Taighde Éireann
Research Ireland

Space Picnic; **Food and Taste in Space**

Classroom Resource Booklet

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Curious Minds/ESERO

Framework for Inquiry

THEME	Overall theme	
CURRICULUM	Strand:	
	Maths:	
	Strand Unit:	
	Curriculum Objectives:	
	Skills Development:	

ENGAGE		
THE TRIGGER	WONDERING	EXPLORING

INVESTIGATE			
STARTER QUESTION	PREDICTING	CONDUCTING THE INVESTIGATION	SHARING: INTERPRETING THE DATA / RESULTS

TAKE THE NEXT STEP		
APPLYING LEARNING	MAKING CONNECTIONS	THOUGHTFUL ACTIONS

Considerations for inclusion

REFLECTION	

Curious Minds/ESERO

Framework for Inquiry

THEME	**SPACE PICNIC;** FOOD AND TASTE IN SPACE
CURRICULUM	**Strand:** Living Things **Strand Unit:** Human Life/Human Life Processes/The Senses **Curriculum Objectives:** Develop a simple understanding of food and nutrition in space. **Skills Development:** Questioning, predicting, investigating, recording, observing, analyzing.

ENGAGE

THE TRIGGER	WONDERING	EXPLORING
Stimulus - A picnic basket and blanket displayed at the top of the room. Show pictures of various locations – beach, office, polar location, field and a park. Elicit the following from the pupils: 1. Where would you like to have a picnic and why? 2. Do environmental factors affect their senses and could/ would/do these factors play a part/ affect/alter our choice of picnic location? 3. Does location/temperature affect our sense of taste/ enjoyment of food? Introduce the possibility of having a picnic in Space? Would the above considerations the pupils discussed be an issue? What other considerations would need to be addressed to have a picnic in space. Elicit from the pupils what kind of food do astronauts at the ISS eat (e.g. fresh food, pre-packaged food etc.).	• Show a picture of astronauts eating together and elicit why this is important. (Social importance of meals & taking time to share a meal together is just as important in space as it is on earth.) • Why do you think astronauts eat the same type of food in space as they do on Earth? (For physical health; constraints on an astronaut's diet, need for exercise, calorie intake/ nutritional value/role in maintaining psychological health of astronauts ; food can be a reminder of home.) • I wonder where do astronauts get their food supplies from? Display an image of an astronaut in a supermarket as a stimulus. Brainstorm for ideas. Explain the role of an ATV. Play ESA clip detailing the contents of an ATV: https://youtu.be/7iI2FyLVXGo	Eating on the ISS: **Sorting Activity**: Invite pupils to examine and sort range of packaged foods. 1. Give pupils time to discuss the merits of the food stuffs' suitability for going to space, for the astronauts to eat. 2. Ask pupils to examine the labels and read what is added to make the food last longer? 3. What different types of food packaging are there? Why is the food packaged in that way? 4. How would you package your preferred foods to go space or on a long field trip? Display images of packaged food sent to the ISS – discuss the packaging and refer back to the foods the pupils sorted. • Play a clip of an astronaut discussing the importance of eating healthy in space: https://youtu.be/18TsNgHlapY • Display images astronauts with food floating around them. Elicit from the pupils, does weightlessness in Space affect taste? Brainstorm with the class. Video clip of eating in space: https://youtu.be/2jhYIG1f9cc: • Difficulties, how to adapt cooking, preparing a meal for making and eating dinner in space. • Use of water, heating it, how is this done? • Use of condiments e.g. ketchup, peanut butter, soy sauce, honey. How are they used? Why?

