Let $(Y_n)_{n\geq 1}$ iid uniform on $\{1,\dots,6\}$ (result of n-th throw). Furthermore define recursively

$$X'_{n+1} = X'_n \cup \{Y_{n+1}\}$$
$$X_0 = \emptyset$$

That is, X'_n denotes the set of observed numbers at time n. In particular, we have $X_n = |X'_n|$. For $i_0,\dots,i_{n+1} \in \{0,\dots,6\}$ with $\mathbb{P}(X_n = i_n,\dots,X_0 = i_0) > 0$ we obtain

$$\begin{aligned}
&\mathbb{P}(X_{n+1} = i_{n+1} | X_n = i_n,\dots,X_0 = i_0)\\
&= \frac{P(X_{n+1} = i_{n+1}, X_n = i_n,\dots,X_0 = i_0)}{\mathbb{P}(X_n = i_n,\dots,X_0 = i_0)}\\
&= \sum_{\substack{A\subset\{1,\dots,6\}\\|A|=i_n}} \sum_{b\in\{1,\dots,6\}} \frac{\mathbb{P}(X'_n = A, Y_{n+1} = b, |A\cup\{b\}| = i_{n+1}, X_{n-1} = i_{n-1},\dots,X_0 = i_0)}{\mathbb{P}(X_n = i_n,\dots,X_0 = i_0)}\\
&= \sum_{\substack{A\subset\{1,\dots,6\}\\|A|=i_n}} \sum_{b\in\{1,\dots,6\}} \frac{\mathbb{P}(Y_{n+1} = b, |A\cup\{b\}| = i_{n+1})\mathbb{P}(X'_n = A, X_{n-1} = i_{n-1},\dots,X_0 = i_0)}{\mathbb{P}(X_n = i_n,\dots,X_0 = i_0)}\\
&= \sum_{\substack{A\subset\{1,\dots,6\}\\|A|=i_n}} \frac{\left(1_{i_{n+1}=i_n}\frac{|A|}{6} + 1_{i_{n+1}=i_n+1}\frac{6-|A|}{6}\right)\mathbb{P}(X'_n = A, X_{n-1} = i_{n-1},\dots,X_0 = i_0)}{\mathbb{P}(X_n = i_n,\dots,X_0 = i_0)}\\
&= \left(1_{i_{n+1}=i_n}\frac{i_n}{6} + 1_{i_{n+1}=i_n+1}\frac{6-i_n}{6}\right)
\end{aligned}$$

Thus $(X_n)_{n\geq 0}$ is a MC with transition matrix $\{p_{ij}\}_{i,j\in\{0,\dots,6\}} = \{\left(1_{j=i}\frac{i}{6} + 1_{j=i+1}\frac{6-i}{6}\right)\}_{i,j\in\{0,\dots,6\}}$