

## Maths pirates and the lost treasure

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$2b \neq 2b?$



$E=mc^2$



# SCIENTIX LEARNING SCENARIO

## Title

Maths pirates and the lost treasure

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## Summary

In this learning scenario (LS), students will learn the basics of computational thinking by trying to navigate a map to find lost pirate treasure. They want to donate the treasure to charity, but the problem is that the items inside are all labelled in different currencies. So, before going to the bank, the students need convert the currencies to euros and do the maths. The bank offers to double the donation amount if the students answer all the quiz questions correctly. The quiz will be a chance to learn some new economic concepts and some interesting facts about money.

## Keywords

Offline coding, counting money, financial literacy, banknotes, coins

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## Overview

<i>Subject(s)</i>	English as a foreign language Maths Computer science
<i>Topic(s)</i>	Expanding English vocabulary (items of clothing, personal belongings) Financial literacy Currency exchange Adding and subtracting numbers up to 1 000 Offline coding
<i>Age of students</i>	9–11 years old
<i>Preparation time</i>	English – 90 min (to prepare the quiz questions, contact the economy/financial expert/banker and schedule the interview) Maths – 30 min Computer science – 60 min
<i>Teaching time</i>	1st session: English – 60 min 2nd session: Computer science – 45 min 3rd session: Maths – 60 min 4th session: interview with an expert and quiz – 60 min
<i>Online teaching material</i>	Gynzy for teachers <a href="https://www.gynzy.com/en/">https://www.gynzy.com/en/</a> (Free trial version for 30 days if you want to make your own interactive materials, but for this LS no registration or account is required) Wordwall – <a href="https://wordwall.net/">https://wordwall.net/</a> or <a href="https://thewordsearch.com/">https://thewordsearch.com/</a> Wakelet – <a href="https://wakelet.com/">https://wakelet.com/</a> (collection of links and materials for

	<p>teachers)</p> <p>Mentimeter – poll for student feedback</p> <p>Bookcreator – glossary of new vocabulary in the form of a book</p> <p>QR code generator – <a href="https://www.qr-code-generator.com/">https://www.qr-code-generator.com/</a> (to make links that are accessible by scanning with a phone)</p>
<i>Offline teaching material</i>	<p>Computer and projector</p> <p>Notebooks/paper for drawing, coloured pencils</p> <p>Printed treasure map template for students – for offline coding</p> <p>Bring your own device (BYOD) – students should bring their own mobile phones for the first and third session (English and maths)</p>
<i>Resources used</i>	<p>Collection of all materials - <a href="https://wke.lt/w/s/HXyA3v">https://wke.lt/w/s/HXyA3v</a></p> <ul style="list-style-type: none"> <li>• Music from ‘The Pirates of the Caribbean’ <a href="https://youtu.be/Xi3qU3jACe8">https://youtu.be/Xi3qU3jACe8</a></li> <li>• Glossary of new words <a href="https://read.bookcreator.com/ndIncRkp7pe6qBCrv8lh7Lyt9MW2/1TFYxpO2Tj69_QxUARoqFQ">https://read.bookcreator.com/ndIncRkp7pe6qBCrv8lh7Lyt9MW2/1TFYxpO2Tj69_QxUARoqFQ</a></li> <li>• Pirate vocabulary quiz – for English session <a href="https://wordwall.net/resource/30669492">https://wordwall.net/resource/30669492</a></li> <li>• Pirates word search <a href="http://thewordsearch.com">thewordsearch.com</a></li> <li>• What is coding? <a href="https://youtu.be/XMZFUnAgOqs">https://youtu.be/XMZFUnAgOqs</a></li> <li>• What is an algorithm and a sequence? <a href="https://youtu.be/v_Pc3UnePZY">https://youtu.be/v_Pc3UnePZY</a></li> <li>• Interactive activities for maths session on the Gynzy platform (no subscription needed) <a href="https://www.gynzy.com/teach/en/board/b336a6a2-137c-438f-a3e8-868813491b8a">https://www.gynzy.com/teach/en/board/b336a6a2-137c-438f-a3e8-868813491b8a</a></li> <li>• Money notes and coins – maths <a href="https://wordwall.net/resource/30324748">https://wordwall.net/resource/30324748</a></li> <li>• Currency converter <a href="http://www.convertmymoney.com/">http://www.convertmymoney.com/</a></li> <li>• Financial literacy <a href="https://youtu.be/9i-XuWBloKk">https://youtu.be/9i-XuWBloKk</a></li> <li>• Economics for Kids: Saving and Spending <a href="https://youtu.be/NfurkrZEN3Q">https://youtu.be/NfurkrZEN3Q</a></li> <li>• Quiz about financial literacy <a href="https://wordwall.net/resource/30689082">https://wordwall.net/resource/30689082</a></li> </ul>