INVESTIGATIE

STARTER QUESTION	PREDICTING	CONDUCTING THE INVESTIGATION	SHARING: INTERPRETING THE DATA / RESULTS
1. How many taste buds does a child have? 2. What are the 4 flavours of taste on the tongue? 3. What does food taste like in space?	• Will I recognise all the flavours easily? • How will the food taste: flavour, temperature, texture. • Will being blindfolded and pinching my nose make any difference? Why might it make a difference? • Will some of the tastes make me feel sick? Is it like this in space? • Will I still taste the first flavour when I'm trying to figure out the next one? • Will we all feel the same taste/sensation from the samples? Why? Why not?	**N.B. Ensure that children with known allergies are accommodated and suitable food sample substitutions are made.** • Divide the students into Crews of Three – Crew Members A, B and C. • Crew Member A wears blindfolds and taste the food. Tasting samples are spoon fed to them, sample by sample by Crew Member B. • Crew Member C records A's observations on the Blind Tasting of Food Data Sheet. • Allow Crew Member A to put on blindfolds whilst Crew Members B take six cups, labelled Container 1 to Container 6. Crew Members C takes a data sheet and pencil.	Display the food data sheet on an Interactive white board/visualizer. Discuss the students' taste findings. • What did the investigation teach us about blind tasting? • Did not seeing the food make a difference? • Did not smelling the food make a difference? • Were some foods more easily recognised than others? Why? Why not? • Did it feel comfortable being blind-fed? • Do you think astronauts need training with space food? • Would you like to train as/to be an astronaut?

Considerations for inclusion

Essential that if a pupil has an allergy, appropriate steps are taken to substitute that food sample in the investigation.

Pupils will be divided up into mixed ability groupings for the lessons to promote peer learning.

Differentiated record sheets – inclusion of sentences starters and or images to act as writing aids.

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Framework for Inquiry

TAKE THE NEXT STEP

APPLYING LEARNING	MAKING CONNECTIONS	THOUGHTFUL ACTIONS

Applying Learning:

- Examine the results of the experiment by tallying the data and explore the data in terms of fractions, decimals and percentages. Present the data in graphical form and discuss the findings.
- Possible data to present; favourite/least favourite sample, number of sample predications the pupils guessed correctly/incorrectly, bitter/salty/sweet/sour food samples etc.

Making Connections:

- Pupils explore the concept of fluid shift and discuss how it impacts on the taste of food in space. Watch the video clip of Tim Peake discussing fluid shift. Pupils try to replicate the feeling of fluid shift in the investigation by tasting the food sample a third time under the following conditions; pupils put their heads between their legs for 30 seconds before tasting the food sample.
- ESA hopes these 9 basic ingredients will be able to be grown in greenhouses on Mars: rice, onion, tomato, soya, potato, lettuce, spinach, wheat and spirulina. Pupils design suitable packaging to send the above food types to Mars for the mission. Use the ESA – Living in Space page 'Meals for Martians' as an aid: https://www.esa.int/esaKIDSen/SEMQ8F1DU8E_LifeinSpace_0.html
  What will astronauts eat on Mars? The exploration of growing food in space could be linked to the Plants and animals strand unit of the Living things strand.

Thoughtful Actions:

- Reflect upon and discuss the difficulties associated with transporting food into space, maintaining a healthy and balanced diet for the astronauts in space, the ways in which astronauts must adapt their eating habits/diets.
- Implications of the pupil's findings for future missions to Mars and beyond.

REFLECTION

- Did I meet my learning objectives?
- What went well?
- How could it be improved?
- Ask the children would they change anything or do anything differently.
- Are the children moving on with their science skills?
- Are there cross curricular opportunities here?

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Feel like an astronaut!

People in space

time
55 minutes

Tip Carry out this activity in the gym.

learning outcomes
To:
- find out how an astronaut washes
- see how an astronaut eats breakfast
- know that an astronaut can sometimes feel sick
- feel weightless for a moment
- find out that it is difficult to work wearing astronaut's clothes
- know how an astronaut stops his or her belongings floating about
- consider whether he/she would like to be an astronaut

materials needed
- photograph of an astronaut's life (Appendix)
- photograph of astronauts eating (Appendix)
- 2 ski suits
- 2 pairs of gloves
- 2 helmets
- 2 nuts
- 2 bolts
- 2 chairs
- 2 ropes
- 2 spoons
- 2 plastic bags
- 2 small drink cartons (the sort that you need to squeeze to drink)
- wet face cloths
- office chair
- box to jump from (gym)
- landing mat (gym)
- flip chart
- felt-tip pens
- Velcro
- colouring pencils

