováním



Klíčové prvky v odkazu J.A.K. v přírodovědné edukaci

- pozorování + manipulace ► výklad
- docílení vědomí u dětí, že se neučí
- opravdové a důkladné poznatky
- experimentování v přírodovědě jako cesta naplnění těchto tezí



Experiment v přírodovědě jako možnost naplnění zásady aktivity a názornosti v odkazu Komenského

- demonstrační pokus X experiment
- experiment jako badatelská metoda
- poznávací náboj
- propojení NÁZORNÉHO VNÍMÁNÍ S MYŠLENKOVÝMI OPERACEMI A PRAKTICKOU ČINNOSTÍ
- od konkrétních manipulativních činností k abstrakci a zobecnění (konkrétní-ikonická-symbolická reprezentace)

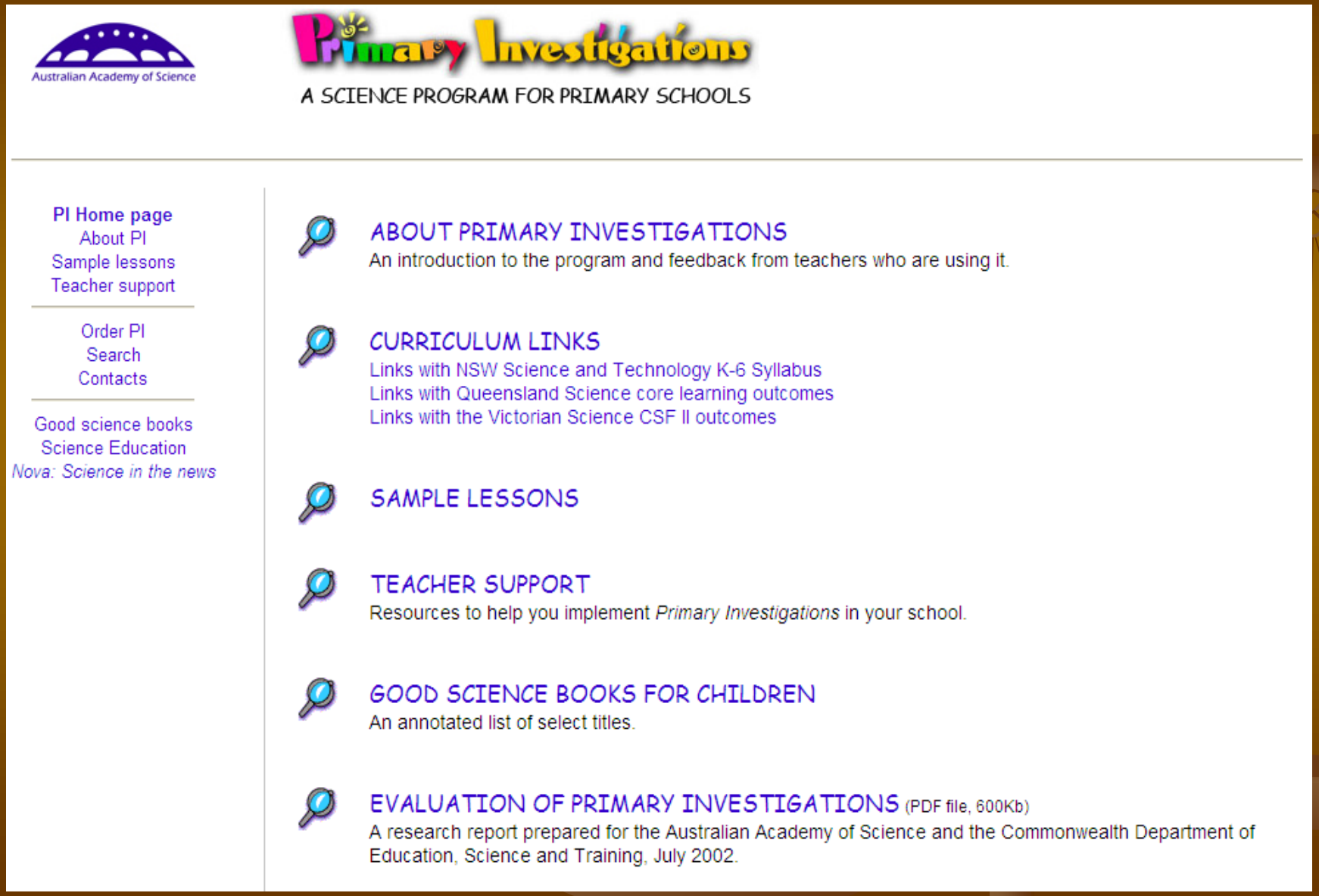
Možný průběh experimentu

- 1. **Stanovení výzkumné otázky** – co chceme prozkoumat?
- 2. **Určení proměnných**, které mají vliv na experiment – co musíme zachovat a co budeme měnit?
- 3. **Stanovení měřícího nástroje** – jak to budeme měřit, co k tomu potřebuji?
- 4. **Stanovení hypotéz** – jak to asi dopadne?
- 5. **Provedení experimentu** a **zaznamenání průběhu** – co se děje?
- 6. **Zaznamenání výsledku** experimentu – co se stalo?
- 7. **Tvorba vlastních závěrů** (zdůvodnění) – proč asi se tak stalo?

