

TEMPLATE for BEST PRACTICE EXAMPLES



1. Name of the project:

DNA from a Banana

2. Subjects covered from STEAM areas:

Science, Technology, Engineering, Math

3. Target group (age range and size of the group):

12-16, unlimited

4. Duration of the activity:

1 hour

5. Key words:

DNA, mashing, filtration, precipitation, and extraction.

6. Key sentence describing context of the activity, followed by short description (200 words):

Extracting DNA from a banana may sound like a difficult task, but it is not very difficult at all. The process involves a few general steps, including mashing, filtration, precipitation, and extraction.

Mashing the banana exposes a greater surface area from which to extract the DNA. The liquid soap is added to help break down cell membranes to release the DNA. The filtration step (pouring the mixture through the strainer) allows for the collection of the DNA and other cellular substances. The precipitation step (pouring the cold alcohol down the side of the glass) allows the DNA to separate from other cellular substances. Finally, the DNA is removed from the solution by extraction with the toothpicks.

7. Description of the activity environment, including the list of materials and tools needed:

- Banana
- Salt
- Warm water
- Liquid soap
- Blender
- Toothpicks
- Strainer
- Glass jar
- Rubbing alcohol
- Knife

8. Step by step, detailed description of the activity, including teaching and learning strategies:

TEMPLATE for BEST PRACTICE EXAMPLES



1. Using your knife, cut your banana into tiny pieces to expose more of the cells.
2. Place your banana pieces in the blender, add a teaspoon of salt and slightly cover the mixture with warm water. The salt will help the DNA stay together during the mashing process.
3. Mix in the blender for 5 to 10 seconds making sure the mixture is not too runny.
4. Pour the mixture into the glass jar through the strainer. You want the jar to be about half full.
5. Add about 2 teaspoons of liquid soap and gently stir the mixture. You should try not to create bubbles when stirring. The soap helps to break down cell membranes to release the DNA.
6. Carefully pour very cold rubbing alcohol down the side of the glass stopping near the top.
7. Wait for 5 minutes to allow the DNA to separate from the solution.
8. Use the toothpicks to extract the DNA that floats to the surface. It will be long and stringy.

9. Learning objectives/competencies:

what is DNA, extracting DNA

10. Evaluation/Assessment guidelines:

comparing the hypothesis to the final outcome

11. Lessons learned:

When pouring the alcohol, make sure that two separate layers are being formed (The bottom layer being the banana mixture and the top layer being the alcohol).

When extracting the DNA, twist the toothpick slowly. Be sure to only remove the DNA from the top layer.

Try repeating this experiment again using other foods such as an onion or chicken liver.

12. Additional information/Links:

-

13. Contact person:

villeteam@utu.fi