Preparation

For the activity **An astronaut's life** you will need the photographs 'An astronaut's life' and 'Astronauts eating' from the Appendix. For the activity **You are an astronaut!** divide the gym into six sections. Prepare the resources for each activity.
For the activity **How does an astronaut eat breakfast?** place the ropes ready on the chairs so the children can tie themselves down.
For the activity **What does it feel like to work as an astronaut?** prepare the nuts and bolts that the children will need to screw together.
For the activity **How does an astronaut prevent his or her belongings from floating about?** stick a small piece of Velcro onto a collection of felt-tip pens. Attach the other side of the Velcro to the board. Make 24 copies of the picture of the astronaut from the end of this lesson and place them with this activity.

An astronaut's life 10 min.

Tell the story of Andy the Astronaut on the following page. While you are telling the story show the photographs of the various activities on the discussion sheet and from the Appendix.

Andy wakes up. He's lying in his sleeping bag. He wants to get up, but first he has to undo his safety belts. He is 'hanging' on the wall. Andy goes to wash himself. There isn't a shower. He washes himself using a wet facecloth. Andy gets dressed. First of all he puts on his overalls. Now he is ready for breakfast. He fastens himself to a chair. He drinks from a carton. If he was to try drinking from a glass, the drink would float away. Andy wants something to eat as well. He uses a spoon to get some food out of the plastic bag. He has to put it in his mouth quickly before it floats away. Andy feels a little sick. He's suffering from space sickness. That's because he's in a weightless environment. Gravity has basically no effect on the space station, which is why he is floating around. Even though Andy isn't feeling very well, he still has work to do. He pulls on his space suit and gloves and puts on his helmet. Now he's ready to go outside the space station. He uses his tools to fasten a nut and bolt. He has practised this many times before, so it isn't difficult. He writes down what he has done. To do this he has to get a pen. The pen is stuck to the wall using Velcro. When he has finished he uses the Velcro to stick the pen back onto the wall. If he didn't do this, the pen would float away. It takes some getting used to, but Andy is glad he became an astronaut!

The children learn about what it is like to be an astronaut.

Pretend you're an astronaut! 30 minutes

Organise the children into groups of four. Assign each group to a different activity. Explain that they are going to imagine what it is like to be an astronaut. They need to ask themselves the following questions:

- How does an astronaut wash?
- How does an astronaut eat breakfast?
- How does an astronaut feel?
- How does it feel to be weightless?
- How does it feel to work as an astronaut?
- How does an astronaut stop his belongings from floating about?

Good to know. In reality an astronaut wears overalls inside the spaceship. He only puts on his spacesuit and helmet if he has to go outside on a spacewalk.

All the groups begin their first activity. After five minutes each group moves on to the next activity, so that by the end of the lesson they have taken a turn at everything. Take care during the activity **How does an astronaut feel?** that the children do not get spun around too much. You do not want them to really feel sick.

How does an astronaut wash?
The children take turns washing their face with a wet face cloth.

How does an astronaut eat breakfast?
The children take turns to tie themselves to a chair. Explain that during this activity the children will only be pretending to eat and drink, not really eating and drinking. The child 'drinks' from the carton and uses the spoon to 'eat' from the plastic bag. They have to be quick or all the food will float away!

How does an astronaut feel?
One child sits on a revolving office chair with their eyes shut. Another child turns the chair round a few times. Stop the chair.

How does it feel to be weightless?
The child jumps from a box onto a landing mat. This enables them to experience a brief moment of weightlessness.

How does it feel to work as an astronaut?
The child puts on a ski suit, gloves, and helmet. The child screws the nut onto the bolt. Then they unscrew it again. When they have finished they take off the clothes.