Zahraniční internetové stránky a přírodovědná výuka založená na experimentování

- jazyková bariéra a její eliminace
- vyhledávání dle hesla (tezauru)
- rozsáhlé možnosti
- inspirace pro výuku i pro koncepci vlastního přírodovědného předmětu

Austrálie: „Primary investigation“



Austrálie: „Primary investigation“

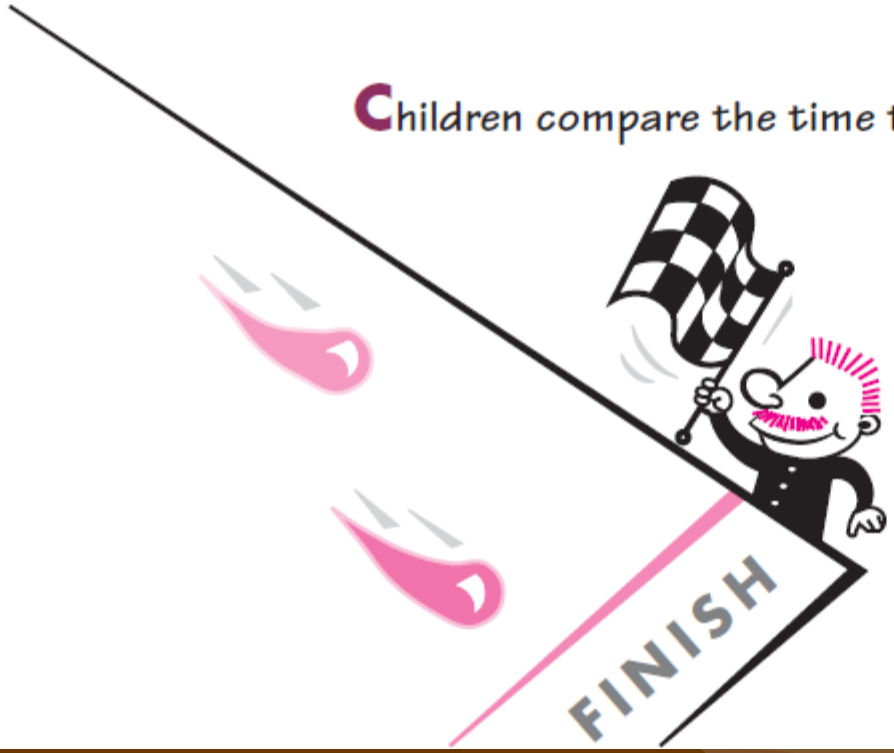
Book number and title	Unit 1	Unit 2	Unit 3	Unit 4
1 Awareness and observation	Introducing awareness of self	Observation	Movement	Space and time
2 Order and organisation	Introducing organisation	Objects and properties	Materials and structures	Investigating colour
3 Change and measurement	Introducing change	Comparison and evidence	Tools and machines	Investigating animals
4 Patterns and prediction	Introducing patterns	Records and data	Construction and testing	Investigating weather
5 Systems and analysis	Introducing systems	Interactions and variables	Problems and solutions	Investigating soil
6 Energy and investigation	Introducing energy	Energy and food chains	Design and efficiency	Investigating astronomy
7 Balance and decisions	Introducing balance	Ecosystems and resources	Constraints and trade-offs	Investigating materials

Název činnosti a stručný popis

Lesson 22

Fast drops, slow drops

60 mins



Children compare the time taken for two drops of liquid to travel down a race board in order to explore the concept of duration of time.

Co nás čeká - přehled

At a glance

- Display two different-coloured solutions and explain that teams are going to try to find out which coloured drop will move faster.
- Demonstrate how to use the eye-dropper and the race board.
- Children experiment freely with both coloured solutions before testing to find out which drop moves faster.
- Children predict which drop will win a 'Drop race' and test their predictions.

Očekávané výstupy lekce

Lesson outcomes

Children are able to compare the duration of events.

They show their ability by using the phrases 'more time' and 'less time' when comparing the duration of the journeys of two drops of different liquids.

Pomůcky a příprava experimentu

Equipment and preparation

For each team

1 container (eg, yogurt), holding a small amount of blue starch solution (see Preparation)

1 container (eg yogurt), holding a small amount of red starch solution (see Preparation)

2 eye-droppers

1 A4 plastic sleeve, containing a sheet of cardboard and a copy of 'Drop race' (BLM 1.10)

newspaper (to cover work area)

paper towels

job badges for manager and speaker

Preparation

To make the blue starch solution, combine 200 millilitres of liquid starch with 100 millilitres of water and enough blue water-soluble paint to colour the mixture.

To make the red starch solution, combine 150 millilitres of liquid starch with 150 millilitres of water and enough red water-soluble paint to colour the mixture.

For each team, insert the piece of cardboard in the A4 plastic sleeve and then insert a copy of BLM 1.10. Seal the opening with tape.

Vyučovací postup – rady pro učitele

Teaching strategies

1 Explain to the children that they are going to hold some 'Drop races' to find out which of two drops is the faster.

To introduce the activity, encourage children to talk about watching raindrops on window panes or read a poem such as the one below:

Two little raindrops running down the glass
One is going slowly, one is going fast.
This one is winning and that one's coming last.
Oh! No it isn't! It's raced right past,
and now the other raindrop is last, last, last!

Pair children and allocate jobs.
Ask managers to collect team equipment.

2 Demonstrate how to use the eye-dropper to take up a quantity of liquid and squeeze out a single drop onto the plastic-covered board. Show how to make the drops 'run' in all directions by tilting the board.

Rozšíření

Extensions

Experiment with and compare drops of other liquids such as milk, oil, coloured water, cordial, honey.

Play a game of 'More time, less time'. Ask children to name events that take more time or less time than other events. For example, ask: What takes more time than a sneeze? (Children's answers might include having a bath/a birthday party/snack time/building a tower.) What takes less time than a sneeze? (A blink/a hiccup/a cough.)

In the playground, encourage children to compare the time it takes to:

- walk and then run from one point to another;
- climb up the climbing frame and then jump down;
- let a ball and a sheet of paper fall from the top of the climbing frame to the ground.

Irsko: Objevujeme přírodní vědy

Videoukázky

Activity Movies [Flash]

The first Flash Activity movie of the new school year is now available! This time, Molly & Spidey explore how to clean dirty water!

As always, select one of the links below to get started. Remember if you have a projector and white board and would like to present the activity to your class, choose the **larger version** for maximum impact! The file size is the same so don't worry about it taking longer to download ...

Click here to view the Cleaning Dirty Water Movie! *

Click here for larger version [1017 X 576 pixels] *

Molly and Spidey discover how to clean dirty water and show you how the water that flows through your taps is so clean! You'll understand what people mean by water being the "Source of Life" after you check out this activity!

