FLINN SCIENTIFIC

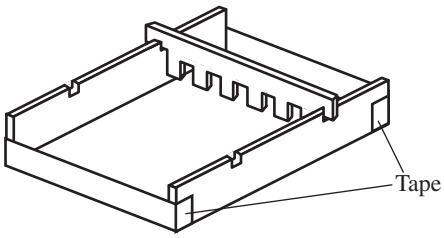
Preparation of 0.8% Agarose Gel

Materials Needed, Casting Agarose Gel

Agarose, 3 g
Balance, 0.01-g readability
Casting trays with well combs
Cotton, non-absorbent or foam plug
Erlenmeyer flasks, borosilicate, 250 mL, 6
Marker or wax pencil
Microwave, hot water bath or stirring hot plate
Stirring rod
TAE electrophoresis buffer, 360 mL
Weighing dishes, small or weighing paper

Preparation of one 0.8% agarose gel (equivalent to 1 minigel)

1. Stir 0.48 g of agarose into 60 mL of the electrophoresis buffer in a borosilicate Erlenmeyer flask. Stopper with a non-absorbent cotton, or foam plug.
2. Mark the height of the solution on the Erlenmeyer flask.
3. Dissolve agarose by heating in a microwave, hot water bath, or on a hot plate. *Caution:* Be careful not to superheat the solution because it will NOT boil until you disturb or disrupt it, whereupon it may spontaneously boil out.
   a. Microwave — 30–40 seconds, stir, repeat.
   b. Hot water bath — do not boil the water
   c. Hot plate — do not boil or scorch the agarose solution
4. Heat until the solution is clear and agarose appears to be fully dissolved.
5. Stir frequently and do not allow solution to boil for more than a few seconds.
6. Use heat protective gloves to remove the bottle.
7. Check the level of the solution. Add distilled water, if needed.
8. To prevent damage to the casting trays, allow the agarose to cool to 55 °C before pouring.



Prepare the casting trays while waiting for the agarose to cool.

1. Attach the rubber dams to the ends of the casting tray or use tape to create the end walls.
2. Place the well-forming comb in the groove toward the end of the gel box.
3. Ensure the casting tray is on a level surface.
4. Slowly pour the melted agarose into the assembled casting tray being careful not to create bubbles in the gel. Use a stirring rod or pipet tip to push any bubbles to the edge of the casting tray. Only add enough agarose to equal the height of the indentations in the well-forming comb—do not fill the tray to the top.
5. Thoroughly rinse out the Erlenmeyer flask immediately.
6. Allow the gel to sit undisturbed for at least 20 minutes until the gel is firm to the touch. The set gel will appear opaque and somewhat white. 60 minutes is optimal.
7. Once the gel is thoroughly set, carefully remove the well-forming comb by rocking it gently from side to side and then pulling it upward. Remove the end dams and carefully slip the gel out of the form.
8. Slide each gel into a separate resealable bag, add 5 mL of buffer, and refrigerate. *Note:* A solidified gel can be stored under buffer in a laboratory refrigerator for up to two weeks.

Safety Precautions

Wear chemical splash goggles and heat protective gloves when handling hot liquids. Be careful not to superheat the solution because it will NOT boil until stirred whereupon it will boil over. Wash hands thoroughly with soap and water before leaving the laboratory. Please consult current Material Safety Data Sheets for additional safety, handling and disposal information.

An art heist has occurred and you are interning with the forensic investigation team that is responsible for the analysis of the DNA evidence from the crime scene. The lead investigator has submitted the following police report.

Police Report

Incident Number:	105895	**Call Time:**	2:32 am
Officer Name:	Rose Franklin	**Arrival Time:**	2:36 am
Location:	1838 Museum Avenue	**Type of Call:**	burglary alarm sounding

Situation: At 2:32 am, police responded to an alarm sounding at 1838 Museum Avenue, the Metropolitan Art Museum. Upon arrival, the police were met at the door by Frank Redi, the museum's night-watchman. Mr. Redi informed officers that alarm 36 sounded. This alarm is connected to an exterior emergency egress door located in the rear of the museum. Additional police officers were dispatched to the area surrounding the museum to search the area for offender(s) and the stolen painting.

Police were taken to the exterior door. Approximately twelve feet away there is a storage area with a damaged lock and a dented door jam. This storage area is where a traveling show of paintings and sculptures were being housed until shipment to another museum the following morning. The storage area is an eight foot by eight foot windowless room with a metal locking door. The metal door has an emergency egress alarm that was triggered when the offender(s) exited the building with the painting. Access to this area of the building was restricted to the museum curator and the security team.

Mr. Redi, the night-watchman, stated that he was walking his normal rounds at the time of the alarm. At 2:30 his rounds take him to the opposite side of the museum on the third floor. This is the farthest point from the storage area in the museum. When the alarm sounded he ran through the museum in search of the correct alarmed door. The red light was on over door 36. The door was closed. Mr. Redi stated that he pushed the door open but that he did not see anyone or any vehicles in the area. He then ran around the building and did not see anyone until the police arrived at which time he escorted the police to the alarmed door. Mr. Redi was wearing a black uniform. His rounds had taken him past the locked storage area at 1:50 am. At that time the door was checked and found to be locked. Mr. Redi stated that he does not unlock any door secured by Walter Sutton, the lead security officer, unless there is a problem. A problem would include an unknown sound or noticeable change from the last round made past the door.

The crime scene area was given restricted access and the remainder of the building was secured by police.

The museum curator arrived at 2:50 am after being notified by the alarm company of the situation at the museum. The curator's name is Zack Jansen. Mr. Jansen arrived at the scene in a dark blue workout suit and athletic shoes. Mr. Jansen stated that he was awakened at 2:35 am by a telephone call from the ABC alarm company. He had been sleeping at the time of the call. He stated that he quickly changed clothes and drove to the museum from his apartment located five blocks away in the former warehouse district. Mr. Jansen confirmed that one piece was missing from the storage area. It was a 30 × 30 inch carton containing an 18 × 22 inch landscape painting by the famous impressionist artist, Jean Dupont. The piece was not currently on display but was ready to be shipped to another museum for a traveling exposition of famous impressionistic art.

The forensic team arrived at 3:22 am. The team collected several samples from the area. Samples included several hairs found snagged under the nail head of a crate located adjacent to the missing painting, as well as dust and debris samples from the storage area. Fingerprints were found at the crime scene on the exterior door, on the damaged interior door, around the storage room light switch, and on the various crates and cartons in the storage room. A small piece of dark fabric with wet blood was found on a jagged edge of the door jamb.

The lead security officer, Walter Sutton arrived on the scene at 3:40 am after having been notified of the situation by Mr. Jansen. Mr. Sutton is the only other person to have access to the storage area. Mr. Sutton arrived wearing his black security uniform. He stated that he had been asleep at the time of the telephone call from Mr. Jansen but he decided to dress in his work uniform since he would probably stay for his work shift at 9 am. Mr. Sutton indicated that he had checked the lock on the storage area at 6 pm, just prior to leaving the museum for the night. The carton was present at that time. Mr. Sutton indicated that the security teams work 8-hour shifts with one hour for lunch except the night-watchmen who works a 12-hour shift from 9 pm until 9 am. These are the hours that the museum is closed. There are two night-watchmen who alternate weeks of four days on and three days off followed by three days on and four days off.

Mr. Redi, Mr. Jansen and Mr. Sutton have volunteered to give fingerprint and DNA samples for analysis. The fingerprint and DNA samples were collected by the lead forensic scientist. The samples from Frank Redi were labeled sample 1. The samples from Walter Sutton were labeled sample 2. The samples from Zack Jensen were labeled sample 3. The crime scene samples were labeled sample 4.

Forensic Sample Results

Microscopic analyses of the dust and debris samples indicate the presence of the typical dust components; quartz particles, black soil particles, and cardboard, paper, wood and spider web fibers. Additional fibers include cotton dyed in the following colors dark blue, tan, white and black.

The fingerprints found at the crime scene are those of Frank Redi, Zack Jansen and Walter Sutton. No unknown fingerprints were found.

DNA analysis of the blood-stained dark fabric is pending.