How does an astronaut stop his belongings from floating about?
The children colour the astronaut on the worksheet. They can use different colours for this. Every time they have finished with a felt-tip pen they must stick it back on the Velcro. Ask them to write their name on their worksheet and leave it in a safe place while they complete the rest of the circuit.

Take the children back to the classroom. Hand out the worksheets.
The children complete Tasks 1 and 2 on the worksheet.

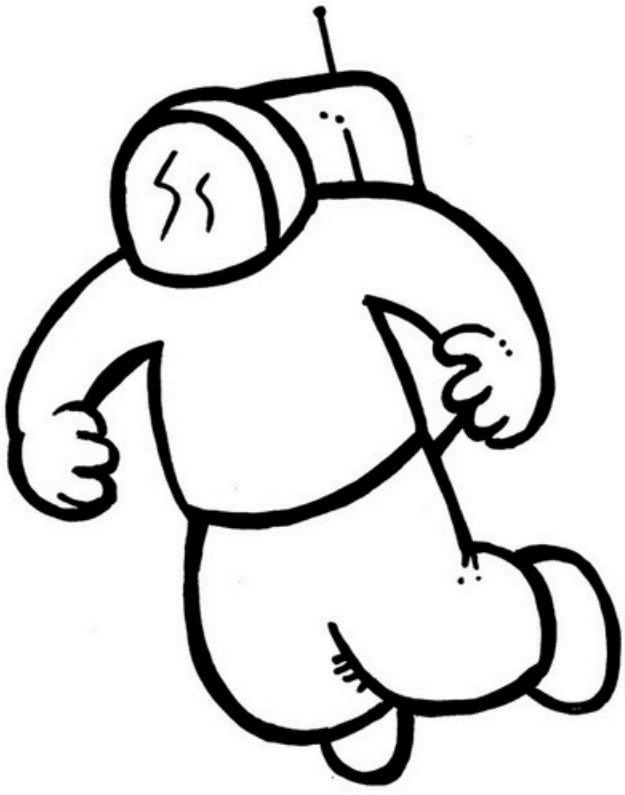
Who wants to be an astronaut? 15 min.

Sit in a circle with the children. What did they think about the activities?
Discuss the various activities, using the completed worksheets.

Ask the following questions:
- Did the children enjoy washing using a wet cloth?
  Would they miss being able to take a normal shower?
- How did they feel about having to eat their breakfast quickly out of a plastic bag and drink from a carton? Would they be able to keep tying themselves down so they wouldn't float away?

- What is it like to feel sick? Would they be able to cope with feeling sick for days on end?
- How would they like to feel weightless all day long?
- Is it difficult to work wearing an astronaut suit?
- How would they feel about having to always take everything they wanted to use from the wall and having to stick it back straight away?

Would the children like to be an astronaut? Encourage them to share their reasons with the class.
Have they changed their mind since the beginning of the lesson?