Click here to view Exploring Lungs Movie! *

Click here for larger version [1017 X 576 pixels] *

Molly and Spidey find out how our lungs work, how to look after them and how to make them work hard. They also perform an experiment to investigate our lungs further! Don't miss out!

Click here to view the Keeping the Damp Out Movie! *

Click here for larger version [1017 X 576 pixels] *

Molly and Spidey investigate damp, by exploring what causes it and how to prevent against it! You'll be amazed to find out what materials are best to protect against damp!


C F
:: Movie Controls >>
1. Introduction
subtitles

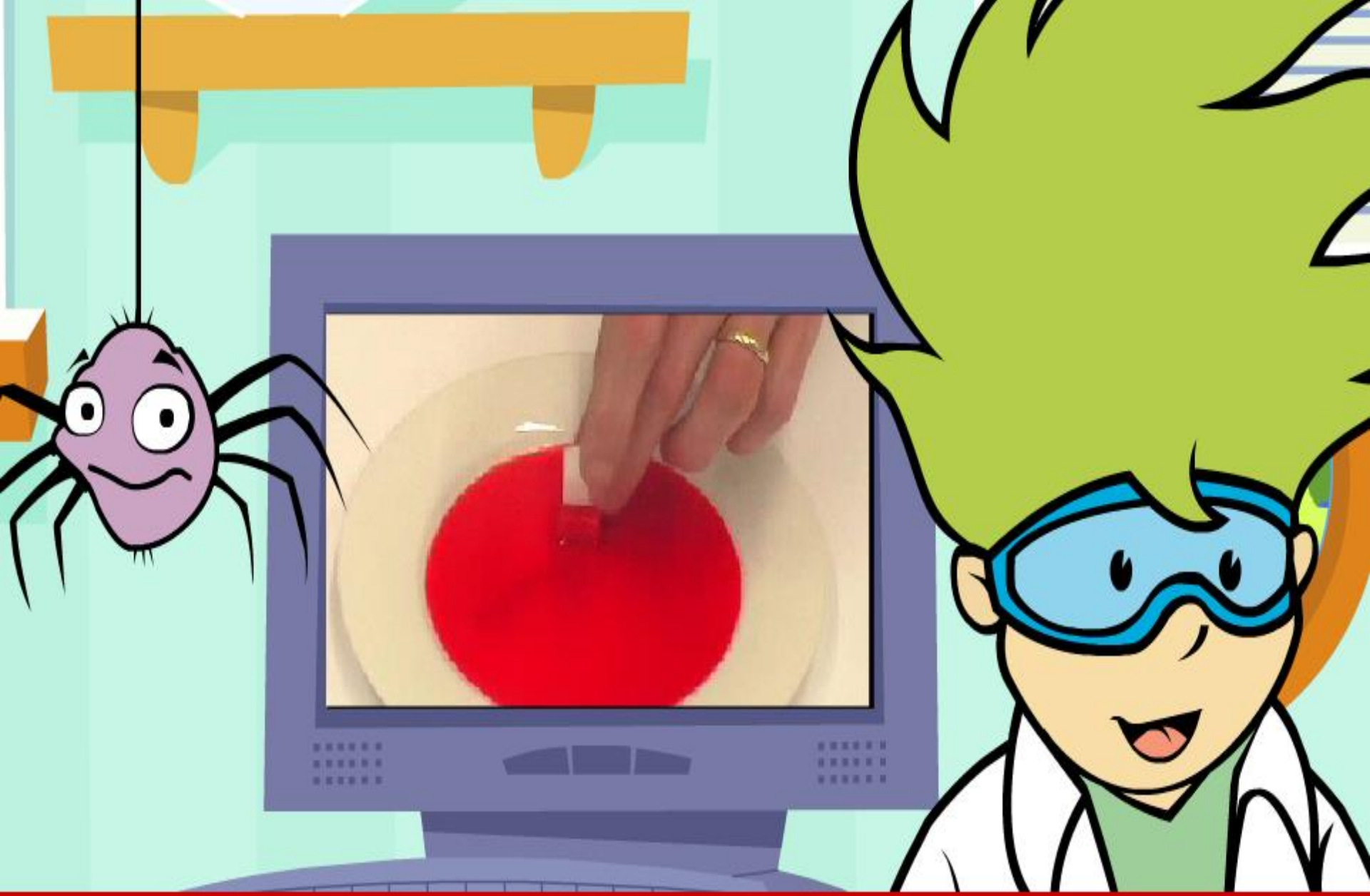

Click here to download
our Activity Sheet
Download Now
:: Movie Controls >>
2. Activity Sheet
subtitles

Activity

GOLD

Equipment	Sugar cubes, small container (e.g. plate or saucer), water, food colouring, pieces of material for testing (e.g. plastic, kitchen towel, kitchen paper, greaseproof paper) 
Suggested class level	1st – 6th
Preparation	None
Background information	Old houses tend to be damp because they have no 'damp course'. Bricks absorb moisture from the ground (see Activity in the pack on 'Absorption') and this moisture rises up the walls ('rising damp' as it is often known). In newer houses a layer of plastic (or other non-absorbent material) placed between the bricks near the ground stops the moisture rising. This is called a 'damp course'. Ventilation (the circulation of air) is another very important factor in keeping damp away.
Trigger questions	What is damp? Damp is water rising from the ground through materials. What is condensation? Condensation is water from the air forming droplets on cool surfaces. Where would you find damp? Where would you see condensation?