### Aim of the lesson

By the end of this learning scenario, students will have learnt new vocabulary and practised writing a description in English. They also solve maths problems involving real-life situations where they have to use and convert different currencies. Students will learn how to use simple coding to navigate a map. Talking with an economy expert will teach students how money is earned and spent.

### Trends

**Edutainment:** playful learning. Learning while having fun.

**Collaborative learning:** a strong focus on pair (or group) work.

**Peer learning:** students learn from peers and give each other feedback.

**Content and language integrated learning (CLIL):** we use a foreign language (English) for teaching, allowing students to practise and improve their second language and integrate STEM and non-STEM subjects.

**Bring your own device (BYOD):** students bring their own mobile devices to the classroom.

**Snack learning:** small and attractive bits of learning rather than prolonged forms of study.

### 21st-century skills

The 21st-century skills that this learning scenario addresses are the following.

**Critical thinking:** students explore idea and discuss and consider other points of view.

**Creativity and innovation:** students come up with new maths problems for their peers to solve.

**Collaboration:** students complete activities by working in pairs and groups.

**Communication:** students practise their communication skills while working in pairs/groups and give feedback to their peers.

**Problem-solving:** students will navigate a map using simple coding steps.

### STEM strategy criteria

In this learning scenario, the following STEM elements and criteria are addressed:

Elements and criteria	How is this criterion addressed in the learning scenario?
<b>Instruction</b>	
Personalisation of learning	This learning scenario caters for all four types of learning styles (visual, auditory, kinaesthetic, reading/writing) and the various needs and interests of the students.
Problem and project-based learning (PBL)	Students are presented with real-life problems (navigating a map, maths problems with different currencies).
Inquiry-based science education (IBSE)	Students are encouraged to ask questions, link what they are learning to their prior knowledge, and test their solutions to problems.
<b>Curriculum implementation</b>	
Emphasis on STEM topics and competences	Teaching coding to young learners encourages creativity and computational thinking.
Interdisciplinary teaching	CLIL approach – English as a teaching language for computer science and maths concepts.
Contextualisation of STEM teaching	Students are presented with real-life problems (navigating a map, maths problems with different currencies).
<b>Assessment</b>	
Continuous assessment	Formative assessment is done in three out of the four sessions.
Personalised assessment	After presenting their work, students give feedback and receive it from their teacher and peers.
<b>Staff professionalisation</b>	
Highly qualified professionals	During this learning scenario, colleagues who teach maths and computer science can assist if needed.

Elements and criteria	How is this criterion addressed in the learning scenario?
Supporting (teaching) staff	Supporting staff help during lessons when needed.
Professional development	These four sessions will be open for observation and evaluation by other staff members as part of teacher professional development.
<b>School leadership and culture</b>	
School leadership	The headteacher approves and supports interdisciplinary learning scenarios and projects.
High level of cooperation among staff	These four sessions will be co-taught with the third grade (9–10 years old) teacher.
Inclusive culture	All opinions matter and are valued in our school.
<b>Connections</b>	
With industry	Inviting a guest speaker who is an expert in financial literacy.
With parents/guardians	The guest speaker is a student's father.
With other schools and/or educational platforms	This learning scenario will be available to other schools that we collaborate with and to English teachers who are members of the Serbian English Teachers' Association from September 2022.
With universities and/or research centres	Alternatively, a financial expert could be invited to the classroom.
With local communities	Students will be encouraged to donate to a charity.
<b>School infrastructure</b>	
Access to technology and equipment	There is internet access at the school, an ICT classroom with computers and a projector in every classroom.
High-quality classroom materials	The school and its staff are encouraged to create high-quality personalised resources.

### Lesson plan

The learning scenario includes four sessions that can be done in one day or over a week, with one session each day. This lesson can be implemented physically by one or more teachers in the classroom or online.