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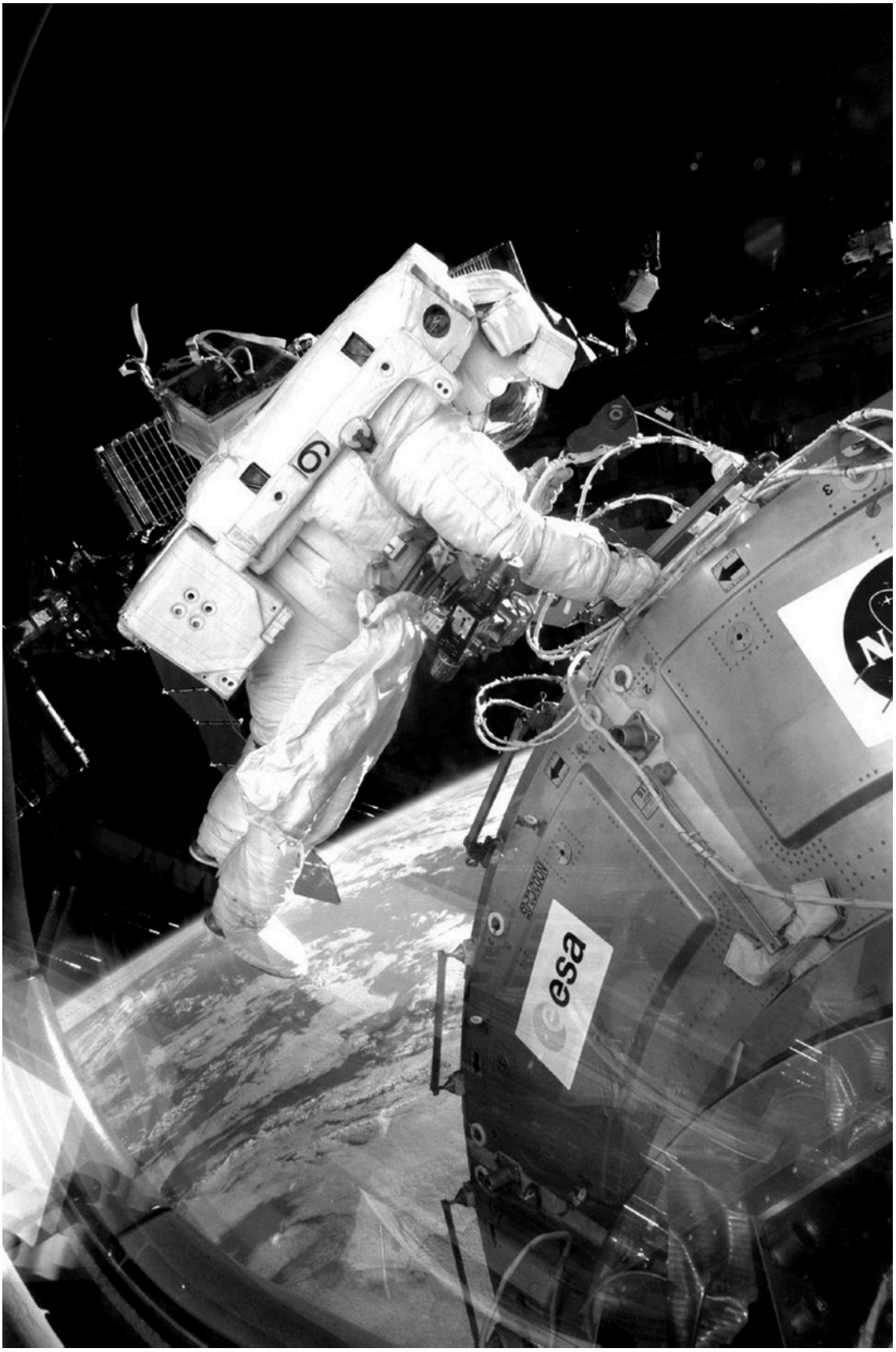
discussion sheet



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Feel like an astronaut!

1 You are an astronaut!

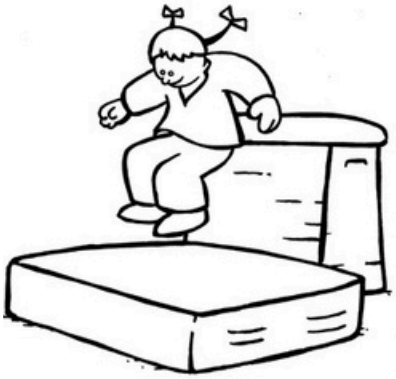
What do you like about being an astronaut? And what don't you like?

like / don't like

like / don't like

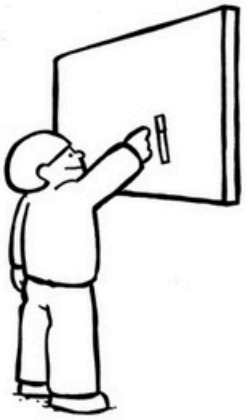
CIRCLE what you like / don't like

like / don't like



like / don't like

like / don't like



like / don't like

2 Who wants to be an astronaut?

Would you like to be an astronaut? **yes / no**

Astronauts eating · LESSON 38

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SPACE PICNIC

Food and Taste in Space Data Sheet

Name of the taster:

