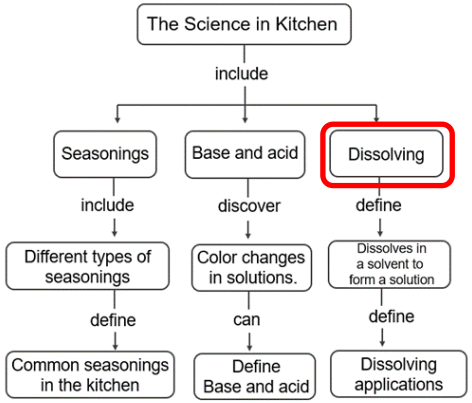
國小自然領域教學研究中心

第二屆國小自然科學實驗雙語教學影片製作競賽

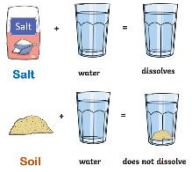
<table>
<tr><td colspan="2">領域/科目
Subject</td><td>Science</td><td>設計者
Designer</td><td></td></tr>
<tr><td colspan="2">單元名稱
Unit</td><td colspan="3">認識溶解 Dissolving</td></tr>
<tr><td colspan="5">設計依據</td></tr>
<tr><td colspan="2"></td><td>學科領域 (content)</td><td colspan="2">英語文 (language)</td></tr>
<tr><td rowspan="2">學習
重點</td><td>學習表現
Students' performance</td><td>tr-Ⅱ-1 能知道觀察、記錄所得自然現象的結果是有其原因的，並依據習得的知識，說明自己的想法。
pe-Ⅱ-2 能正確安全操作適合學習階段的物品、器材儀器、科技設備及資源，並能觀察和記錄。
ah-Ⅱ-1 透過各種感官了解生活週遭事物的屬性。</td><td colspan="2">語言能力 (聽)
1-Ⅱ-7 能聽懂課堂中所學的字詞。
1-II-10 能聽懂簡易句型的句子。
語言能力 (說)
2-Ⅱ-4 能使用簡易的教室用語。
語言能力 (讀)
3-II-2 能辨識課堂中所學的字詞。
學習興趣與態度
6-II-2 積極參與各種課堂練習活動。</td></tr>
<tr><td>Learning focus</td><td>學習內容
Learning content</td><td>INe-Ⅱ-3 有些物質溶於水中，有些物質不容易溶於水中。</td><td colspan="2">Ac-Ⅱ-2 簡易的生活用語。</td></tr>
<tr><td colspan="2">核心素養
Core competency</td><td colspan="3">自-E-A1 能運用五官，敏銳的觀察周遭環境，保持好奇心、想像力持續探索自然。
自-E-B1 能分析比較、製作圖表、運用簡單數學等方法，整理已有的自然科學資訊或數據，並利用較簡單形式的口語、文字、影像、繪圖或實物、科學名詞、數學公式、模型等，表達探究之過程、發現或成果。
自-E-C2 透過探索科學的合作學習，培養與同儕溝通表達、團隊合作及和諧相處的能力。</td></tr>
<tr><td colspan="2">議題融入
Issue integration</td><td colspan="3">□人權教育 □環境教育 □海洋教育 □品德教育 □生命教育
□法治教育 □科技教育 □資訊教育 □能源教育 □安全教育
□防災教育 □閱讀素養 □國際教育 □家庭教育 □原住民教育
□戶外教育 □多元文化教育 □性別平等教育 □生涯規劃教育 ■無</td></tr>
</table>

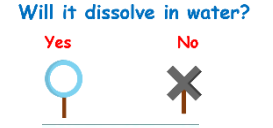
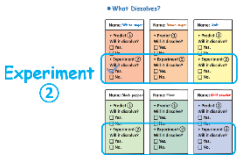
與其他領域/科目的連結 **Connections to other subjects**	□音樂　□體育　□藝術 □社會 □科技　□生活 □綜合活動　□健康與體育　□其他：_____
教材來源 Materials **參考資料 References**	111 南一版 自然科學 3 (下) page 111-113