Cross-curricular links	History – how people lived in Ireland (life-styles, types of houses, etc.) Geography – houses with mud walls
Skills	Predicting Investigating Experimenting
Activities	**Aim of Investigation:** ***What material will make the best damp course?*** 1. Put a small amount of water in the container, and add a few drops of food colouring (it makes it easier to see the water rising). 2. Put some sugar cubes, one on top of the other, into the water. Wait a few minutes and watch what happens. 3. Now put a fresh sugar lump into the water, put a piece of kitchen towel on top of it, and then another sugar lump. What happens? 4. Repeat Stage 3 several times, putting pieces of different material each time between the bottom sugar lump and the next one. Which of these materials would you think would make the best 'damp course' if you were building a house?
Safety	**Care with water.**
Follow-up activities	Time how long it takes for the water to reach a certain place, e.g. the top of the second cube.
References	Discover Primary Science pack- activity on absorption Eureka, Irish Independent, Vol. 2, No. 9, November 2005

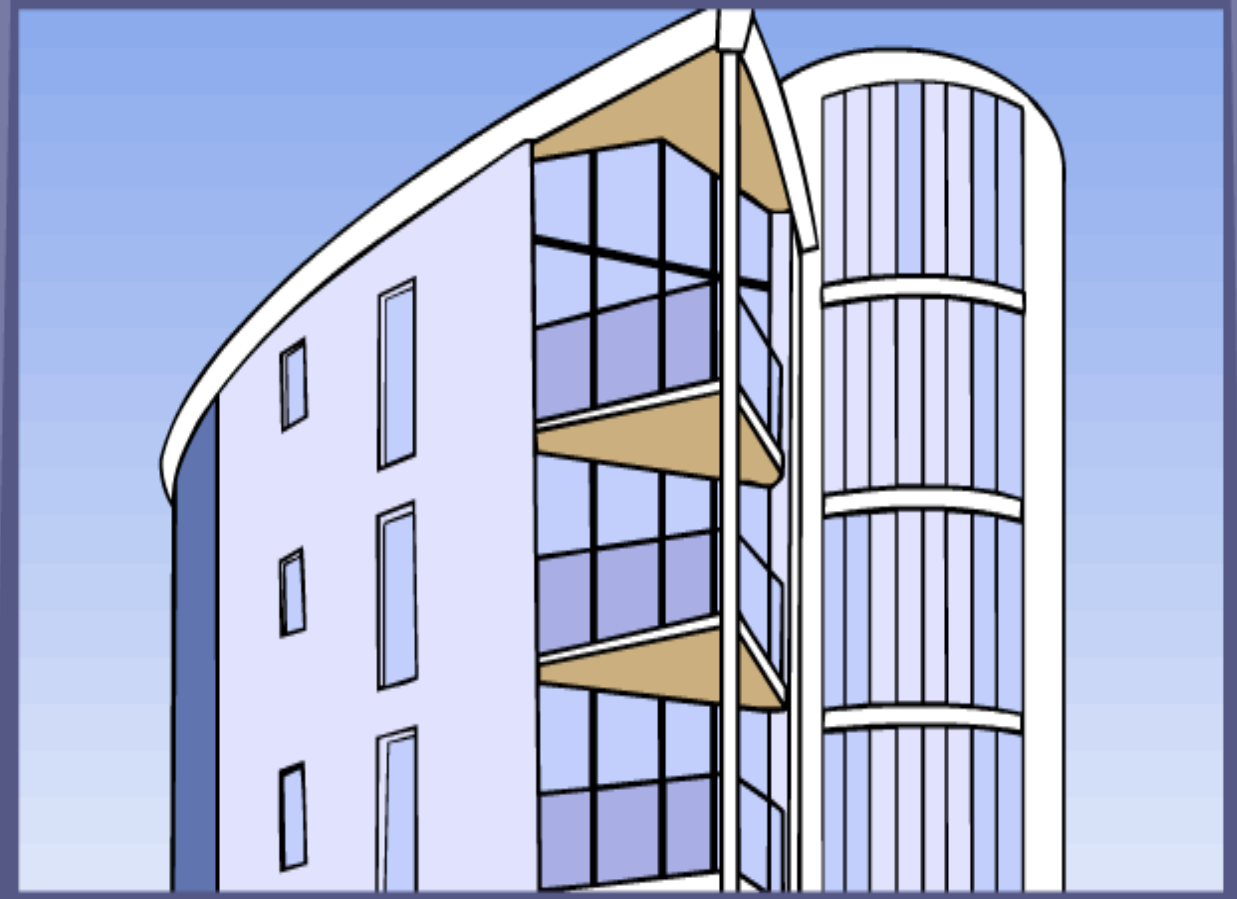


Place three sugar cubes on top of each other in the plate.

:: Movie Controls >>

3. Investigate

subtitles



2/4

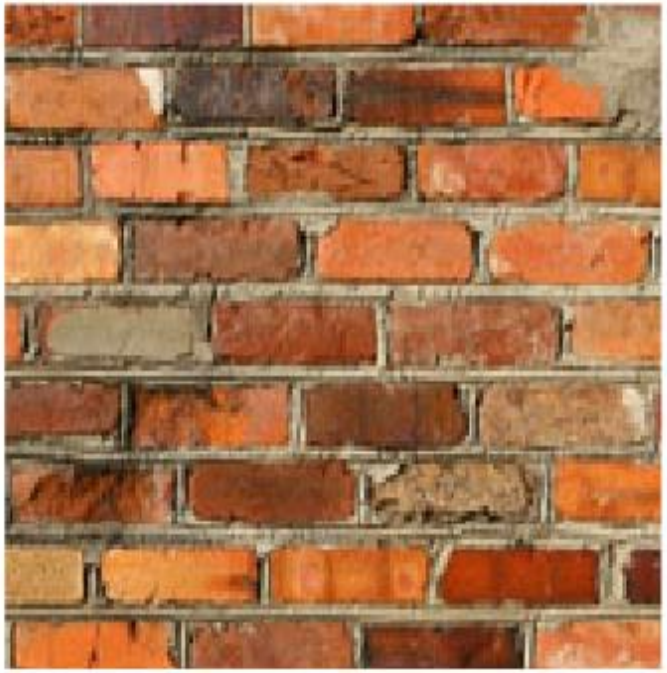
:: Movie Controls >>

4. Exploring Dampness

subtitles

Did You Know:

Water that stays in bricks and stones can gradually destroy them, because the water expands when it freezes and breaks up the bricks and stones. This can happen to rocks as well.