Food Sample	With nose closed Taste description	With nose closed intensity (0-10)	With nose open Taste description	With nose open intensity (0-10)	Identified food? (Yes/No)
Container 1					
Container 2					
Container 3					
Container 4					
Container 5					
Container 6					

Name of the taster:

Food Sample	With nose closed Taste description	With nose closed intensity (0-10)	With nose open Taste description	With nose open intensity (0-10)	Identified food? (Yes/No)
Container 1					
Container 2					
Container 3					
Container 4					
Container 5					
Container 6					

MATERIALS NEEDED FOR SPACE PICNIC

Food and Taste in Space Frameworks

Food packaging sorting activity

Choose from a wide selection of food, including fresh, canned, or packaged in various materials such as foil or plastic.
For example, you could use:

- Tomatoes in different states (fresh, canned, tubes of puree)
- Fresh fruit/vegetables
- Juices in small cartons/bottles
- Condiments like ketchup, salt, pepper, sugar, jam and honey in sachets
- Canned /packet soup
- Rice/noodles
- Muesli bars and cookies in different packages
- Wraps/pitta bread

Tasting investigation

The below items are necessary per group:

- 6 covered containers with food items labelled 1-6 (make sure pupils are not aware of the contents and that they do not smell the food).
- Each container should contain the same amount of food sample in each
  - Container 1 – applesauce
  - Container 2 – mushroom soup
  - Container 3 – blueberry/raspberry yoghurt
  - Container 4 – Black coffee (can be decaffeinated) or grapefruit
  - Container 5 – Chocolate drink
  - Container 6 – Orange juice
- 3 plastic spoons – one for each crew member
- Blindfold
- Swimming nose clip
- Data sheet & pen for recording investigation results.

Additional Online Resources

Video links used in the framework

- Contents of an ATV sent to the International Space Station https://youtu.be/7iI2FyLVXGo
- Astronaut discussing the importance of eating healthy in space https://youtu.be/18TsNgHlapY
- Cooking with Astronauts: The Great British Space Dinner https://youtu.be/2jhYIG1f9cc
- ESA – Living in Space page ‘Meals for Martians’ https://www.esa.int/esaKIDSen/SEMQ8F1DU8E_LifeinSpace_0.html

Other useful links

- ESA Teachers Corner Classroom Resources – International Space Station http://www.esa.int/Education/Teachers_Corner
- ESA astronaut Samantha Cristoforetti Cooking on the ISS https://www.youtube.com/watch?v=4exaXdPKS3Y
- Does the Food in Space have a strong taste? Tim Peake https://www.youtube.com/watch?v=AjbLJKuWph8
- Heston Blumenthal Summary Cooking with Astronauts https://www.youtube.com/watch?v=2jhYIG1f9cc

Curious Minds/ESERO

Framework for Inquiry - Promoting Inclusion

SPECIAL EDUCATION SUPPORT SERVICE
building on ability

When planning science activities for students with Special Educational Needs (SEN), a number of issues need to be considered. Careful planning for inclusion using the framework for inquiry should aim to engage students in science with real purpose. Potential areas of difficulty are identified below along with suggested strategies. This list is not exhaustive, further strategies are available in the Guidelines for Teachers of Students with General Learning Disabilities (NCCA, 2007).

ENGAGE

POTENTIAL AREA OF DIFFICULTY	STRATEGIES
Delayed language development/poor vocabular y/concepts	• Teach the language of science demonstrating meaning and/or using visual aids (material, property, strong, weak, textured, dimpled, absorbent, force, gravity). • Have the student demonstrate scientific phenomena, for example gravity —using 'give me, show me, make me,' as much as possible. • Assist the student in expressing ideas through scaffolding, verbalising a demonstration, modelling. • Use outdoor play to develop concepts.