<table>
<tr><td>教學設備/資源
Teaching aids/equipment</td><td colspan="2">Teacher's materials: Power point slides, cups, stirring rods, solute (salt, white sugar, brown sugar, black pepper, chili powder), worksheet
Students' materials: pencils</td></tr>
<tr><td>*學生背景
Students' Background</td><td colspan="2">Students are introduced to the concept of dissolution for the first time.</td></tr>
<tr><td rowspan="6">學習目標
Learning Objectives
(請編號)</td><td>學科領域 (Content)</td><td>英語文 (Language)</td></tr>
<tr><td rowspan="5">Students will be able to:
C1 Recognize the concept of dissolution.
C2 Understand that some substances are easily dissolved in water, while others are not.
C3 Identify what kinds of seasonings will easily dissolve in water.</td><td>Language of learning</td></tr>
<tr><td>Students will be able to:
L1 Which ones dissolve in water? White sugar, brown sugar, and salt.
L2 Which ones does not dissolve in water? Black pepper, flour, and chili powder.</td></tr>
<tr><td>Language for learning</td></tr>
<tr><td>教師用語 For teachers
L3 Use visual aids, such as pictures, realia, gestures, demostration, to support students' understanding when explaining the learning activities. For example, "Does it dissolve in water?", "Did it dissolve in water?"</td><td>學生用語 For students
Students will be able to:
L4 Use visual aids, such as pictures, realia, teacher's gestures, as comprehension strategies to support learning. For example, "White sugar dissolves in water.", "Check yes or no."
L5 Share their ideas, ask for help, or clear up confusion. For example, "Did flour dissolve in water?", "Can you help me?"</td></tr>
<tr><td>Translanguaging</td></tr>
</table>

		L6 Students can answer questions in Chinese, and then teacher paraphrases in English. L7 Students can use Chinese to explain what the teacher just said. L8 Teacher can ask questions in Chinese to check students' comprehension.
情境脈絡 **（文化/社區/公民實踐）**	Curriculumn Diagram: This lesson plan explores "dissolving"  	

教學活動設計　Classroom Procedure	
教學重點及學科概念說明 Main Points of Teaching	
學科領域 (Content)	**英語文 (Language)**
1. Explore the definition of dissolution. 2. Investigate that some substances are easily dissolved in water, while others are not. 3. Identify what kinds of seasonings will easily dissolve in water.	1. Understand the instructions of the project by using the visual aids and non-verbal clues. 2. Understand the key words including dissolve and the common seasonings in the kitchen.

學習目標 Learning objectives	**教學活動 Teaching activities**		**教學設備/資源 Teaching Aids/equipment**	**時間(分) Time**	**評量 Evaluation**
	中文 (In Chinese)	英語文 (In English)			
C1 L3	1. 引起動機 -教師詢問學生是否品嚐過玉米濃湯及紅豆湯 -教師給予問題請學生思考為什麼玉米濃湯會有鹹味，以及紅豆湯會有甜味 - [迷思概念] 教師引出學生對於溶解的迷思概念 (溶解與融化)	**Warm-up** - The teacher asks the students if they had tasted corn soup and red bean soup. - The teacher asks the students to think about why the corn soup has a salty taste and the red bean soup has a sweet taste. -[Misconception] The teacher introduces the students to the misconception about dissolution (dissolving and melting).	powerPoint slides   cups, soil, salt, PowerPoint slides, stirring rods	5 mins	Oral evaluation- Students are able to answer the questions and share their experiences.
C1 L1 L2 L3 L4	2. 發展活動 ➢ 實際觀察 -教師請學生以土壤和食鹽進行實驗，並觀察兩杯水中的變化，並帶出溶解的操作型定義 -教師呼應引起動機之問題，並破除	**Follow-up activity** ➢ **Observation** - The students observe how the soil and salt will be changed in two cups of water. The purpose of this experiment is to introduce the definition of dissolution- Teacher		33 mins	In class participation- Students listen carefully and follow the steps, observe the results while doing the experiment.

