Dream Space TV: The brAI_n_waves series for primary schools
The Dream Space TV: brAIn_waves series is a collaboration between RTÉ Learn and Microsoft Dream Space which aims to educate young people on the importance of understanding Artificial Intelligence (AI), from how it works and what is behind it, to its impact on us and why we should be learning about it. This series will provide hands-on lessons focused on developing AI literacy for all schools and the youth sector across the island of Ireland.

The brAIn_waves series for primary students (3rd – 6th class) is a two-part series which explores computational thinking, algorithms, data and how Artificial Intelligence works at a basic level. This will allow students to consider how technology works whilst also applying knowledge and skills from these areas within the hands-on lessons.

This educator guide provides a walkthrough of each episode. It also includes links to the new primary school framework, UNESCO K-12 AI curricula links, worksheets and additional teacher guidance where needed.
Dream Space TV: 

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Episode 1
In this episode, **We Are Learning To ...**

1. Think computationally 🎓
2. Look at algorithms and explain how they work 🤖
3. Collect data and look for trends 📈
4. Construct simple block-based coding programmes 🛠️

**Lesson Duration 🕒**

The lesson should take an **estimated one hour** to complete which includes (i) watching the episode, (ii) completing activities 1-3 and (iii) planning on what will be done for the closing activity.

The closing activity itself can be done in two parts: outside the classroom (data collection) and inside the classroom (coding the solution based on the example provided) which would take an additional 20 minutes to complete in another class. The closing activity worksheet will support you with this.

**Materials Needed 🎨**

- Worksheets provided in this teacher guide
- Pen/pencil and paper
- Access to an internet connected device (pair programming encouraged) – the website being used in this episode is [https://makecode.microbit.org](https://makecode.microbit.org)
UNESCO K-12 AI Curricula Framework

Knowledge:
Domain: Algorithms  Sub-domain: Computational thinking  Sub-domain: Algorithm definition and application  Sub-domain: Algorithm components and processes  Domain: Data literacy  Sub-domain: Data trends and collection

Skills:

Values:
Interest in ICT; Persistence/resilience/collaboration/respect

Primary Curriculum Framework Links

Key competencies in this episode: Being creative; being a digital learner; being mathematical; being a communicator and using language; being an active learner

Curriculum Areas and Subjects (stages 3 & 4): Science, Technology and Engineering Education; Mathematics
• Relationships, connections and patterns that surround us.
• Enable children to benefit from learning about and working with traditional, contemporary and emerging technologies.
• Use engineering design process...generate solutions to real-life problems through playful experimentation and investigation.
Lesson Procedure 🏰

1. **Computational Thinking Part One:** In the opening part of the episode, students are told what computational thinking is and the different parts of computational thinking we use.

There are **two activities** in this part (see worksheets provided):
- Activity One: Identify the pattern to open the chests
- Activity Two: 20 Questions (note for teachers: if you want to, you can ask students to base their ‘person’ or ‘place’ on a topic you are covering in school e.g. books we have read this year or Europe etc.)

2. **Computational Thinking Part Two: Algorithm Design**
During this part, students will be asked to take on an **activity** that involves them writing out an algorithm based on the provided options.

3. **Data collection:** In this part of the episode, we discuss the importance of gathering information or data to help us understand how we can solve problems. The students will watch Amanda and Corey collect data on the number of cars and car parking spaces available at Microsoft.

4. **Learning to use algorithms in code:** In this section, Amanda and Corey use pseudocode to write out the steps in the algorithm which will help them monitor how many car spaces are taken. They then move into MakeCode for micro:bit ([https://makecode.microbit.org](https://makecode.microbit.org)). Students should watch this part of the episode to see the connection between the planned code on the whiteboard and the MakeCode interface.

5. **Closing activity**
Review this activity with students and decide on (i) what data/information you want your class to collect and (ii) complete a counter in MakeCode using the demo in the episode for support.
**Coding** is when we use languages that computers can understand.

**Variables** are something that we create in the program to store information which can also be updated over time.

**Inputs** are how the program can take information in from the environment.
Episode One - Activity One: Unlock the chests
Circle the number that you think is the correct answer based on the pattern shown.