INVESTIGATE

POTENTIAL AREA OF DIFFICULTY	STRATEGIES
Fear of failure/poor self-esteem/fear of taking risks	• Model the speculation of a range of answers/ideas. • Repeat and record suggestions from the students and refer back to them.
Understanding Time and Chronology	• Practice recording the passing of time, establish classroom routines that draw the students' attention to the measurement of time. • Teach and practice the language of time.
Fine/Gross Motor Difficulties	• Allow time to practice handling new equipment. • Allow additional time for drawing diagrams, making models etc. • Give students the option to explain work orally or in another format.
Short Term Memory	• Provide the student with visual clues/symbols which can be used to remind him/her of various stages of the investigation.

TAKE THE NEXT STEP

POTENTIAL AREA OF DIFFICULTY	STRATEGIES
Developing Ideas	• Keep ideas as simple as possible, use visuals as a reminder of earlier ideas. • Discuss ideas with the whole group. • Repeat and record suggestions from students and refer back to them. • Encourage work in small group and in pairs.
Communicating Ideas	• Ask students to describe observations verbally or nonverbally using an increasing vocabulary. • Display findings from investigations; sing, do drawings or take pictures. • Use ICT: simple written or word-processed accounts taking photographs, making video recordings of an investigation.

REFLECTION

- Did I take into account the individual learning needs of my students with SEN? What differentiation strategies worked well?
- Did I ensure that the lesson content was clear and that the materials used were appropriate?
- Was I aware of the pace at which students worked and the physical effort required?
- Are there cross curriculum opportunities here?
- Are the students moving on with their skills? Did the students enjoy the activity?

More strategies, resources and support available at **www.sess.ie**

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Curriculum Links

SPACE PICNIC; FOOD AND TASTE IN SPACE

English / Irish

- English – A day a life of an astronaut/Going outside the ISS to do repairs.
- English/Gaeilge- Menu Writing-The Great British Space Dinner- Heston Blumenthal.
- Write instructions for eating food /storing food and cooking on the ISS.
- Gaeilge- Dialann lae: Conas a chaith mé lá ar an ISS le mo chara Tim Peake.
- Filíocht – Dán a scríobh faoi bheith i do Spásaire ar an ISS.
- Keep a diary of your time on the ISS.
- An application for a job as an astronaut.
- Write a letter to the ESA for information about their latest missions.
- Newspaper report about life on Mars.
- An Interview with Tim Peake/Chris Hadfield about their stay on the ISS.
- List the items delivered to the ISS from the ESA support ferry ATV, (Automated Transfer Vehicle)- Georges Lemaître.
- Write a film review of the film Alien Planet (a film by George Lucas).
- Poetry – Looking back down to Earth - I'm having a look around.

SESE

- Geography – Study the Solar System- The planets, investigate plants, need for water for all life.
- History – Time lines, Inventors, Engineers, Scientists, history of the World, 1st Moon landing, history of the ISS, history of Satellites, history of space travel.

The Arts

- Drama – The Great Clean Up in Space - Who hid my tooth-brush? Pupils in groups role play the astronauts cleaning the ISS. During the clean up one of the astronauts accidentally misplaces their fellow astronauts toothbrush.
- Drama – Being an Astronaut on the ISS/Walking on the Moon/Landing on Mars.
- Art – Shadow portraits, 3D rockets, Design and make the ISS/ a satellite/a Mars lander-Schiaparelli/ Rosetta/Hubble telescope using recyclable materials.
- Art – A view from my window on the ISS.
- Art-Design a menu for the crew on the ISS.
- Draw and design a comic strip illustrating your adventures on the ISS/Mars/Moon/Landing on a Comet.
- Music & Art - The Planets by Gustav Holst, Listening and Responding/ Composing.
- Music – Listening Responding to John Williams- Music from Star Wars/ET.
- Music – Listening Responding to John Adams –Short ride in a Fast Machine.
- Music & Art - The Planets by Gustav Holst, Listening and Responding/ Composing.

SPHE & PE

- SPHE – Healthy eating, Looking after themselves, exercise, teeth.
- PE – Mission X- exercising on the ISS: http://trainlikeanastronaut.org
- PE- Zero gravity training – high intensity training.

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