Web Link:

Oldhouse.info

Visit Site >>

Pracovní listy ke stažení

Activity Download Sheets

Activity	Content Strand	Skill Development	B & W	Colour
Exploring Lungs [Gold]	Living things - myself, Forces	Experimenting and observing		
Keeping the Damp Out [Gold]	Materials - change.	Predicting, experimenting and investigating,		
Custard Bouncy Balls [Gold]	Materials - properties change, energy and forces.	Experimenting and investigating,		
Amazing Triangles [Silver]	Forces, Materials and their properties	Experimenting, Designing, and making. Investigating, Observing and Analysing		
Exercise and your Heart [Gold]	Living Things - Myself, Human life	Investigating, Recording and Analysing		

FOTOGALERIE






























Velká Británie: „Primary resource“

SCIENCE RESOURCES:

Choose a section

- Scientific Enquiry & General Resources
- Life Processes and Living Things
- Materials and their Properties
- Physical Processes

Sc1 Scientific Enquiry (& General Science Resources)

- Investigative skills
- Other resources

Sc2 Life Processes and Living Things:

- Life Processes
- Humans and other animals
- Green plants
- Variation and classification
- Living things in their environment / Minibeasts

Sc3 Materials and their Properties:

- Grouping and classifying materials
- Changing materials
- Rocks and Soils
- Separating mixtures of materials

Sc4 Physical Processes:

- Electricity
- Forces and Motion
- Light and Sound
- The Earth and Beyond

Teorie a praxe experimentování

Assesment / Planning Sheets / Scientific Enquiry:

- Science Investigation Sheets (Lynn Edwards) PDF
- Science Experiments (Sheila Daly)
- Scientific Investigation (Veronica Thomas) PDF
- Science Investigation Sheets (Alison Latham) DOC
- My Science Investigation (Richard Hough) DOC
- Investigation Cards (Sue Barry) DOC
- Planning a Science Investigation (Iffat Sardharwalla)
- Let's Investigate! (Sharen Phillips)
- Science Investigation Success Criteria (Iffat Sardharwalla) DOC
- 6 Pupil Self-Assessment Tick Sheet (David Masters) DOC
- 6 Recognise Factors in a Given Test (David Masters) DOC
- 5 6 Investigation Vocabulary Posters (Steve Washington)
- Science 'Child Speak' Level Descriptions (Vicky Frampton) DOC
- Writing Up Experiments
- Group Observation Profile (Deborah Cadman) PDF
- Targets in Scientific Enquiry (Josie Hodges) PDF
- AT1 Investigation Sheet (Roy Chambers) PDF
- Scientific Enquiry (Shopping Bags) (Dave Wallace) PDF
- Science Investigation Learning Wall (Display) (Iffat Sardharwalla) DOC
- 1 2 Soap Lather Experiment (Kathryn Norton) DOC
- Investigation Sheets (Julie Bonney) DOC
- KS1 AT1 Science Planning House (Natalie Eyles) DOC
- KS2 Science Investigation Pro Forma (Fiona Robertson) DOC NEW

Ukázka pracovního listu / síly a pohyb

Forces- pushing and pulling

Squashing, bending, twisting and stretching can change the shape of objects.
Will these things **CHANGE, NOT CHANGE** or **BOUNCE BACK?**

Materials	Predict- what do you think will happen?	Results- what did happen?
Bag of sand		
Sponge		
Cotton reel		
Elastic band		

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Do your kids ask lots of questions? Do they sound anything like these? We're sure your kids ask as many questions as ours do because that's how children learn. Let us help you to be ready with the right answers! SUBSCRIBE NOW!


What is a crystal?


What's a fingerprint?


What do plants need to grow?


What are germs?


Why do I get a shock when I touch a doorknob?


Why are leaves green?


Why do I have ears?

What does water look like up close?


Which drops faster, a big ball or a little ball?


What are primary and secondary colors?

Teoretický úvod do problému

What's a Fingerprint?

Did you know that even before you were born you had tiny fingerprints or lines on the tips of your fingers? Nobody else in the world has exactly the same fingerprints on their fingers. In some cases, fingerprints have been used to find lost children or to catch a criminal who left a mark from their fingers at the time of a crime. You can't always see your fingerprints but police and other experts have special equipment that helps fingerprints show up even when they were invisible before.

When you were a baby, your fingers were a little small, so the hospital you were born at took your footprint instead. Even twins who look exactly alike have different fingerprints. Let's make a fingerprint page of your own fingerprints. An adult can save the page in case you ever get lost.

Pomůcky; Postup; Zápis

WHAT YOU'LL NEED :

- An ink pad
- A magnifying glass
- A piece of paper
- A pen

WHAT TO DO :

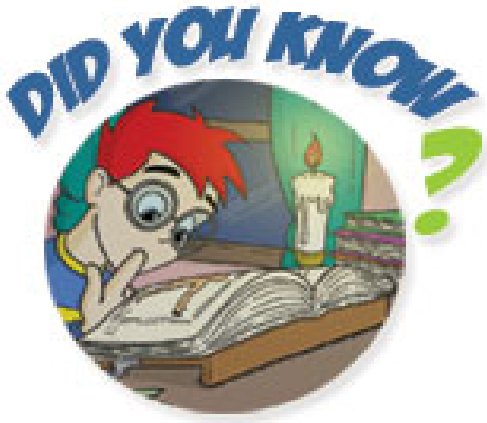
Name_____

1. Put your name on the piece of paper.
2. Start with your left hand. Touch the tips of each finger to the pad of ink and have an adult carefully place each finger on the paper so that your finger prints line up in a row.
3. Do the right hand in the same way, doing one finger at a time.
4. Use a magnifying glass to see the fingerprints up close.