Episode One - Activity Two: 20 Questions
How to play the game:
- In your team of 3-4, nominate one person to think about a person or place.
- Questions can only return Yes/No answers.
- Other team members can ask this person up to 20 questions (keep track of this using by crossing off their question attempts as they go)
- You can only attempt to guess the what this person is thinking three times (keep track of this below also).
Episode One - Activity Three: Algorithm Design

I am going to write an **algorithm** for

__________________________________________________________________

Algorithm in steps:

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

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Episode One – Closing activity

Part One: Data Collection

I am going to collect data about:
______________________________________________________________
______________________________________________________________

The number of ______________ I counted was _______. Based on this data I think (what does that data tell you? Are there any problems to solve?)
______________________________________________________________
______________________________________________________________
______________________________________________________________
______________________________________________________________
______________________________________________________________

Part Two: Coding a counter in the micro:bit

The blocks below are jumbled up but will all be used to create a counter like Amanda and Corey did in Episode One. Can you use makecode.microbit.org to put the algorithm together properly to suit your challenge.
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Episode 2
In this episode, We Are Learning To ...

1. Explain what Artificial Intelligence (AI) means

2. List the components that make up Artificial Intelligence

3. Look for ways in which AI is used in everyday life

4. Label images to recreate how a machine learns

5. Discuss how bias might occur in data

Lesson Duration

The lesson should take an estimated one hour to complete which includes (i) watching the episode, (ii) completing activities 1-2 and (iii) starting the closing activity.

More time may be given if you want the closing activity completed in full (est. 1 hour 20 minutes). Or this could also be completed as homework to finish.

Materials Needed

- Worksheets provided in this teacher guide
- Pen/pencil and paper
- Access to an internet connected device (if possible, a device per student would work best with this episode) – the website being used is https://code.org/oceans
UNESCO K-12 AI Curricula Framework

Knowledge:
Domain: AI techniques
  Sub-domain: AI definitions & components
Domain: AI technologies
  Sub-domain: Computer and human perception
  Sub-domain: Understanding AI technologies
Domain: Applications of AI to other domains
Domain: Social implications of AI

Skills:
Topic area: AI techniques
Topic area: AI development
Topic area: AI applications
Topic area: Ethics of AI

Values:
Interest in ICT; Personal empowerment; Critical thinking and reflection; personal responsibility

Primary Curriculum Framework Links

Key competencies in this episode: Being an active citizen; being creative; being a digital learner; being a communicator and using language; being an active learner

Curriculum Areas and Subjects (stages 3 & 4):
Science, Technology and Engineering Education; Mathematics
  Relationships, connections and patterns that surround us.
  Enable children to benefit from learning about and working with traditional, contemporary and emerging technologies
  Use engineering design process...generate solutions to real-life problems through playful experimentation and investigation.
Lesson Procedure 🏖️

1. Artificial Intelligence (AI) in our everyday life: In the opening part of the episode, students are encouraged to think about what they know about AI already. You can choose to have a class discussion about this and/or you can use the worksheet provided to have students think about this alone first before sharing with the class.

2. Explaining Artificial Intelligence: Here, Amanda and Corey explain what AI is and the three components that are involved in it: Data, Algorithms and Machine Learning.

3. Examples of Human and Artificial Intelligence: Amanda and Corey compare and contrast these two things (some of which may have come up as part of activity one and your class discussion). In this section, the team are trying to link the examples back to the data, algorithm and machine learning aspects of the technology to enhance understanding.

4. AI for Oceans on code.org: In this section, Corey demonstrates the AI for Oceans activity found at https://code.org/oceans. Students will be undertaking this activity, so this is just a demo to support them with this task. As the teacher, you could go to this website first and watch the opening video together before allowing students to being the challenge themselves. Please encourage students to read the instructions carefully.

5. Closing activity: In this final section, Amanda and Corey will outline the worksheet provided for students which allows them to imagine the possible when it comes to a technology they could create to solve a particular problem.
Episode Two - Activity One: What I know about AI

Q.1 What is Artificial Intelligence?
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

Q.2 Where is it used?

Q.3 How do you think it works?
Episode Two – Closing Activity: Create your own technology

The specific problem I want to fix is...

One cause of our problem is...

A diagram/drawing for how this could look or work (if applicable):
The technology we will create:

A simple algorithm for how this could work: