

SAN01_MÒDUL 07_OPERACIONS BÀSIQUES DE LABORATORI
UF2 NF1 Activitat N°3 Mixing solids

Type of activity: Compounding pharmaceutical at the laboratory	Topic: Mixing solids; Geometric dilutions
Grouping: Groups of two or three students.	Resources: 1. Student document: Protocol "Mixing solids" 2. Student grammar support: verb tenses. 3. Teacher answer key: Solutions mixing solids. Videos for teachers; to know more 4. Teacher grammar support – answer key 5. New terminology template 6. COM
Timing: 90'	Outcomes: At the end of the practice, students will be able to calculate the amounts of the different reagents, report values with the correct number and prepare pharmaceutical products employing the appropriate technique and lab equipment.

The **aim** of this activity is to prepare a pharmaceutical product using all security measurements and applying the quality protocol, while promoting collaborative behaviours.

Directions:

Notice that all of the verbs in these sentences are showing actions that are happening right now (imperative, simple present) or in the future.

1. In today's lesson, we are going to synthesize a pharmaceutical product (pharmaceutical compounding).
2. Make sure that the students know how to use the lab equipment. Also, workplace security awareness and the importance of keeping the laboratory clean, neat, and tidy every time should be made clear.
3. Hand out the student's document (mixing solids; Geometrical dilutions) and distribute the laboratory's reagents and material. Then, read the document and test student understanding.
4. The mixing solid's practice ends when the mixture has an even colour. Then, each group has to weigh their final product on the balance and get their practice's result.
5. It is important to fill in the new terminology template for further feedback.
6. Pay attention to the grammar support to review verb tenses. Correct as a whole group.
7. Finally, all together, compare results and make conclusions.
8. As a whole group, fill in the new terminology template during the course of the lesson for further feedback.

1. STUDENT DOCUMENT. PROTOCOL "MIXING SOLIDS" GEOMETRICAL DILUTIONS

Protocol Mixing solids

In today's lesson, we will generate (synthesize) a pharmaceutical product (pharmaceutical compounding). **We are going to combine fine powders of unequal amounts** to ensure equal distribution. **The process involves combining the products slowly in small portions at a time.**

Remember that everyone must keep all of her/his books, bags and jackets in the wardrobe closets and hanging closets. While in the lab, **we are going to wear lab coats, as usual.**

You have worked in the lab throughout this academic year and, you know the success depends on the participation of all of the group's members. While the lesson's going on, **the teacher evaluates whether you:**

- I. Cooperate with your peers.
- II. Share the responsibility of decision making.
- III. Solve problems among yourselves, and deal with conflicts of ideas.

The teacher provides you with the laboratory's reagents and material.

The teacher is going to read this document. Notice that the key words of this document were written on the whiteboard before class began.

The mixing solid's practice ends up when the mixture has regular colour. Then, each work group has to weigh their final product on the balance and get their practice's result.

Read the instructions of geometric dilutions and prepare the reagents and material on the lab work surfaces

Mixing solids: geometric dilutions

I- Reagents:

- Lactose or Glucose 28 g
- Talc.....1g
- Magnesium Stearate7 g
- Riboflavin c.s.p.

II- Material:

- Auxiliary weight
- Digital balance
- Spatula
- Mortar and pestle

III-Procedure:

1. Weigh all the reagents and identify in each auxiliary weigh recipient.
2. Mix one gram of talc with one gram of magnesium stearate in the mortar.
3. Add a little bit of Riboflavin and mix with the pestle since the complete homogenization – riboflavin colour will help us.
4. Add to the mortar the same weigh that there is – 2 grams of magnesium stearate.
5. Make uniform the sample with the pestle.
6. Add the same weigh that there is - 4 grams of magnesium stearate.
7. When the 8 grams of the sample at the mortar made uniform, add 8 grams of the next excipient, lactose.
8. Make uniform the 16 grams and then add the rest of the lactose.
9. Weigh the final sample and answer the activities.

IV-Precautions:

Be careful while you're working with the balance, keep it clean every time. If you accidentally drop any substance on the balance, switch it off before cleaning it. Remember to tare the balance before each weight.

V- Results and conclusions:

1. Calculate the % of weight your work group has lost during the Geometric dilution process.

Initial Regent	Lactose	Magnesium stearate	Talc
Weight (g)			

Initial weight (g)

Final weight (g)

Weight lost (g)

Weight lost %

2. Copy the class results into your notebook and determine the most efficient procedure.

Group	1	2	3	4	5	6
Initial (g)						
Final (g)						
Weight lost (%)						
Efficiency (%)						

3. Look at your colleges' product of *Geometric dilution* and discuss the result of each one. How is the most homogeneous result? Is it the same than the most efficient?

2. STUDENT GRAMMAR SUPPORT. VERB TENSES

The aim of this session is to review and practice the verb tenses.

Follow teacher's instructions and complete the charge bellow:

Verb tenses	Uses	Examples
Present simple		We mix the solids
Present continuous		We are mixing the solids at this moment
Going to		We are going to prepare a pharmaceutical compounding
Imperative		You have to obtain a homogeneous compound

Review:

1. Read again the introduction displayed in "**student document. Protocol mixing solids**". Notice that some sentences are written in bold. Identify the verb and write down the verb tense used: *present simple, present continuous, past simple, present perfect and simple future tense.*

Ex: You compare results → **Present simple**

2. Fill the gap with the correct verb tense.

- a) When Stephen _____ (arrive) home, Jennifer _____ (watch) television.
- b) I _____ (prepare) dinner when the telephone _____ (ring).
- c) What _____ (you do) when the postman _____ (arrive)?
- d) Kimberly _____ (learn) to drive when she _____ (work) in London.
- e) Where _____ (you sit) when the show _____ (begin)?
- f) I _____ (visit) Athens while I _____ (tour) Greece.
- g) It was when he _____ (cross) the street that John _____ (fall).
- h) What _____ (you see) while you _____ (wait) for the bus?
- i) Where _____ (you go) when your car _____ (break) down?
- j) Annie _____ (meet) Josh when she _____ (walk) in the park.