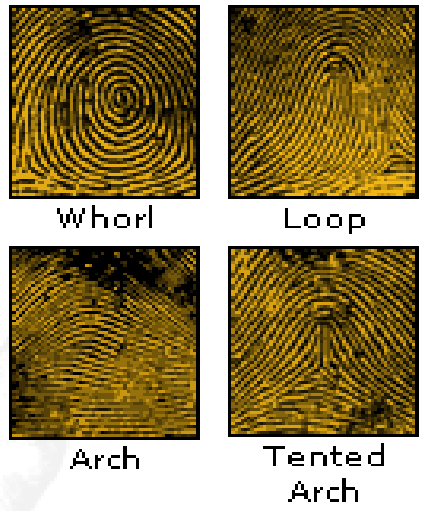
WHAT HAPPENED ?

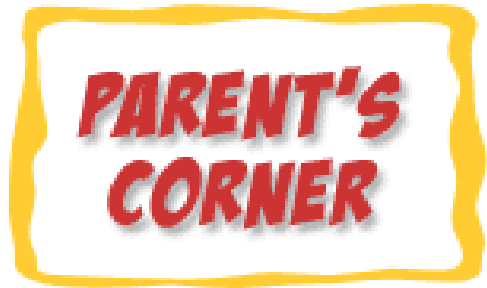
Diskuze; Víš, že?; Koutek pro rodiče/učitele

Your fingerprints show up on the paper when you use the ink. Look at the different patterns and shapes you see. By looking at the patterns and shapes, experts can tell what type of fingerprint you have.



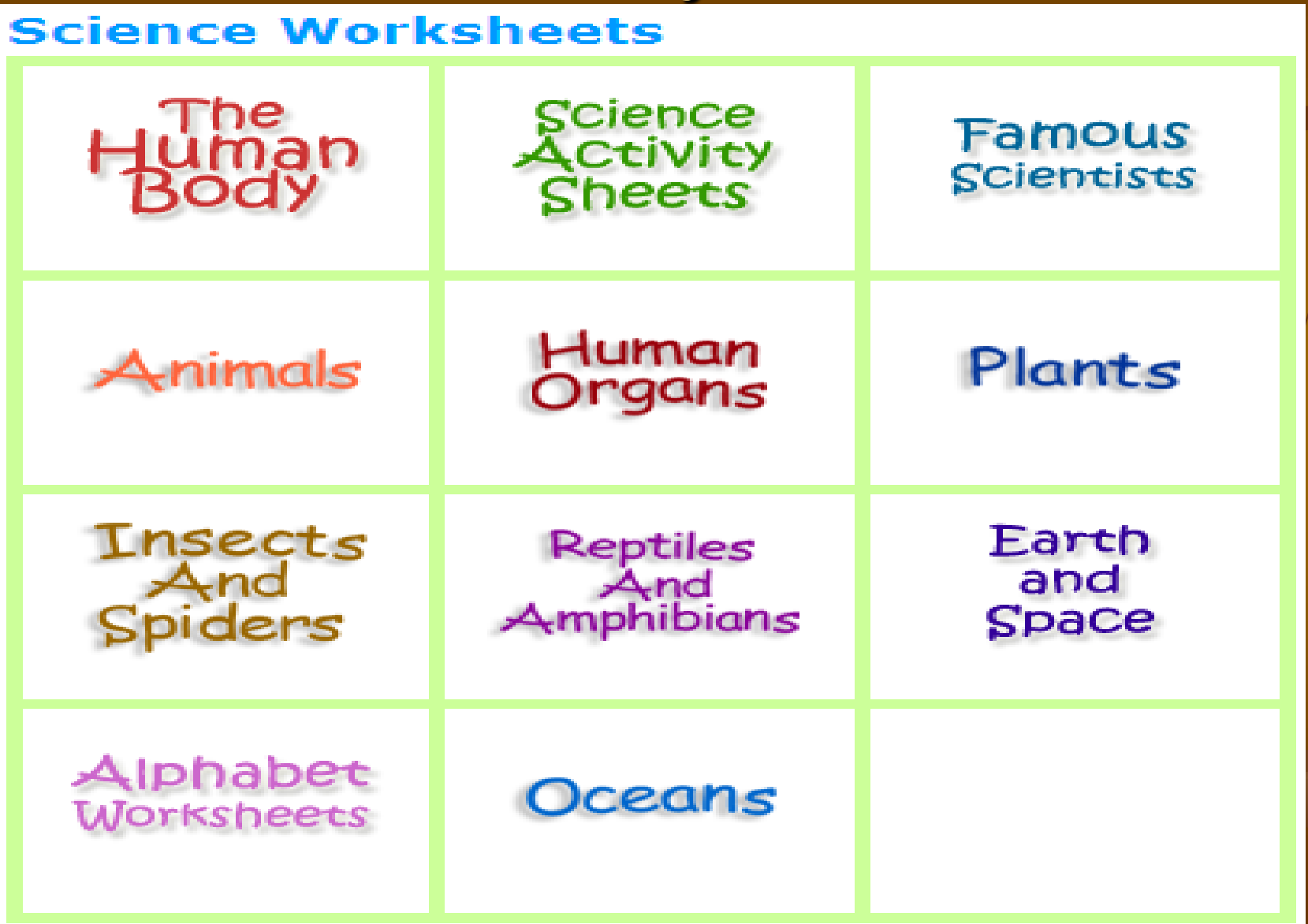
- Fingerprints are also called "friction ridges" and are on your fingers so you can grab things easier. Fingerprints make your fingertip rough.
- Your fingerprint can last for many years if you touch something that isn't cleaned off after you touch it.
- The different shapes of the fingerprint are called the whorl, the arch, the tented arch and the loop.