Name of activity	Procedure	Duration
<b>Yo-ho-ho – we're the pirates (English)</b>	<p>The teacher plays ONLY the music from 'The Pirates of the Caribbean' as a cue for students to guess the topic of the session <a href="https://youtu.be/Xj3gU3jACe8">https://youtu.be/Xj3gU3jACe8</a></p> <p>The teacher asks students about vocabulary about pirates that they already know and adds new words using the 'Label the diagram' activity <a href="https://wordwall.net/resource/30669773">https://wordwall.net/resource/30669773</a> Glossary of words in Annex 0</p> <p>Instructions for students: You have 15 minutes to draw and colour a pirate and describe what the pirate looks like (physical appearance and clothing). Be sure to mention at least two objects the pirate has and one object that is missing.</p>	<p>60 min in total</p> <p>(10 min – new vocabulary)</p> <p>15 min – draw and write a description</p>

	<p>(Students practise using vocabulary for physical appearance and items of clothing and form sentences using have/has got and the present continuous tense for describing the picture).</p> <p>Possible description (to use as an example if needed). <i>My pirate's name is Redbeard. He is tall and has got long red hair. He's got a red beard and a moustache. He is wearing a big, black hat and an eyepatch on his left eye. He is wearing a short, red coat, a white shirt, and brown trousers. He has got a sword and a compass, but he hasn't got a parrot.</i></p> <p>After 15 minutes, the teacher asks the students to swap their notebooks, read each other's descriptions and give feedback on what could be improved. The teacher then asks several volunteers to show their drawings to the whole class and read their descriptions aloud. The other students give feedback with reference to the instructions and ask questions about the drawings. Allow up to 30 minutes for this activity. Example questions and instructions for peer feedback are in Annex 1.</p> <p>The last 5–10 minutes of the session are intended for formative evaluation in the form of a quiz (PDF version in the Wakelet collection in Annex 1). Each student scans the QR code to open the vocabulary quiz. <a href="https://wordwall.net/resource/30669492">https://wordwall.net/resource/30669492</a></p>	<p>30 min – peer feedback</p> <p>5 min – formative evaluation quiz)</p>
<p><b>Treasure hunt (computer science)</b></p>	<p>The teacher starts the session by revising the pirate vocabulary in a word search <a href="http://thewordsearch.com/puzzle/3479806/pirates/">http://thewordsearch.com/puzzle/3479806/pirates/</a> (Printable PDF in Annex 2).</p> <p>How do robots and computers understand what we want them to do? Example questions:</p> <ul style="list-style-type: none"> <li>- Can robots function on their own?</li> <li>- What language do robots speak?</li> <li>- What kinds of jobs can robots perform instead of people?</li> <li>- Who teaches them how to do it?</li> </ul> <p>Explain what coding is with <a href="https://youtu.be/XMZFUnAgOqs">https://youtu.be/XMZFUnAgOqs</a> and what an algorithm and a sequence is with <a href="https://youtu.be/v_Pc3UnePZY">https://youtu.be/v_Pc3UnePZY</a>.</p> <p>Introduce the treasure map (printable PDF in Annex 2) and explain that the students are going to navigate the map and write a series of instructions for a robot who has to collect all the pirate items on the map. Divide the students into pairs (or groups of four), give each group a printed treasure map and assign the items on the map to write a sequence for.</p> <p>Group A – a parrot, a ship wheel, a bandana, a pirate hat Group B – a map, a key, a ship wheel, a pirate flag Group C – a hook, a pirate hat, a key, a compass Group D – a flag, a map, a bandana, a parrot Group E – a hook, a compass, a bandana, a map Group F – a key, a hook, a parrot, a ship wheel</p>	<p>45 min in total</p> <p>(7 min – word search</p> <p>10 min – videos and explanation</p> <p>20 min – offline coding group work</p>