3. TEACHER ANSWER KEY

The **key words** of the student document: Protocol "mixing solids are:

Powders	Mixture to obtain a homogenous colour
Unequalamounts	Lab coats
Wardrobeclosets	Make uniform
Reagents	Geometrical dilutions

Solutions mixing solids

1. Calculate the % of material your work group has lost during the practical.

There are as different results like groups, the teacher has to remember how to calculate % and review each group solution. For example:

Group	1
Initial (g)	36,06
Final (g)	34,52
Weight lost	1,54 g →5,62%

2. Copy the class results in your notebook and determine the most efficient procedure.

For example:

Group	1	2	3	4	5	6
Initial (g)	36,06	35,94	36,11	36,09	36,21	36,00
Final (g)	34,52	34,18	35,82	35,71	35,85	35,85
Weight lost (%)	4,23%	4,90%	0,82%	1,05%	0,99%	0,42%
Efficiency (%)	95,73	95,10	99,20	98,95	99,01	99,58

The most efficient, how less product has lost during the process was the group 3 with only 0,82 % material lost and 99,20 % of efficiency.

3. Look at your colleges' product of Geometric dilution and discuss the result of each one. How is the most homogeneous result? Is it the same than the most efficient?

The most homogeneous could be distinguished looking at all geometric dilutions together. Look at the examples: Figure 1 and 2 from the video “*Compounding tips: Geometric dilutions*”



Fig. 1 Not very homogeneous mixture

Fig. 2 More homogeneous mixture

TO KNOW MORE

If you want to know more about protocol Geometric dilutions and how to use an electronic balance, check these links:



[Compounding tips: Geometric dilutions](#)

[Using an electronic balance:](#)

4. TEACHER GRAMMAR SUPPORT - ANSWER KEY

In this section, the teacher reviews some verb tenses. There are some videos displayed in this document to help you on this matter. After this complete the activity “*Students grammar support*”

TO KNOW MORE

If you want to know more about the following verb tenses check these links.



[Simple present](#) - [Present Progressive](#) - [Simple past](#) - [Present perfect](#) - [Simple future](#)

Solutions students' grammar support; review

1. Read again the introduction displayed in “**student document. Protocol mixing solids**”. Notice that some sentences are written in bold. Write down the verb tense used next to each sentence: present *simple, present continuous, past simple, present perfect and simple future tense*.
 - a) We **are going** to combine fine powders of unequal amounts → *going to*
 - b) The process **involves** combining the products slowly in small portions at a time → *present simple*
 - c) We **are going** to wear lab coats, as usual → *going to*
 - d) The teacher **evaluates** you → *present simple*
 - e) The teacher **provides** you with the laboratory's reagents and material → *present simple*
 - f) The teacher **is going to** read this document → *going to*
 - g) The mixing solid's practice **ends** up when the mixture has regular colour → *present simple*
 - h) Each work group **has to weigh** their final product on the balance → *imperative*
 - i) Each work group **has to get** their practice's result → *imperative*
2. Fill the gap with the correct verb tense.
 - a) arrived - was watching
 - b) was preparing - rang
 - c) were you doing - arrived
 - d) learnt/learned - was working
 - e) were you sitting - began
 - f) visited - was touring
 - g) was crossing - fell
 - h) did you see - you were waiting
 - i) were you going - broke down
 - j) met - was walking

6. BIBLIOGRAPHY

Supplementary documentation considered: catalogues, articles, instructions, photographs, audios, and videos, pages of reference websites, documents, graphics, and links to similar documents

Imatge	Dades
	<p>Nom: Operaciones básicas de laboratorio</p> <p>Autoria: A. Tomás, A. Cabedo, M. Soldado i M. Pastor</p> <p>Llicència:</p> <p>URL: https://www.sintesis.com/sanidad-245/operaciones-basicas-de-laboratorio-ebook-2188.html</p>
Imatge	Dades
	<p>Nom: Easy Pace Learning is a website that is free to allow anyone to start learning English.</p> <p>Autoria:</p> <p>Llicència:</p> <p>URL: https://www.easypacelearning.com/all-lessons/all-sorts/about-us</p>
Imatge	Dades
	<p>Nom: Using an electronic balance. Biotechnology explorer. Bio-Rad</p> <p>Autoria:</p> <p>Llicència:</p> <p>URL: https://www.youtube.com/watch?v=0UyymTJATLc</p>
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	<p>Nom: Compounding tips: geometric dilution</p> <p>Autoria:</p> <p>Llicència:</p> <p>URL: https://www.youtube.com/watch?v=k-3DoyKy0zE</p>
Imatge	Dades
	<p>Nom: Verbs in English</p> <p>Autoria:</p> <p>Llicència:</p> <p>URL: https://learnenglish.britishcouncil.org/es/english-grammar/verbs</p>
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	<p>Nom: Simple present - Present Progressive - Simple past - Present perfect - Simple future</p> <p>Autoria: TeacherPhil.com</p> <p>Llicència:</p>

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	<p>Nom: Jessica Lu, Bachelor of Arts (Cell Biology), Columbia University</p> <p>Autoria: Audio and grammar correction</p> <p>Llicència:</p> <p>URL: https://www.linkedin.com/in/jessica-lu-89b15348</p>