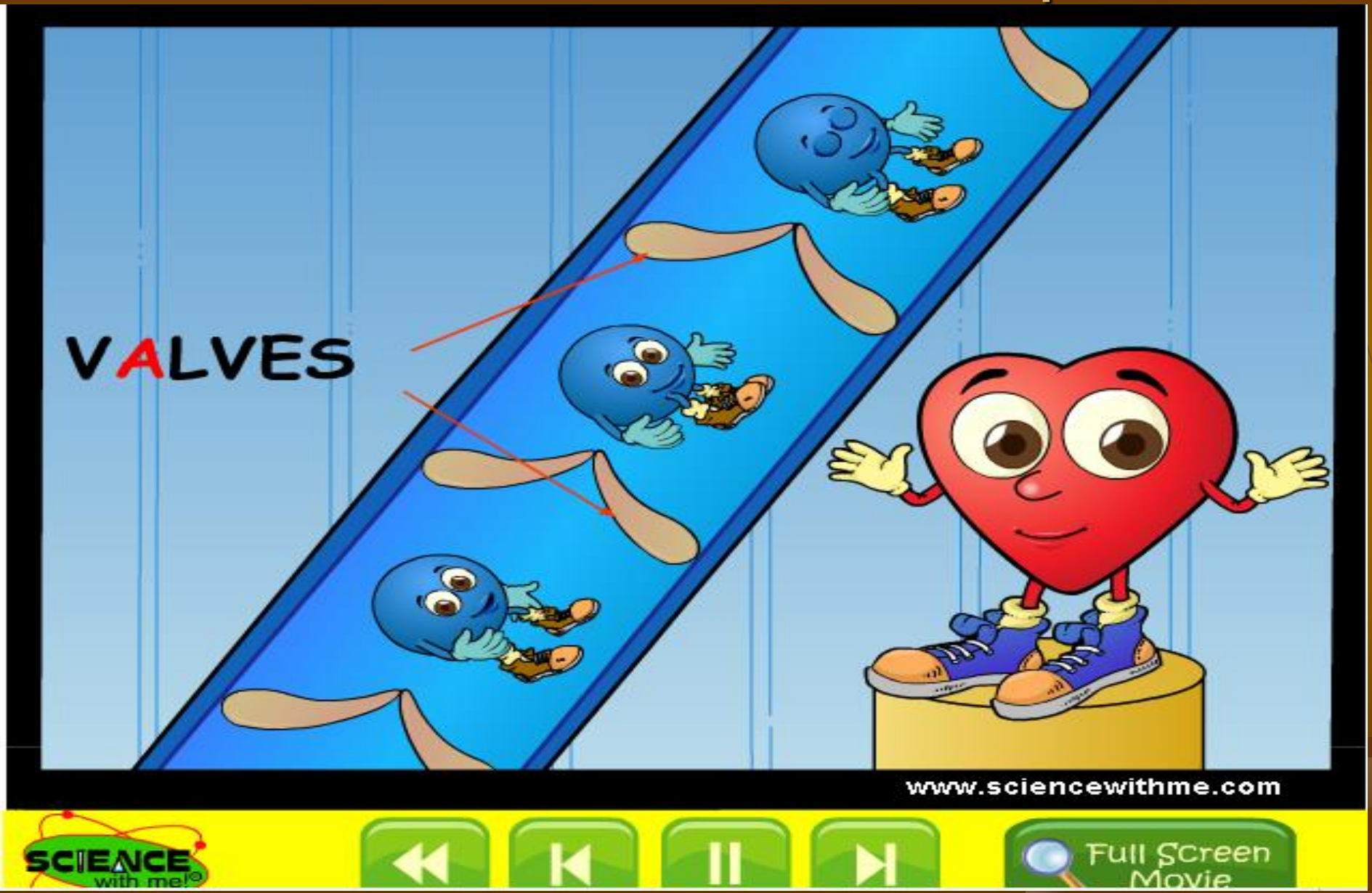


It's a good idea to save a copy of your child's fingerprint in case something should happen to them. The different shapes and patterns in fingerprints are shown so you can help your child decide what pattern he or she has on a finger.

Pracovní listy dle témat



Animace – videa // tep



Další webové stránky:

http://www.ug.edu.au/_School_Science_Lessons/year1to6.html

Year 1 Lessons	Year 2 Lessons	Year 3 Lessons
1.1 Living and non-living	2.1 Bird feathers	3.1 Ant life cycle
1.2 Animals and plants	2.2 Bird sounds	3.2 Mosquito life cycle
1.3 Different animals	2.3 Bird beaks and feet	3.3 Butterfly life cycle
1.4 Different plants	2.4 Different birds	3.4 Cockroach, grasshopper
1.5 Plant pictures	2.5 Protect our birds	3.5 Plant and animal uses
1.6 Different leaves	2.6 Care of birds	3.6 Care of cats
1.7 Knocking sounds	2.7 Bottle sounds	3.7 Burn with a magnifier
1.8 String sounds	2.8 Dull and bright in the sun	3.8 Make water waves
1.9 Light and shadow game	2.9 Melt substances	3.9 Mix colours
1.10 Spinning picture	2.10 Magnetic pin chain	3.10 Make rainbow colours
1.11 Mirror game	2.11 Balanced parrot	3.11 Spin a colour disk
1.12 Spinning top	2.12 Siphon and water spray	3.12 String telephone
1.13 Same and different	2.13 Count our teeth	3.13 Describe our bones
1.14 Mark our height	2.14 Measure in hand spans	3.14 Feel our bones
1.15 Our five senses	2.15 Measure with your body	3.15 Record our heights

Další webové stránky:

http://www.firstschoolyears.com/science/index.htm

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- D.T.
- Art
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- P.E.
- R.E.
- P.S.H.E.
- S.E.N.
- General

Ads by Google
Science Flash Cards
Bio chem

General | Ourselves | Living Things | Materials
Forces | Electricity | Light & Dark | Sound

Ads by Google Science Topics Experiments Science Facts Science Clips

Science Worksheets and Resources

This section contains free worksheets, flashcards, online activities and other educational resources to support the teaching and learning of Science. Some resources are based upon the QCA Schemes of Work for Science at Key Stages 1 and 2.