	<p>After 15–20 minutes, test the sequences on the big map projected on the whiteboard. <b>There can be more than one correct sequence</b> – allow the students to discuss with the other group that had the same task.</p> <p>Congratulations! You managed to collect all the items and find the treasure chest. We will open it in the next session.</p>	<p>8 min – testing the sequences of coding steps)</p>
<p><b>Pirate treasure chest maths</b></p>	<p><b>GYNZY interactive materials</b> <a href="https://www.gynzy.com/teach/en/board/b336a6a2-137c-438f-a3e8-868813491b8a">https://www.gynzy.com/teach/en/board/b336a6a2-137c-438f-a3e8-868813491b8a</a></p> <p>The teacher shows the Gynzy materials on the projector and invites the students to imagine that they have found the lost treasure. They introduce new vocabulary for jewellery items (ring, necklace, earrings, bracelet). The teacher explains that there are different kinds of currencies in the world and shows the different banknotes and coins for dollars and euros. (Adaptation for offline teaching – PDF of Gynzy materials in Annex 3)</p> <p><b>Problem-solving task.</b> When we opened the pirate treasure chest, it was full of jewellery and gold coins. How can we donate this treasure to charity? The problem is all the items of jewellery are labelled in different currencies. Let's convert them all to euros and then go to the bank. Scan the QR code to go to online currency converter <a href="http://www.convertmymoney.com/">http://www.convertmymoney.com/</a> and then turn each item label to euros to calculate the charity donation amount.</p> <p>Students do the money conversions and maths calculations in pairs and after 15 minutes, it is time to check the results as a class. Take a closer look at the coins and notes for dollars and euros so you can practise using this money to buy different things (interactive task on Gynzy where students drag the correct notes and coins to 'buy' an item).</p> <p>After several students have taken turns 'online shopping', students are given two real-life maths problems to solve. Over to you – students come up with a maths problem for their classmates to solve (this can be assigned as homework if the mock shopping task takes up more time).</p> <p>At the end of this session, students do a formative assessment quiz on <a href="https://wordwall.net/resource/30324748">https://wordwall.net/resource/30324748</a> (printable PDF in Annex 3).</p>	<p>60 min in total</p> <p>(10 min – new vocabulary and different currencies</p> <p>15 min – conversion of currencies using online converter</p> <p>15 min – simulation of shopping using different money</p> <p>10 min – create a maths problem</p> <p>10 min – formative assessment quiz</p>
<p><b>Financial literacy quiz and interview with a bank worker</b></p>	<p>New vocabulary on financial literacy is introduced with a YouTube video: <a href="https://youtu.be/9i-XuWBloKk">https://youtu.be/9i-XuWBloKk</a> (income, savings, spending, goods, services, needs, wants, charity). Saving and spending – explain economic terms with <a href="https://youtu.be/NfurkrZEn3Q">https://youtu.be/NfurkrZEn3Q</a>.</p> <p>As you remember from the previous session, the treasure will be donated to charity. The bank offers to double the amount if you</p>	<p>60 min – in total</p> <p>(15 min –</p>

	<p>answer all the game show questions correctly!          Guest speaker – a bank worker (in our case, he is one of the students’ fathers) plays the role of a game show host. They ask the questions and briefly explain the answers afterwards.  <a href="https://wordwall.net/resource/30689082">https://wordwall.net/resource/30689082</a>          (Printable PDF with quiz questions in Annex 4)</p> <p>Students ask the guest speaker questions about their education and career.          These are some example questions students could prepare beforehand, but spontaneous questions during the interview are welcome too:</p> <ul style="list-style-type: none"> <li>- What school/university did you go to become a banker?</li> <li>- What does your regular working day look like?</li> <li>- What are pros and cons of your job?</li> <li>- When did you decide you wanted to become a banker and did someone influence your decision?</li> </ul> <p>The session ends with students scanning the QR code to access the Mentimeter poll and answering the questions about the whole learning scenario experience (example of poll questions in Annex 5).</p>	<p>quiz and discussion about the answers</p> <p>35 min – question and answers with the guest speaker</p> <p>10 min – poll)</p>
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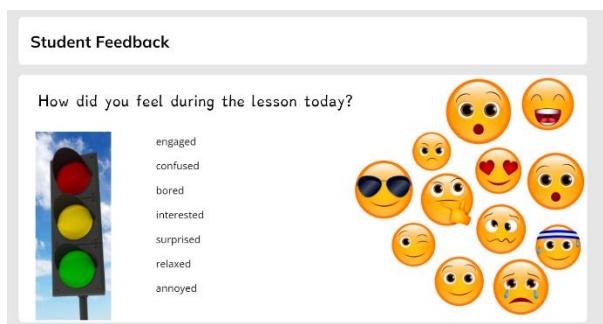
### Assessment

In this learning scenario, there are different types of assessment at different times, such as:

1. Formative assessment after session 1: <https://wordwall.net/resource/30669492> and the PDF version in Annex 1.
2. Peer feedback – students use the rubric provided in Annex 1.
3. Formative assessment after session 3: <https://wordwall.net/resource/30324748> and the PDF version in Annex 3.