C2 L5 L6 L7 L8	學生對於溶解的迷思概念 (溶解與融化) ➢ POE 教學法 -教師將六種廚房中常見調味料繪製成表格，並詢問學生其是否會易溶解於水中，以及其推測原因 ➢ 複習舊經驗 -教師詢問學生是否仍記得上一堂課操作量匙的經驗 ➢ 進行探究實驗 -學生分組完成溶解探究實驗，並將所觀察的實驗結果紀錄在學習單表格中 ➢ 說明 -教師將學生的實驗結果紀錄於表格中，並請學生比較推測與實際實驗之結果，能解釋其中之差異	responds to warm-up questions and rectify students' misconception about dissolution (dissolving and melting). **POE teaching method** - The teacher will gather six common kitchen seasonings and will ask the students whether they think each seasoning will dissolve easily in water. The students discuss the dissolving reasons. **Review previous lessons** - The teacher asks the students to recall if they still remember how to take seasonings by using a measuring spoon in the previous lesson. **Experiment** - The students are able to complete the experiment on dissolution in groups, and they can write down the results in a worksheet. **Explanation** - The teacher records the students' experimental results in a table and asks them to compare the predictions with the experimental results and provide explanations for any differences.	 worksheet white sugar, brown sugar, salt, flour black pepper, chili powder, powerpoint slides      		In class participation- Students are paying attention by looking at the teacher and listening carefully when their classmates are talking. Worksheet- Students are able to complete the worksheet by writing the prediction part. Experiment-Students are able to follow the steps and complete the experiment by teamwork. Worksheet- Students are able to complete the worksheet by writing the experiment part.

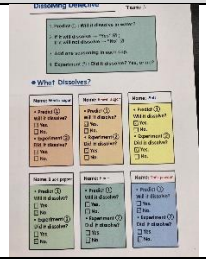
C3	➢ 歸納實驗結果 -教師補充並歸納實驗 ➢ 統整活動 -教師歸納統整並以簡報上之調味料評量學生對於溶解之概念 -教師總結溶解之概念 -教師引出下一節課對於固定水溫及水量，物質是否能無限制溶解之問題，請學生於下課時先進行思考推測	**<u>Summarize the experiment results.</u>** -The teacher summarizes the results. **<u>Wrap up</u>** - The teacher summarizes concepts of dissolution with the seasonings in the presentation. - The teacher introduces the next lesson. Students are encouraged to think about it before next class.	 powerpoint slides  	2 mins	Oral evaluation- Students are able to explain the differences between prediction and experiment results. In class participation- Students listen carefully and can correctly raise the dissolving signs. Oral evaluation- Students are able to answer the questions and share their ideas.

附件（教具、學習單、實驗器材）

附件 1 教學影片 Teaching Video

https://sites.google.com/view/bilingual-science-video/%E9%A6%96%E9%A0%81

附件 2 教具 Teaching Aids

		
Cups and seasonings	Worksheet	Yes and no sign

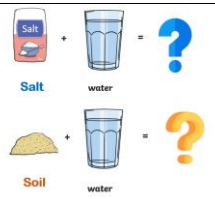
附件 3 教學簡報 Powerpoint slides

1

2

3

4



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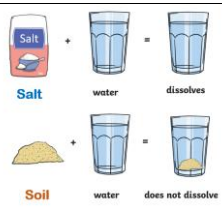

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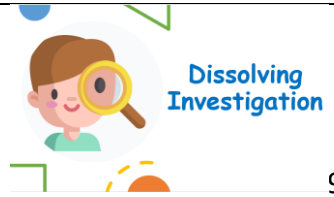

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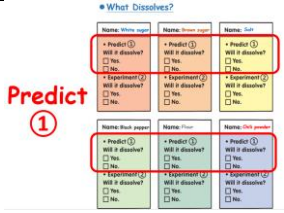

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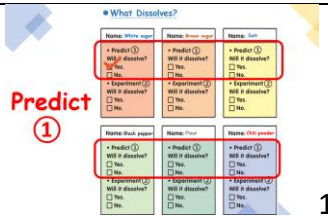

12

Will it dissolve in water?

Yes

No

13

100 c.c.

100 c.c.

100 c.c.

100 c.c.

100 c.c.

100 c.c.

14

Sugar

Brown sugar

Salt

Black pepper

Flour

Chili powder

15

100 c.c.

16

17

Experiment ②

18

Sugar

Brown sugar

Salt

Black pepper

Flour

Chili powder

100 c.c.

19

Did it dissolve in water?

Yes

No

20

Let's review it!

21

Did it dissolve in water?

Yes

No

22

Did soil dissolve in water?

No

23

Did White sugar dissolve in water?

Yes

SUGAR

24

Did brown sugar dissolve in water?

Yes

SUGAR

Brown Sugar

25

Did salt dissolve in water?

Yes

SALT

26

Did black pepper dissolve in water?

No

27

Did flour dissolve in water?

No

FLOUR

28

Did chili powder dissolve in water?

No

29

dissolve

NOT dissolve

Brown Sugar

30

Does salt dissolve in water?

SALT

31

100 c.c.

Salt

???

32