Free Science Resources

Resource Name	Type	Resource Name	Type
The Solar System Resources	HTML		

General Science Links

Active Science - Primary and secondary notes, games and downloadable activities covering a range of science-related topics.
Association for Science Education - Includes details of membership, publications and conferences.
Brainpop - Uses Shockwave Flash movies to teach about health, science and technology. Also includes quizzes and information.
NASA Kids - Space-related facts and activities from NASA.
Primary School Science - Subscription service offering lesson plans, worksheets, clipart and other resources to support the teaching of Science in the Primary School. Some free samples available.
ScienceNet - Question and answer site for anyone interested in science.
Scienceweb - Primary science resources based upon the QCA schemes of work. Includes lesson plans, worksheets, questions and answers and contact details. Now a subscription service

Další webové stránky:
http://www.coxhoe.durham.sch.uk/curriculum/Science.htm#Long%20Term%20Overview%20of%20the%20Science%20Curriculum

Overview of the Science Curriculum
Links to Useful Sites
Living Things Activities
Materials Activities
Physical Processes Activities

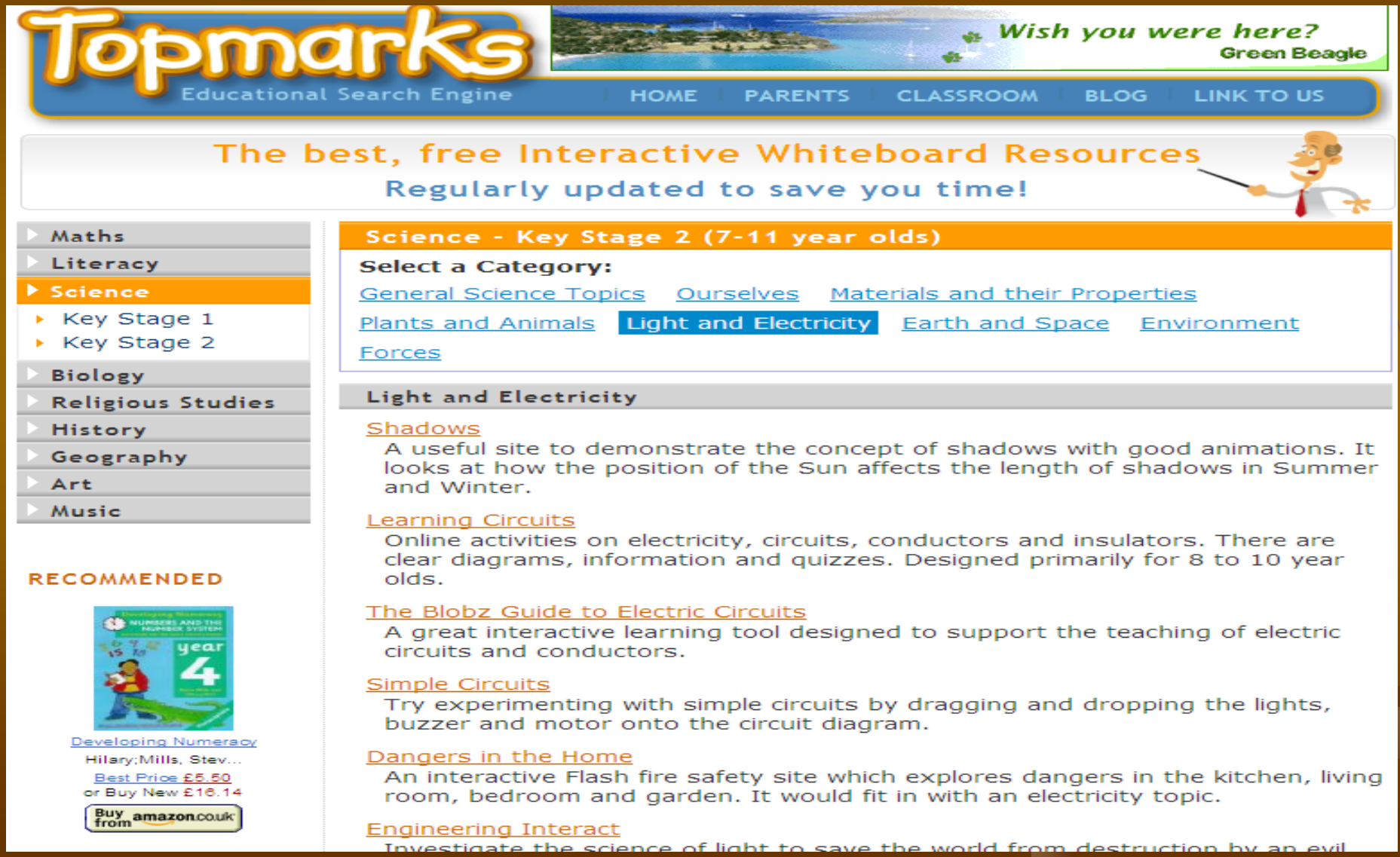
The school follows the QCA schemes of work for Science. Whenever possible Science experiences are presented to the children in practical contexts.

Long Term Overview of the Science Curriculum

TERM	1a	1b	2a	2b	3a	3b
Y1	Ourselves	Light and Dark	Pushes and Pulls	Growing Plants	Sorting and Using Materials	Sound and Hearing
Y2	Plants and Animals in the Local Environment	Variation	Grouping and Changing Materials	Forces and Movement	Using Electricity	Health and Growth
Y3	Helping Plant Grow Well	Characteristics of Materials	Magnets and Springs	Teeth and Eating	Light and Shadows	Rocks and Soil
Y4	Habitats	Circuits and Conductors	Moving and Growing	Solids and Liquids	Friction	Keeping Warm
Y5	Keeping Healthy	Life Cycles	Gases Around Us	Changing State	Earth, Sun and Moon	Changing Sound

Další webové stránky:

http://www.topmarks.co.uk/Interactive.aspx?cat=71



Závěrečné motto:

„Přírodovědný experiment může být hrou, hrou se zaměřením, která uspokojuje přirozené poznávací potřeby, žáci při ní získávají trvalejší poznatky, prožívají radost a přírodověda se stává pro ně velkou laboratoří, kam se těší. Jsou přece nyní vědci…“

DĚKUJI ZA POZORNOST

ondrej.simik@osu.cz