### Student feedback

Students are encouraged to provide feedback in the form of an anonymous survey after the fourth session using a traffic light system to show how hard the lessons were, emojis to show how they felt, and one-word answers to describe the overall learning scenario experience.



Alternatively, students can share feedback using an anonymous poll in [Mentimeter](https://www.mentimeter.com/).

The teacher creates the poll options (example in Annex 5).



## Teacher remarks

The learning scenario was a pirate-themed series of activities, meaning the four sessions were done one after the other for one day.

\*Note to teachers with less experience using ICT – use the PDF versions of the online quizzes in the Wakelet collection in the annex.

The first session was intended to only last 45 minutes, but the time was changed to 60 minutes because the students needed to copy the new vocabulary into their notebooks and the peer feedback activity took a bit longer than expected as this activity was new to them.


Teaching young learners requires very clear and short instructions, so for the second session (coding activity), I would advise drawing arrows on the board or having the slide with the explanation on the screen so students can always see it. When I did the session, the students started writing the algorithm steps that included moving sideways instead of just forward, turn left, and turn right.

Also, having QR codes for quick access to links was very handy.

Gamification as formative assessment was a great success. Students were eager to do the Wordwall quizzes multiple times to get a better score and a higher place on the leaderboard.

During the interview with the parent who is a banker, the students were able to browse through my personal coin collection and see what Serbian money looked like in the past. This started a good discussion and motivated the students to compare old money with what we currently use.


The feedback from the students was fantastic and they expressed their willingness to try out similar activities again. A video slideshow of photos taken during the implementation can be found at: <https://vimeo.com/700096999>.



Describe today's experience  
in one word

beautiful enjoyable nice perfect lovely  
funny great good fun excellent so fun interesting  
very interesting cool like a pirate  
soooo great very good

Press \$ to show image



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## About Scientix

Scientix, the community for Science Education in Europe, promotes and supports a Europe-wide collaboration among STEM (science, technology, engineering, and mathematics) teachers, education researchers, policymakers, and other STEM education professionals. If you need more information, check out the [Scientix portal](#), or contact the Scientix National Contact Point or Scientix Ambassadors [in your country](#).

## Annex(es)










All materials and links used in this learning scenario can be found in this Wakelet collection. The materials in this Wakelet are organised according to the session they are intended for <https://wke.lt/w/s/HXyA3v>.

**Annex 0** – Glossary of words (enter the Wakelet link to have a look at the words taught throughout the whole learning scenario)

**Annex 1** – Yo-ho-ho, we're the pirates (English)

In Wakelet, you will find the video to start your lesson, a Wordwall activity for introducing new vocabulary (label the picture), and formative assessment for the end of the lesson.

For this session, you can also use the peer feedback rubric below:

<b>PEER FEEDBACK RUBRIC</b>				
				
	Picture is complete and fully coloured.	Picture is not fully coloured.	There is only an image of the pirate without any details.	There is no pirate in the picture.
	The text has detailed description of the appearance, clothes and possessions.	Appearance, clothes and possessions not very detailed.	The text missing one or more elements (appearance, clothing or possessions)	No text about the picture.
	"have / has got" used correctly	Only a few errors with "have/has got"	Several errors using "have / has got"	Needs to revise the usage of "have/has got"
	No spelling errors	Only a few spelling errors	Many spelling errors	Needs to practice spelling more

Example questions:

1. Is your pirate wearing shoes or boots?
2. Has the pirate got a bandana under his hat?
3. Has your pirate got a compass or a spyglass?
4. Has the pirate got big circle earrings?

**Annex 2** - Treasure hunt (computer science – offline coding).

All coding resources needed for this session are in the Wakelet collection in Annex 2: treasure map with instructions and explanations, PDF with group tasks, word search printable for vocabulary review, and YouTube videos to use as explanation.

**Annex 3** – Pirate treasure chest maths:

Materials for this session include: a link to a Gynzy lesson and a PDF version of the slides and a link to the formative assessment quiz in Wordwall and a PDF printable version of the quiz questions with colour-coded solutions.

**Annex 4** – Financial literacy quiz.

Here you can find links to YouTube videos that you can use to explain economic concepts. There is also a link to quiz questions in Wordwall and a PDF printable of the same questions with colour-coded solutions.

**Annex 5** – Model for creating a Mentimeter poll.